

**BOARD OF WATER SUPPLY**

CITY AND COUNTY OF HONOLULU

630 SOUTH BERETANIA STREET

HONOLULU, HAWAII 96843



April 11, 1994

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KENNETH E. SPRAGUE  
KAZU HAYASHIDA  
Manager and Chief Engineer

Mr. Brian J. J. Choy, Director  
Office of Environmental Quality Control  
State of Hawaii  
220 South King Street, 4th Floor  
Honolulu, Hawaii 96813

Dear Mr. Choy:

Subject: Negative Declaration Determination for the Proposed Kupaua Exploratory Well Project, Kupaua, Oahu, Hawaii TMK: 3-7-04: 01

RECEIVED  
94 APR 21 AM 8:30  
OFFICE OF ENVIRONMENTAL  
QUALITY CONTROL

The Honolulu Board of Water Supply has reviewed the comments received during the 30-day public comment period which began on August 23, 1993. We have determined that the environmental impacts of this project are being adequately addressed as discussed in the Final Environmental Assessment (EA) and are issuing a negative declaration. Please publish notice of this action in the next Office of Environmental Quality Control (OEQC) Bulletin.

The completed OEQC Bulletin Publication Form and four (4) copies of the Final EA are enclosed. If you have any questions, please call Barry Usagawa at 527-5235.

Very truly yours,

KAZU HAYASHIDA  
Manager and Chief Engineer

Enclosures

1994-05-08-0A-~~FEA~~-~~Kup~~ <sup>MAY</sup> Kupaua Exploratory 8 1994  
Well & Access Road

**ENVIRONMENTAL ASSESSMENT  
FOR AN EXPLORATORY WELL AND ACCESS ROAD  
AT KUPAUA, OAHU, HAWAII**

**Proposing Agency**

**BOARD OF WATER SUPPLY**  
City and County of Honolulu  
630 South Beretania Street  
Honolulu, Hawaii 96843

**Contact**

Barry Usagawa, 527-5235

**Prepared by:**

**MAGUIRE GROUP INC.**  
1600 Kapiolani Boulevard, Suite 601  
Honolulu, Hawaii 96814

February 1994

OFFICE OF  
QUALITY CONTROL

94 APR 21 AM 8:37

RECEIVED

**ENVIRONMENTAL ASSESSMENT**  
**FOR AN EXPLORATORY WELL AND ACCESS ROAD**  
**AT KUPAUA, OAHU, HAWAII**

**Proposing Agency**

**BOARD OF WATER SUPPLY**  
City and County of Honolulu  
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February 1994

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**CHAPTER 1**  
**INTRODUCTION AND SUMMARY**

**1.1 APPLICANT / PROPOSING AGENCY / APPROVING AGENCY**

Board of Water Supply, City and County of Honolulu

**1.2 AGENCIES CONSULTED IN MAKING THE ASSESSMENT**

Office of Environmental Quality Control

U. S. Army Corps of Engineers

**1.3 PROJECT OBJECTIVES AND BACKGROUND**

In the fiscal year ending June 30, 1991, the Honolulu Board of Water Supply (BWS) system served a population of over 830,000. Average daily water demand on the island during this period was 156 million gallons (mg). According to BWS projections, average daily water demand in the year 2010 will be 191 mg, an increase of 23 percent.

To meet growing demands for water, BWS has initiated a comprehensive groundwater development program. As part of this program, BWS proposes to drill an exploratory well within the watershed of the Kupaua stream to determine the yield and quality of water supplies which may be withdrawn from this location.

**1.4 PROJECT AND SITE DESCRIPTION**

The proposed exploratory well will be located in the Kupaua Valley mauka of Niu Valley. It will be located above the present development limits, on land owned by the Tiana Partners/Hawaiian Humane Society. The site is located on the western slope of the valley, about 2,500 feet from the end of Halaki Street, between Kupaua stream and Kulepiamo Ridge.

Access to the well site for test well purposes is available via an existing jeep trail leading into Kupaua valley from Puamamane Street along the eastern side of Kupaua<sup>1</sup> stream. The project site can be reached by crossing the stream bed from the trail, constructing an access road on the west side of the stream and a clearing for a work area for test drilling. The project will involve drilling a hole about 14 inches in diameter to a depth of about 270 feet. Once the drilling is completed, a 10 inch diameter steel casing will be grouted into place in the hole and a pump will be installed. A series of pumping tests will be conducted to determine the potential sustained yield and quality of water from the aquifer. Water from the pumping tests will be routed via conduit laid on the surface and discharged to Kupaua Stream.

Upon completion of the testing, the well driller will remove the pump, cap the well, and clean the area. The total project will require an estimated six to seven months to complete.

An alternative access route to this site was considered in order to eliminate the need to cross Kupaua stream. A new road could be constructed along the western side of Kupaua valley. The stream would be crossed at the existing, City and County of Honolulu, Niu Stream Boulder basin and wier which is located on Kupaua (Niu) stream at the head of Halaki Street. This road would be about 2,500 feet long, quite steep in grade and it was concluded that for the test well, the construction of such a road was not justified. However, should the site be developed into a production well, access by this route should be reevaluated.

#### **1.5 POTENTIAL IMPACTS, MITIGATION MEASURES, AND ALTERNATIVES**

Due to the presence of cultural remains at the site an archaeological inventory survey will be conducted prior to construction of the access road and exploratory well to identify and minimize any possible adverse impacts to historic sites. If the inventory survey warrants it, archaeological monitoring at the site will be conducted during any excavation work. No

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<sup>1</sup> The lower course of this stream (Awai) is known as Niu stream

significant adverse impacts are expected during the drilling and test pumping. Short-term impacts during construction of the well and testing will include localized soil disturbance and increases in noise resulting from site access and the operation of drilling equipment. No permanent impacts are anticipated. Mitigation measures will be carried out to minimize soil erosion and short-term impacts of equipment noise.

Three alternatives to the project have been considered. These are: no action, development of alternative sources, delaying the project, and developing sources at other sites. None of these alternatives would enable to Board of Water Supply to successfully achieve its stated objectives.

#### **1.6 GOVERNMENTAL PERMITS AND APPROVALS**

The following permits and approvals will be required:

Well Drilling Permit - Department of Land and Natural Resources

Water Use Permit - Department of Land and Natural Resources

Stream Channel Alteration Permit - Dept. of Land & Natural Resources

Erosion Control Permit - Dept. of Public Works

Dept. of the Army Permit - Corps of Engineers

Coastal Zone Management Consistency Concurrence - Office of State Planning

Water Quality Certification Concurrence - Dept. of Health

Conservation District Use Application - Dept. of Land & Natural Resources

**CHAPTER 2  
PROJECT DESCRIPTION**

**2.1 PROJECT SITE**

The site for the proposed exploratory well is on the west slope of the Kupaua Valley between the Kupaua stream and Kulepiamoa Ridge. Figure 1 is a regional map indicating the general location of the proposed well. The well site is about 200' west of the stream. Located at an elevation of about 230 feet, the site slopes steeply to the east, toward the stream. It is accessible via a trail from an unimproved road which follows the east bank of the Kupaua stream northward from the northern terminus of Puamamane Street. Figure 2 provides photographs of the site location.

The well site [TMK 3-7-04:01] is owned by the Tiana Partners/Hawaiian Humane Society. The site and the immediate area is designated on the City and County of Honolulu Development Plan Land Use Map as Preservation.

**2.2 PROJECT FEATURES**

The following table describes the features of this exploratory well site.

<u>Item</u>	<u>Kupaua Exploratory Well</u>
Tax Map Key (TMK)	3-7-04:01
Total Parcel Area (Acres)	412.749 acres
Flood Insurance Rate Map (FIRM)	Flood Zone D (Areas of undetermined, but possible, flood hazard)

<u>Item</u>	<u>Kupaua Exploratory Well</u>
State Land Use District	Urban/Conservation (Subzone G)
State Water Management Area	Honolulu
City & County of Honolulu Development Plan	Preservation
City & County of Honolulu Zoning	P-1 Restricted Preservation District
Estimated Yield of Production Well	0.25
Type of Aquifer	Ko'olau Dike System (Perched)
Land Owner	Tiana Partners/Hawaiian Humane Society
Nearest Access	Unimproved Road from Puamamane St.

### 2.3 PROPOSED FACILITIES AND ACTIVITIES

The project will involve a temporary ford across Kupaua stream<sup>2</sup>, access road construction, well installation and test pumping. Access road construction will involve bulldozing a 300 foot long access trail to the well site. Well installation will require clearing and grading of a work area, covering about 900 square feet (30' x 30') for drilling and pumping equipment. Drilling equipment will be brought in to the cleared site and used to drill a hole about 14 inches in diameter and approximately 270 feet deep with 240 feet of grout casing. The depth will be determined by the depth necessary to reach basal water, groundwater that is partially prevented from moving seaward by caprock of sedimentary origin and by relatively impermeable lava flows of the Koolau range.

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<sup>2</sup> A Section 401 Water Quality Certification (WQC) for this activity will not be required if there is no filling or earthwork which effects Kupaua stream.

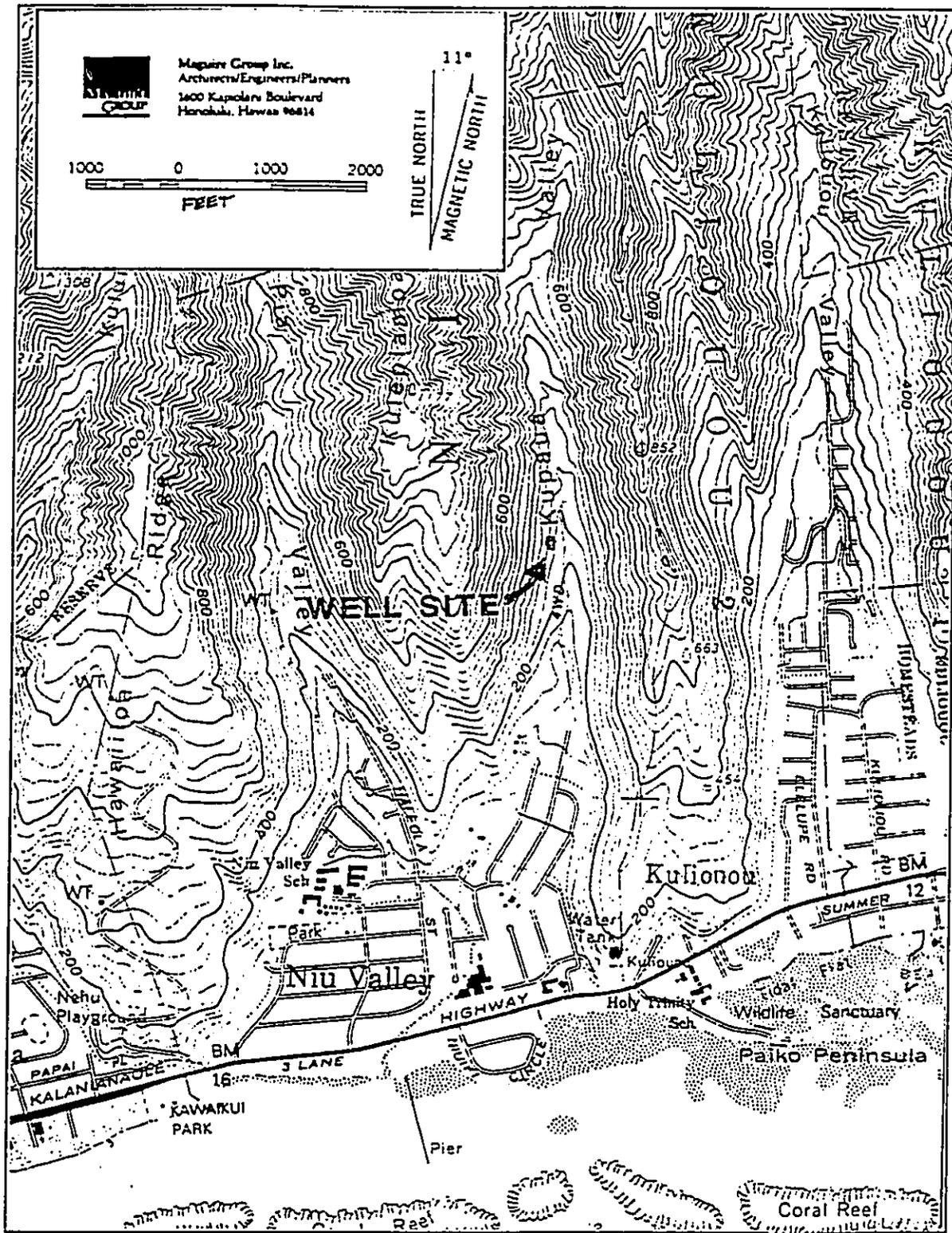


FIGURE 1: Location of Proposed Kupaua Test Well



Photo 1: View Looking east toward Kupaua III Site



Photo 2: Proposed Location of Kupaua III Test Well

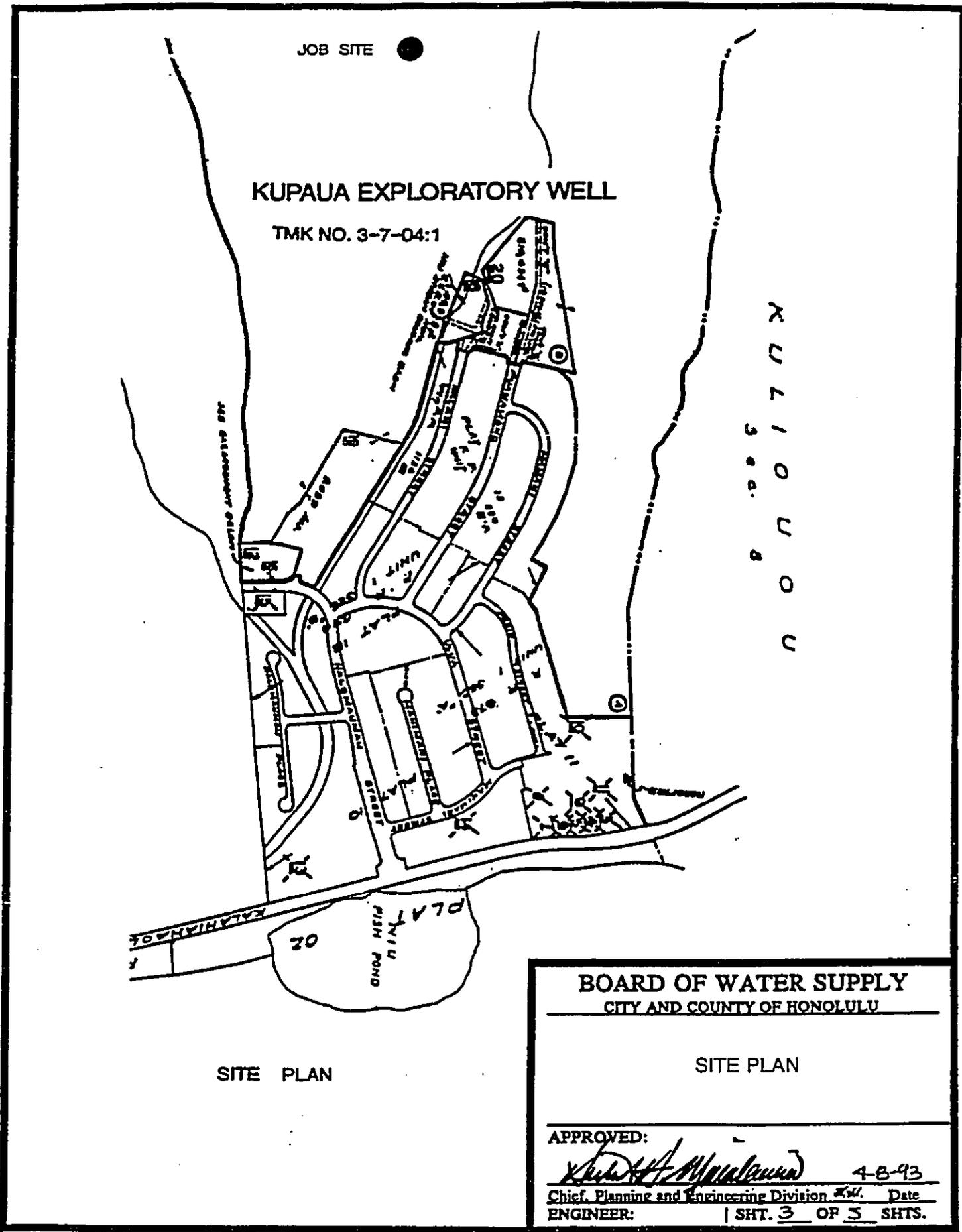
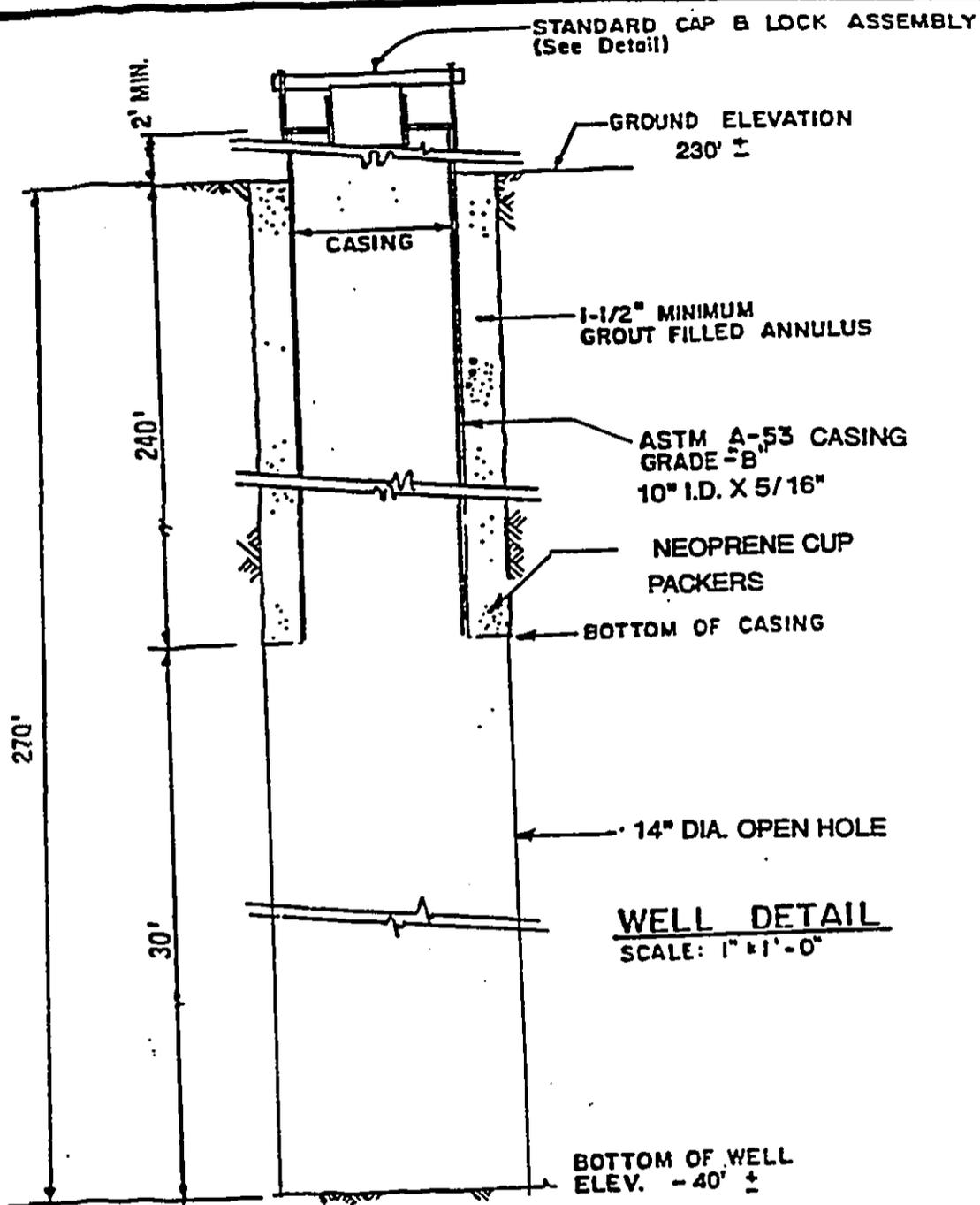


FIGURE NO. 3



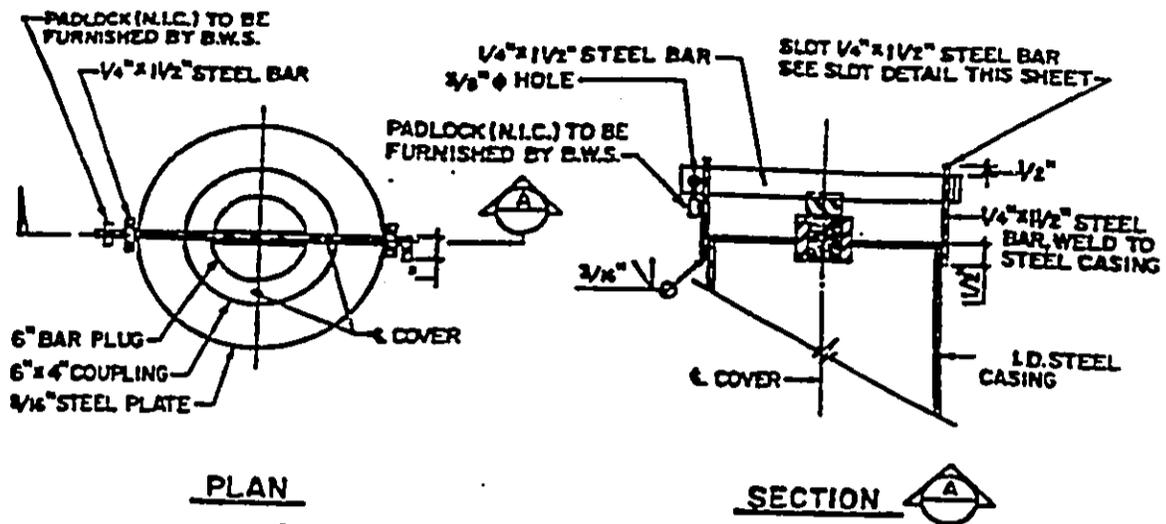
**BOARD OF WATER SUPPLY**  
CITY AND COUNTY OF HONOLULU

WELL DETAIL (1)

APPROVED:

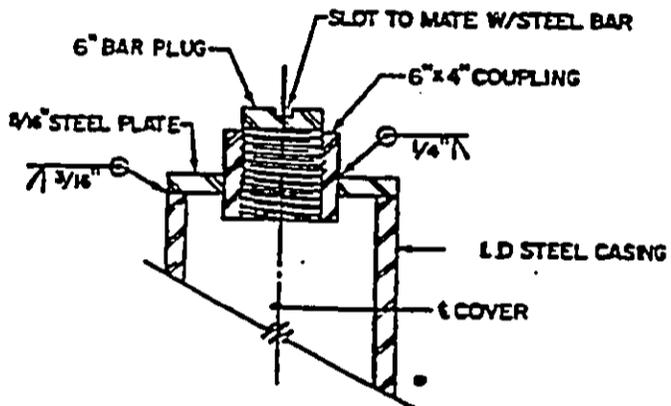
*Richard A. Munn* 4-8-43  
Chief, Planning and Engineering Division  
ENGINEER: | SHT. 4 OF 5 SHTS. Date

FIGURE NO. 4



**BAR CAP LOCK DETAIL**

NOT TO SCALE



**COVER DETAIL**

NOT TO SCALE



**BOARD OF WATER SUPPLY**  
CITY AND COUNTY OF HONOLULU

WELL DETAIL (2)

APPROVED:

*Robert A. Miller (Signature)* 4-8-93  
 Chief, Planning and Engineering Division Date  
 ENGINEER: | SHT. 5 OF 5 SHTS.

FIGURE NO. 5

Clearing and grading operations will be restricted to hours from 7:30 AM to 3:30 PM on weekdays to minimize disturbance. No activities will occur on the project during weekends and holidays.

Once the site has been cleared and secured, a truck or trailer-mounted well drilling rig and other support equipment will be brought to the project site for the exploratory drilling operation. The truck engine or a self-contained engine will be used to provide power for the well drilling rig. A single well hole about 14 inches in diameter will be drilled at the project site to reach the groundwater source.

One of two existing types of drilling methods, either cable tool or rotary, will be used. The cable tool drilling method is performed by repeatedly raising and dropping a heavy drill bit until the desired depth has been reached.

All waste material from the cable tool drilling operation is bailed from the hole and collected in a pit constructed on the project site or discharged on the surface. In either case, the waste material will be disposed of in an approved manner. The waste material generated from this drilling method does not contain any contaminants. Depending on the depth and geologic formations encountered, the well drilling may require up to a maximum of six months to complete.

If the rotary method is used, a drill bit rotating at moderate speed will bore the well while drilling fluid is pumped down the drill stem to the bit at the bottom of the hole. The drilling fluid, bentonite, a fine clay material, is then forced back up the hole carrying drill cuttings to the surface where they are removed from the drilling mud by a screen. The mud is then collected in a mud tank mounted on the side of the drilling rig. The collected mud is recirculated from the mud tank and is not considered a hazardous material. No surface runoff of the drilling mud will be permitted. When the drilling complete, the drilling mud will be taken away from the project site and disposed in an approved manner. Some drilling contractors use air and foam to lift cuttings rather than drilling mud for the entire operation.

Once the water table is reached, instead of drilling fluid, an air compressor will be used to pump air or an air foam mixture down to the drill bit. This will ensure that drilling mud does not enter the aquifer. This rotary drill method of drilling may require three to four weeks to complete.

Upon completion of the drilling operation, a 10 inch diameter steel casing will be grouted into the drilled hole and a pump will be installed.

#### 2.4 PUMP TEST

Two types of test pumping will be conducted after the drilling operation is completed. The initial test, a step-drawdown or yield-drawdown test, involves pumping water from the well at various pumping rates to estimate the specific capacity (number of gallons withdrawn per foot of drawdown) of the well. The drawdown will be measured for each pumping rate. Once the drawdown has stabilized, the pumping rate will be changed and a new drawdown measured. A step-drawdown test may last up to five hours, and will be performed from about 9:00 AM to 2:00 PM on a weekday.

After the step-drawdown test has been completed, a five-day sustained pumping test will be undertaken. The well will be pumped 5 hours the first day, and 8 hours per day for the next four days. This test is designed to determine the sustainable capacity of the well, monitor water quality, and to measure aquifer parameters. (The sustainable capacity of a well is the rate at which the well can be continuously pumped without adversely affecting nearby existing wells or water quality.)

In addition to monitoring the nearby well, Kupaua Stream will be monitored to identify adverse effects from the pumping.

Water pumped during the pump test will be collected and tested for organic compounds as required by the U.S. Environmental Protection Agency (EPA); heavy metals, minerals, hazardous materials, coliform and standard plate count for bacteria. The tests are

performed by the BWS and, in some cases, by the State of Hawaii Department of Health. The water pumped during the five-day test will be disposed into Kupaua Stream.

Upon completion of the five-day pumping test, the well driller will then remove the pump, cap the well, and clean the area, removing all excess materials and wastewater withdrawn during test pumping. The well will be capped after testing to prevent misuse of the well such as for disposal of hazardous wastes, sewage, or household garbage. According to the U.S. Environmental Protection Agency Underground Injection Control Section, unplugged or improperly abandoned water wells can easily become receptacles for the disposal of waste which may contaminate the groundwater aquifer.

If the results show that development of the water source is feasible, the Board of Water Supply expects to convert the exploratory well for production purposes. This will require installation of a permanent pump, control station and pipeline. Production well development will be subject to the environmental review process as stipulated in Chapter 343, Hawaii Revised Statutes, and Chapter 200 of the State Department of Health Regulations.

## **2.5 PROJECT SCHEDULE AND COST**

The project is expected to begin in late 1993. Drilling will begin after installation of the access road and clearing and grading of the well site and access road, estimated to take about three to four weeks. Drilling will be completed in two to three months. Installation of the casing will take about a week and another two to three weeks will be required to install the pump and run the test pumping. Demobilization will also take about two weeks. Total project duration is therefore estimated to be about five to six months time.

The project will cost an estimated \$125,000. Funds for the project are available in the BWS budget for the fiscal year ending June 30, 1993.

## 2.6 NEED FOR THE PROJECT

The Board of Water Supply currently serves a population of more than 830,000 persons (Board of Water Supply 1982). Island-wide average daily water demand was about 156 million gallons per day (mgd). The Honolulu District, extending from Aliamanu to Hawaii Kai, is the most heavily populated of the water districts on Oahu and has the highest domestic water demand on the island. Water demand in the district is presently about 86 mgd. Over half of this amount was produced from sources within the district, while the remainder had to be imported from the Pearl Harbor District and the Windward District. Pumpage from the Pearl Harbor aquifer cannot be further increased without risking serious encroachment of sea water into the basal water lens. The Department of Land and Natural Resources, Commission on Water Resource Management, currently limits the Honolulu District's total allowed draft imported from the Pearl Harbor aquifer to 38.14 mgd.

Demand for water in the Honolulu District is projected to continue to increase to 92 mgd by the year 2010. During this period, island wide water demand is projected to rise by nearly 23 percent. To meet growing demand, the Board of Water Supply is seeking to identify, test, and develop new groundwater sources. Some of these new sources will be used to meet demand in the districts within which the sources are developed, some will be transferred to meet the growing demand in Honolulu. If the Kupaua source is determined to be feasible for development, an estimated 0.25 mgd may be added to the BWS system.

The BWS has considered a number of alternatives for production of potable water. Water conservation programs are already in place to try and reduce per capita water demand. Alternatives to expanded use of groundwater sources include desalination, development of surface systems, use of brackish sources with dilution, and recycling of treated wastewater. At present, each of these alternatives is presently considered unacceptable for technical, health, and/or cost reasons.

## CHAPTER 3 EXISTING CONDITIONS

### 3.1 PHYSICAL ENVIRONMENT

#### 3.1.1 Geology

The Kupaua valley is a deep trough cut into the south face of the Ko'olau range. Runoff from rainfall high in the mountains carved the valley, depositing the eroded material along the coast. Alluvium of marine origin also accumulated at the base of the valleys as sea level rose and fell during glacial and inter-glacial periods.

A major feature of the Ko'olau range is an extensive dike system which formed in the rift zone. The dikes were formed when molten rock flowed into fissures in the volcano and then cooled and solidified. Because these flows solidified under pressure, they formed rock which is much denser and much less permeable than the older, surrounding lava flows. Rainfall which is not lost to evapotranspiration or surface runoff infiltrates into the highly porous Ko'olau basalt and is stored as groundwater between the relatively impermeable dikes.

Seaward of the dike zone there is a substantial body of basal groundwater which floats on top of salt water. This basal lens is confined by sedimentary caprock forming the coastal plain. It is recharged primarily by leakage and overflow of dike-impounded groundwater from higher elevations and by infiltration of rainfall and stream flow.

#### 3.1.2 Hydrology

The proposed well site is located in the watershed of the Kupaua Stream. The Kupaua stream is an intermittent stream which originates high in the Ko'olau range in the Honolulu Watershed Forest Reserve. It flows generally southward through the Niu Valley and into Maunalua Bay. It is fed principally by runoff but dike leakage and dike overflow may also occasionally contribute to its flow. The well site is located about 200 feet west of the stream

and is expected to tap into the Koolau basal water. Flows in the Kupaua stream are not gaged because the stream is intermittent and the streambed is therefore normally dry.

### 3.1.3 Topography

The proposed well site is located at an elevation of about 230' above sea level. It is located on the west slope of the Kupaua valley and slopes steeply eastward down toward the Kupaua stream.

### 3.1.4 Climate

Average monthly temperature in the vicinity of the proposed well site is approximately 75°. It ranges from 72° in January to 78.5° in August (State of Hawaii Data Book, 1987). Rainfall in the area originates when tradewinds are intercepted and forced upward by the peaks of the Ko'olau range, dropping their moisture as they rise and cool. The proposed well site is in an area which receives a mean annual rainfall of about 50" (Atlas of Hawaii, 1973).

### 3.1.5 Soil

Soils in the vicinity of the proposed well site are classified by the U.S. Department of Agriculture Soil Conservation Service (SCS) as belonging to the Rock land-Stony steep land association (SCS 1972). These are steep to precipitous, well-drained to excessively drained stony soils. More specifically, the soils at the proposed site are classified as Lualualei extremely stony clay.

The Lualualei soils developed in colluvium and alluvium. The SCS describes a representative profile as follows:

"...the surface layer, about 10 inches thick, is very dark grayish-brown, very sticky and very plastic clay that has a prismatic structure. The next layer, 37 to more than 42 inches thick, is very dark grayish-brown, very sticky and very plastic clay that has prismatic structure. In addition, it has gypsum crystals.

The soil is underlain by coral, gravel, sand or clay at depths below 40 inches. It is neutral in the surface layer and medium acid to moderately alkaline in the underlying layers.....there are many stones on the surface and in the profile."

Erosion hazard for the Lualualei series soils varies from slight to severe depending upon the slope. Given the steepness of the land at the proposed site, the erosion potential at the site is moderate to severe. The soil capability classification also varies depending upon slope, with a rating of VIIs applicable to the proposed well site. Class VII soils have severe limitations that make them unsuitable to cultivation. Subclass VIIs soils have very severe limitations because of unfavorable texture, because they are extremely rocky or stony, and because of steep slopes.

The proposed well site is on land which is not presently in agricultural use and which is not suited to agricultural use. The U.S. Department of Agriculture Soil Conservation Service and the Hawaii Department of Agriculture do not consider Lualualei soils to be important agriculturally (Dept. of Agriculture, 1977).

### 3.1.6 Natural Hazards

According to the National Flood Insurance Program Flood Insurance Rate Map, the proposed well site is in zone D, an area in which flood hazards are undetermined (FEMA, 1987). This generally indicates that the risk of flooding within the area is not significant enough to warrant detailed study by FEMA. Given the site elevation and relationship to the stream, the risk of flooding of the site can be considered negligible.

Earthquake risk in the vicinity is also minimal. The island of Oahu is classified as a Seismic Zone 1 area, in which damage would be minor in the event of an earthquake (Uniform Building Code, 1988).

### 3.1.7 Flora and Fauna

A biological assessment of the project area was performed in October of 1992 by the B.P. Bishop Museum biological staff, Appendix 2. Niu Valley is one of the most famous collecting localities on Oahu. Many of the early Hawaiian botanists visited this valley so there is a good record of the vegetation present in the 1800's. The Hawaii Heritage Program data base has records from Niu Valley for 14 rare plants. However, the current vegetation has only a few native plants, with the site dominated by alien weeds such as; *Leucaena leucephala*, *Schinus terebinthifolius*, *Asystasia gangetica*, and *Panicum maximum*. Four native species were observed; *Dodonaea viscosa* (a few scattered plants), *Sida fallax* (a small area with 20 to 30 plants), *Lipochaeta lobata ssp. lobata* (25 to 50 plants at the base of the cliffs), and *Erythrina sandwicensis* (several plants along the existing road on the east side of the creek). None of these species is considered rare or endangered and only the *Erythrina sandwicensis* should have special consideration (destruction of individual trees should be avoided). It does not appear that well construction would negatively impacted on either rare plants or native plant communities.

TABLE 1

PLANT SPECIES IDENTIFIED ON THE KUPAUA SITE

<u>Scientific Name</u>	<u>Common Name</u>
<i>Bonamia menziesii</i>	_____
<i>Cyanea grimesiana ssp. grimesiana</i>	Haha
<i>Eurya sandwicensis</i>	Anini
<i>Ctenitis squamigera</i>	Panoa
<i>Tetraplasandra gymnocarpa</i>	Oheohe
<i>Delissea subcordata</i>	Haha
<i>Exocarpos guadichaudii</i>	Heau
<i>Chamaesyce celastroides var. kaenana</i>	Akoko

TABLE 1  
(continued)

PLANT SPECIES IDENTIFIED ON THE KUPAUA SITE

<u>Scientific Name</u>	<u>Common Name</u>
<i>Joinvillea ascendens ssp. ascendens</i>	Ohe
<i>Lobelia monostachya</i>	Haha
<i>Phyllostegia parviflora var. parviflora</i>	_____
<i>Rollandia lanceolata ssp. calycina</i>	Haha
<i>Melicope saint-johnii</i>	Alani
<i>Schiedea nuttallii</i>	_____
<i>Leucaena leucephala</i>	Koa Laole
<i>Schinus terebinthifolius</i>	Christmas berry
<i>Asystasia gangetica</i>	Chinese Violet
<i>Panicum maximum</i>	Guinea grass
<i>Dodonaea viscosa</i>	Aalii
<i>Sida fallax</i>	Ilima
<i>Lipochaeta lobata ssp. lobata</i>	Nehe
<i>Erythrina sandwicensis</i>	Wiliwili

The dominant vegetation on the site includes those species listed in Table 1. Table 1 provides the scientific names of the plants found on the site, following the taxonomy and nomenclature of St. John (1973) and Wagner, Herbst and Sohmer (1990). The scientific name is followed by the Hawaiian name and/or the most widely used common name for the subject species. An asterisk before the plant name indicates that the plant was introduced to the Hawaiian Islands either by the aborigines or since Cook's arrival in the islands.

As can be seen from Table 1, the vegetation on the site consists of guava, Christmas berry, californiagrass, hilograss and ricegrass. None of these species are listed or proposed for listing on the federal list of threatened or endangered species (USFWS, 1990) and none are considered threatened, endangered or rare species at the state level (State of Hawaii, 1990).

### **3.1.8 Archaeological Resources**

An archaeological inspection of the proposed well site was conducted in October of 1992 by archaeological staff of the B.P. Bishop Museum. The archaeologists report is appended to this Environmental Assessment. A pedestrian survey was made on both the west and east side of Kupaua stream. The work on the western bank of the stream followed a route through the undeveloped woods above the stream to the well site. This route was investigated in order to make a preliminary review of conditions which could be encountered if the proposed site was not feasible by crossing Kupaua stream from the existing jeep trail. Due to the presence of cultural remains near the project site, an archaeological inventory survey will be conducted prior to construction of the access road and exploratory well to identify and minimize any possible adverse impacts to historic sites. Archaeological monitoring on site will be conducted if the survey indicates it is warranted.

### **3.2 Socio-Economic Environment**

Located in the Kupaúa valley above the limits of present development, the proposed well site is not in the immediate vicinity of any particular residential, commercial or industrial development. Residential development in the Niu Valley has been expanding up into the Kupaua and Pia valleys, but has not yet begun to encroach on the proposed well site.

The socio-economic impact of the proposed well is expected to be regional in nature. The population on the island of Oahu has been steadily increasing. The Honolulu district is one of the locations within which continued growth has been forecasted to occur. City, County and State population projections indicate that the Honolulu district population will reach 464,389 by the year 2000, with a predicted daily water usage of 92.40 million gallons (BWS

1982). The proposed Kupaua test well is one of several sources of water proposed for development to meet the needs of expanding population within the District.

**CHAPTER 4**  
**POTENTIAL IMPACTS AND MITIGATION MEASURES**

**4.1 TEMPORARY IMPACTS**

The development of a test well at the Kupaua site will result in short-term impacts on the environment in the immediate vicinity of the project area. No significant adverse impacts are expected during the drilling and pump testing. Short-term impacts during construction of the well and testing will include localized soil disturbance causing fugitive dust and temporary increases in noise resulting from the operation of drilling equipment.

Localized soil disturbance will result from installation of the access road and from clearing and grading of the vicinity of the well head to provide a work area for installation of the well and pumping equipment. It is anticipated that the affected area will be about 15'x 2,500' for the road (37,500 sq.ft.) and about 30'x30' (900 sq.ft.) for the work area. Because of the potential for soil erosion once the vegetation is removed from the Lualualei soils, every effort will be made to minimize the amount of soil disturbance. Silt fence and erosion barriers will be used to minimize erosion during the clearing of the road and the work area. An erosion control plan will be filed with the City Department of Public Works prior to all work. The site will be revegetated with grass species as soon as possible after completion of the installation and testing work.

Noise will be produced by the drilling equipment and by the operation of the pumps. This minor increase in noise levels will not result in any significant adverse impacts because of the distance between the well location and populated areas.

**4.2 IMPACTS ON STREAM FLOW AND STREAM ENVIRONMENT**

The proposed access to the well site requires crossing the Kupaua stream from the road along the east bank of the Kupaua stream from the northern terminus of Puamamane Street. This access would require constructing a temporary ford across Kupaua Stream.

The temporary construction would consist of placing in the stream bed a large diameter culvert and crushed stone material to provide vehicular access across the stream but to permit continuous stream flow. The crossing would be designed, such that large storm events resulting in loss of temporary fills would cause minimal damage downstream. Once the well has been completed all temporary construction would be removed and the area restored to its original condition. While such a ford could have a potential to affect flood flows, it is believed that it can be designed and constructed in such a manner so as to minimize them. It would require review and approval by regulatory agencies including the U.S. Army Corps of Engineers, which has authority to grant the crossing under its National Permit authority. If a Dept. of the Army Permit is required a Coastal Zone Management concurrence and a Water Quality Certification concurrence would also be required.

The well testing will require that water be withdrawn from the aquifer penetrated by the well. This water will be discharged to the Kupaua Stream, resulting in a temporary increase in flow in the streambed. The increase in flow is expected to be within the range of peak flows normally experienced within the stream system and will not result in any flooding or adverse impacts in downstream areas. Water from the test pumping will be routed to the Kupaua Stream via pipeline to prevent soil erosion by dissipating the flow velocity through baffles to minimize excessive turbidity into the stream which might otherwise occur.

Intermittent flows in the Kupaua Stream are fed principally by runoff and occasionally by groundwater spilling over or leaking out of the dike system in the upper elevations of the Ko'olau range. The test pumping may lower the elevation of the groundwater table, reducing the hydraulic head for the testing duration. Since the groundwater elevation at the well site is about 200' below the stream elevation, the intermittent flows in Kupaua Stream will be unaffected because stream flow originates as runoff rather than groundwater leakage. Impacts on flows in the Kupaua Stream are therefore also likely to be negligible.

#### 4.3 IMPACT ON ARCHAEOLOGICAL RESOURCES

As noted in Chapter 3, archaeological review has indicated that there are no archaeological

resources within the immediate vicinity of the site. The project will therefore not result in any adverse impacts to archaeological resources. However, a field reconnaissance found evidence that suggests the area was utilized by native Hawaiians in the distant past. Thus, an archaeological inventory survey will be conducted to verify the existence of any significant archaeological resources. The results of this survey will be used to help determine what mitigative measures are appropriate to reduce or eliminate any adverse effects on the resources. These measures will be coordinated with the State Historic Preservation Division.

## CHAPTER 5 ALTERNATIVES

### 5.1 NO ACTION

The no action alternative would not meet the objectives of the Board of water supply for this project. This project is part of an overall groundwater development program intended to increase the municipal water supply to meet growing demand. If the Board's new water sources program is curtailed it would not be able to provide adequately for the water needs of the population of the island in the future, which may result in cut backs in new development as well as regional water shortages.

### 5.2 ALTERNATIVE SOURCES

The Board of Water Supply has considered a variety of other alternatives to the development of new groundwater sources. Alternatives considered include direct use of streamflow, blending and use of brackish water resources, demineralization of brackish water sources, desalination of sea water and direct reuse of treated wastewater. None of these alternatives at this time offers the potential to economically or cost-effectively produce water supplies of the quality which can be obtained through the proposed program.

### 5.3 DELAYED PROJECT

Delay in the proposed well testing program would increase the risk that population growth will lead to increasing water demands in excess of the available supplies. Delay of the project will not materially alter the environmental impacts of the project and has the potential to increase project costs.

#### 5.4 ALTERNATIVE WELL SITES

In addition to evaluating alternative water sources, the Board of Water Supply has plans to test a number of other potential sites for development of groundwater resources. These alternative sites also offer opportunities as groundwater supply sources, but are to be considered in addition to, rather than as alternatives to, the proposed well testing program. The Kupaua test location has been selected by the Board of Water Supply because it offers the potential to supply a significant quantity of high quality water which may not be obtainable at alternative sites. Developing and testing a well at the Kupaua site is the most reasonable alternative given the relative remoteness of the site and the insignificant impacts associated with its development.

**CHAPTER 6  
DETERMINATION**

In accordance with Chapter 343, Hawaii Revised Statutes, it has been determined that an Environmental Impact Statement is not required for the proposed Kupaua exploratory well and test pumping program. This determination has been made based primarily on the short duration of the project and its minimal impacts on the environment. The project will result in some negative impacts, but these can be minimized or alleviated by the suggested mitigation measures. The identified impacts have been determined to be less significant in comparison to the potential benefits to be provided by the water supplies which may be obtainable from the Kupaua well.

**APPENDIX**

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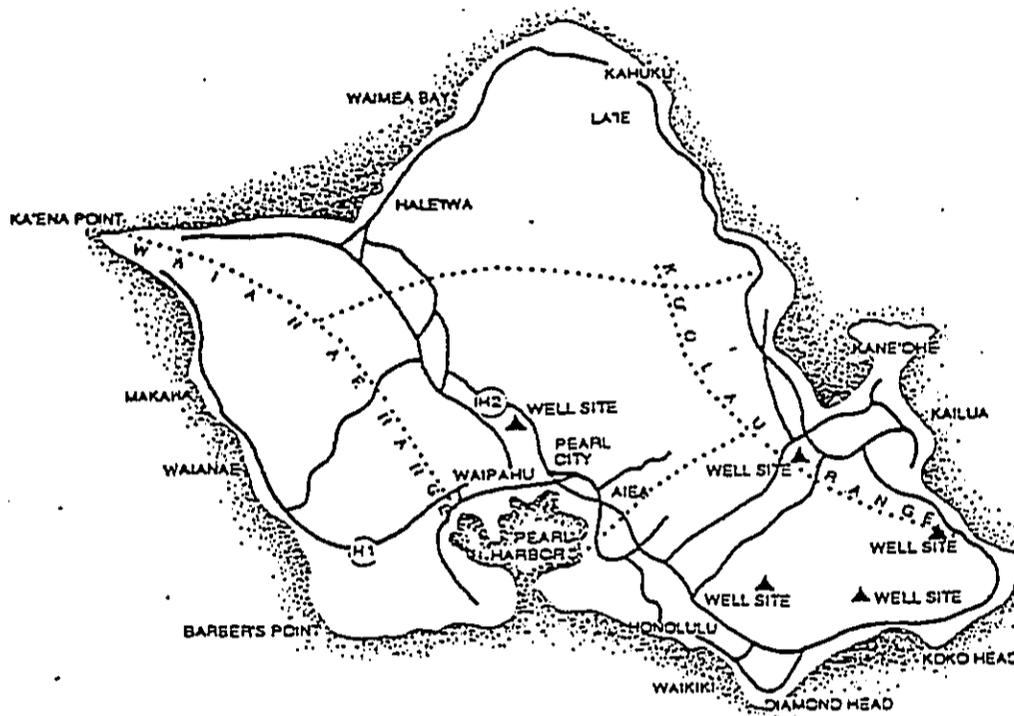
## CHAPTER 7

### REFERENCES

- Board of Water Supply, 1982 - Board of Water Supply, City and County of Honolulu, State of Hawaii, *Oahu Water Plan*, fourth edition, July, 1982
- Department of Agriculture, 1977 - Hawaii Department of Agriculture, *Agricultural Lands of Importance to the State of Hawaii*, Map Series: January, 1977.
- FEMA, 1987 - Federal Emergency Management Agency, National Flood Insurance Program. *Flood Insurance Rate Map, City and County of Honolulu*: September 4, 1987.
- SCS, 1972 - U.S. Department of Agriculture, Soil Conservation Service in cooperation with The University of Hawaii Agricultural Experiment Station, *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii*, August 1972.
- St. John, 1973 - St. John, H. *List of the Flowering Plants of Hawaii*. Pacific Tropical Botanical Gardens. Memoir 1. Lawai, Kauai; 1973
- State of Hawaii, 1987 - Hawaii, State of, Department of Business and Economic Development, *The State of Hawaii Data Book, 1987; A Statistical Abstract*, Hawaii, November 1987.
- State of Hawaii, 1990 - Hawaii, State of, Department of Land and Natural Resources. *Endangered and Threatened Species*., 1990.
- University of Hawaii, 1983 - University of Hawaii, Department of Geography, *Atlas of Hawaii, Second Edition*. Honolulu: University of Hawaii Press, 1983
- Uniform Building Code, 1988 - International Conference of Building Officials, *Uniform Building Code*, Whittier, California; 1988.
- USF&WS, 1990 - U.S. Fish and Wildlife Service., *Endangered and Threatened Wildlife and Plants*., 50 CFR 17.11 & 17.12. U.S. Government Printing Office., Washington, D.C. 1990.
- Wagner et. al., 1990 - Wagner, W.L., Herbst, D.R., and Sohmer, S., *Manual of the Flowering Plants of Hawaii*., Vols. 1 & 2. University of Hawaii Press, 1990.

**ARCHAEOLOGICAL REPORT**

AN ARCHAEOLOGICAL RECONNAISSANCE  
OF FIVE BOARD OF WATER SUPPLY WELLS  
ON O'AHU, HAWAII



Prepared by

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Supervising Archaeologist

Prepared for

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October 27, 1992

Revised  
October 15, 1993

Public Archaeology Section  
Applied Research Group  
Bishop Museum  
Honolulu, Hawai'i

Project #503  
MS #102792

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Honolulu, Hawaii**

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## ABSTRACT

During October 1992, the Applied Research Group of the Bishop Museum conducted an Archaeological Reconnaissance as part of an Environmental Impact Assessment for five (5) exploratory water wells proposed by the Board of Water Supply for the City and County of Honolulu, under contract to the Maguire Group, Inc. Four of these locations-- Waipahu, Kāne'ohe, Waimānalo, and Mānoa failed to yield any cultural remains on the surface. The fifth location, in Kūpaua Valley, contained the remains of a culturally-modified bedrock terrace and one polished stone adze, on the surface, near the proposed well site on the east bank. Survey of the access road along the west bank also encountered possibly-modified bedrock terracing above the stream bed.

## ACKNOWLEDGMENTS

The author would like to thank Mr. Ken Rappolt of the Maguire Group for the cooperation and patience he has shown in dealing with the sometimes alien profession of archaeology. In particular, his willingness to accompany Bishop Museum staff on a preliminary tour of the five water well locations greatly facilitated our work in the field from a logistical standpoint.

Within the Applied Research Group at the Bishop Museum, fieldwork was shared equally by Steve Clark, Maurice Major, and Angela Steiner-Horton, who also assisted with the cataloging of documents, photos, and artifacts. Hemantha Jayatilleke prepared the illustrations for this report, while Lana Pigao, Jinni Mitchell, and Chris Alper produced the final draft report. Peggy Chee and Marie Paresa coordinated our field needs, while Alan Haines was a rock of support in much more than just contracts.

## INTRODUCTION

Under contract to the Maguire Group, Inc., the Applied Research Group of Bishop Museum conducted an archaeological reconnaissance of five exploratory water well locations on the island of O'ahu during October 1992. All were surveyed as part of an Environmental Impact Assessment being submitted by the City and County of Honolulu Board of Water Supply in accordance with the State of Hawaii, Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules. Any subsequent implementation of the exploratory well plans should ensure compliance with State Historic Preservation Division draft guidelines which may require additional research at these properties.

## PROJECT LOCATIONS

The five exploratory water well locations are scattered around the island of O'ahu (Figure 1), situated above the 200 ft above mean sea level (famsl) elevation at the base of the Ko'olau mountain range to access known aquifers, in most cases already providing drinking water for local populations.

### Waimānalo Well III

This well is located at approximately 240 famsl on Waimanalo State Forest Reserve land (TMK 4-1-11) in the *ahupua'a* (traditional land division) of Waimanalo, Koo'lau Poko District (Figure 2). Access to the project area crosses State land currently leased to Meadow Gold Dairies via trails starting at the end of Kulawai Street *mauka* from the beach park in Waimanalo. The well site and access road are on land presently forested with *Eucalyptus* as the dominant genus, although a nearby powerline has encouraged the invasion of a dense weedy understory.

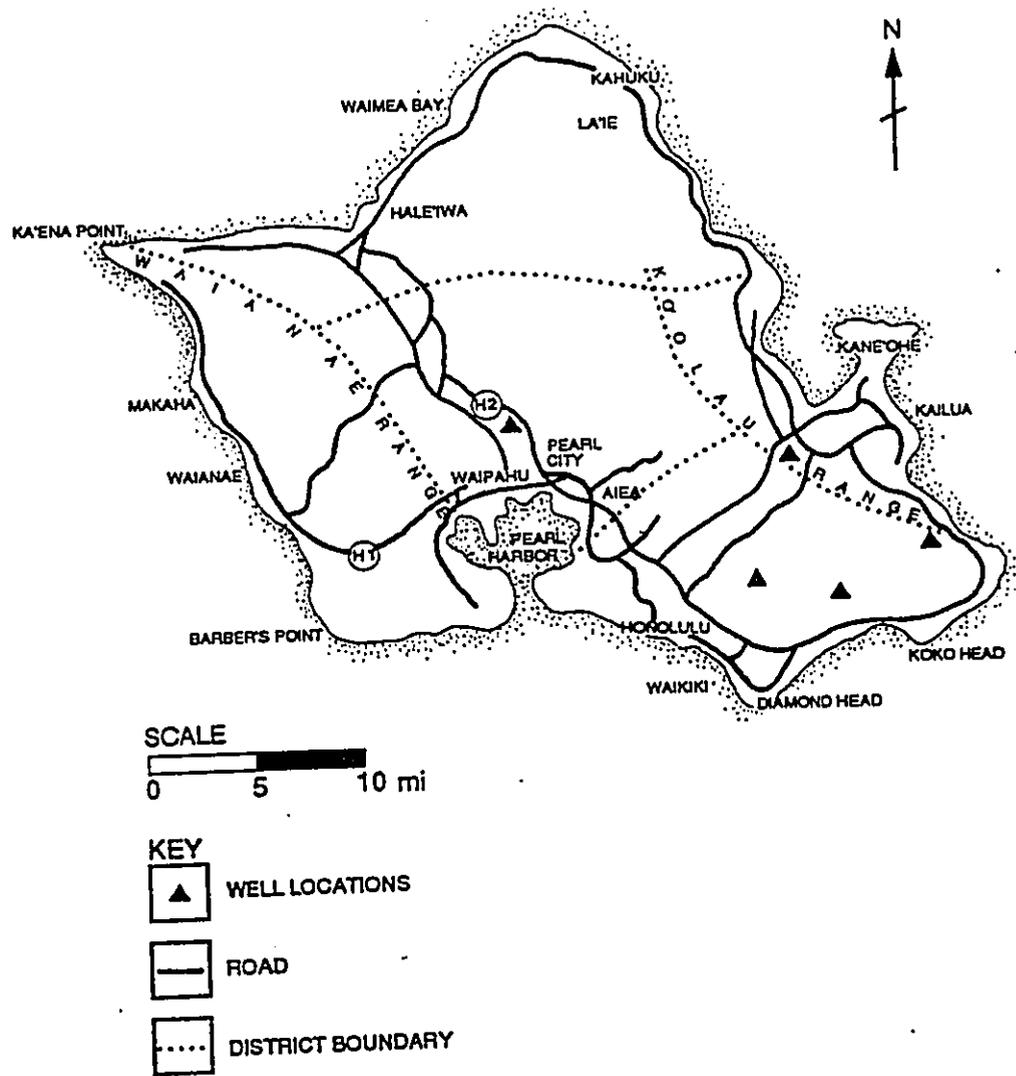


Figure 1. Location of the Five Water Wells on the Island of O'ahu.

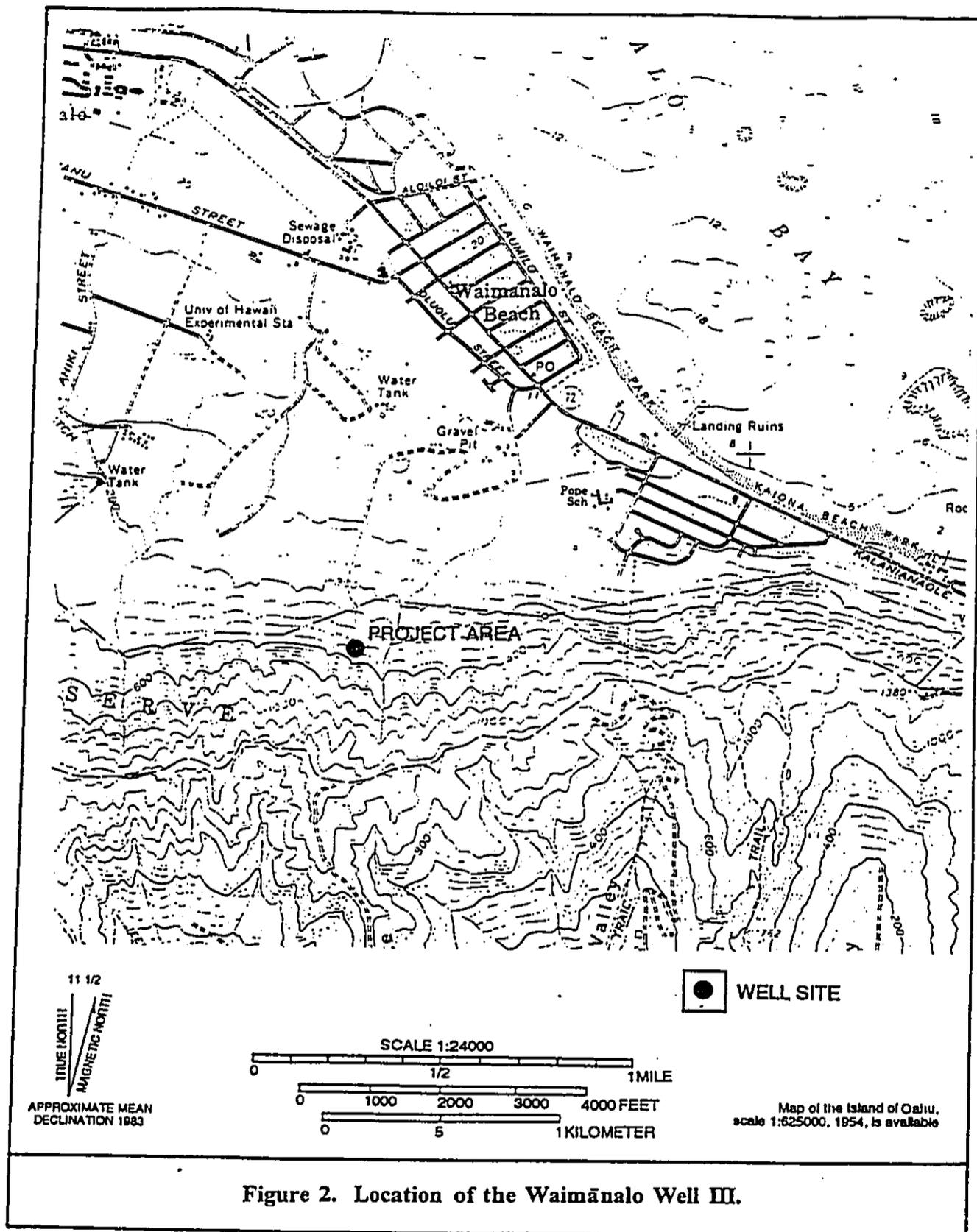


Figure 2. Location of the Waimānalo Well III.

### Waipahu Well III

This well is located at approximately 280 fmsl on Castle and Cooke, Ltd. land (TMK 9-4-5:74) in the *ahupua'a* of Waipio, 'Ewa District (Figure 3). Access to the well site, located in a fallow pineapple field, is provided by Kamehameha Highway, which runs immediately adjacent (east) to the project area.

### Kuou Well III

This well is located at approximately 280 fmsl within Ho'omaluhia Park (TMK 4-5-41) in the *ahupua'a* of Kāne'ohe, Ko'olau Poko District (Figure 4). Access to the well site is provided by a trail from the main park road, which is situated just *makai* of the H-3 Highway right-of-way and fenceline. The area is currently planted with banana trees that appears to have been there for some time.

### Mānoa Well

This well is located at approximately 200 fmsl within Mānoa Valley Park on City and County of Honolulu land (TMK 2-9-36) in the *ahupua'a* of Mānoa, Kona District (Figure 5). Access off Mānoa Road is provided on the lawn between the tennis courts *mauka* of Mānoa School and a small gulley bordering residential housing. The proposed location of the well is currently covered in low grasses.

### Kūpaua Wells

These two alternate wells are located at approximately 300 fmsl on land owned by Hawaiian Trust Co. Ltd. and the Hawaiian Humane Society (TMK 3-7-04:01) in the *ahupua'a* of Niu, Kona District (Figure 6). Access today is by a trail along the east bank of Kūpaua Stream although the route of a proposed access road up the opposite stream bank was surveyed in October. Two exploratory well locations were also surveyed, one on both sides of the stream. The entire project area is wooded with secondary regrowth of *koa haole*, *kiawe*, and various tall grasses although banyan, mango, and *wiliwili* trees were also observed.





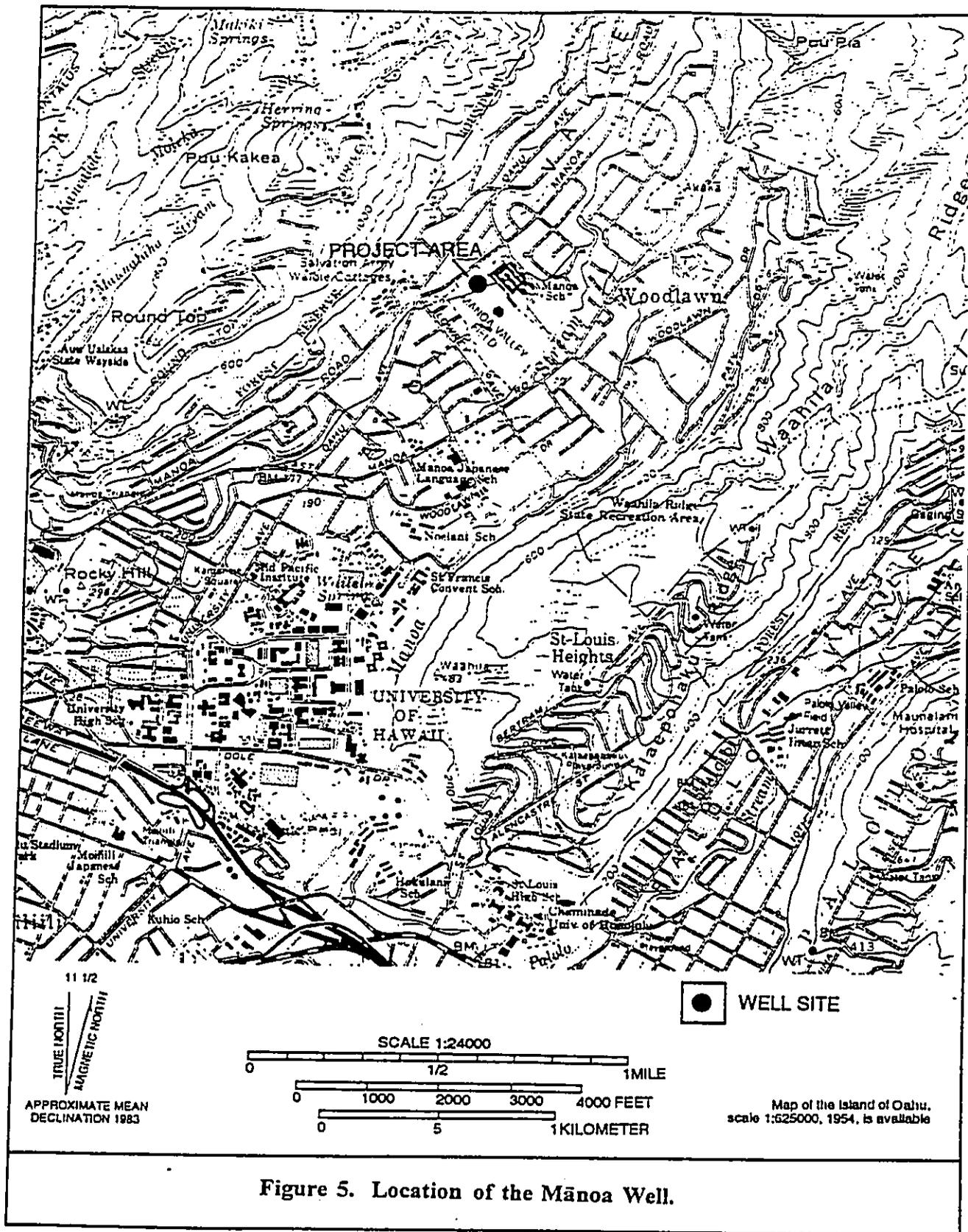


Figure 5. Location of the Mānoa Well.

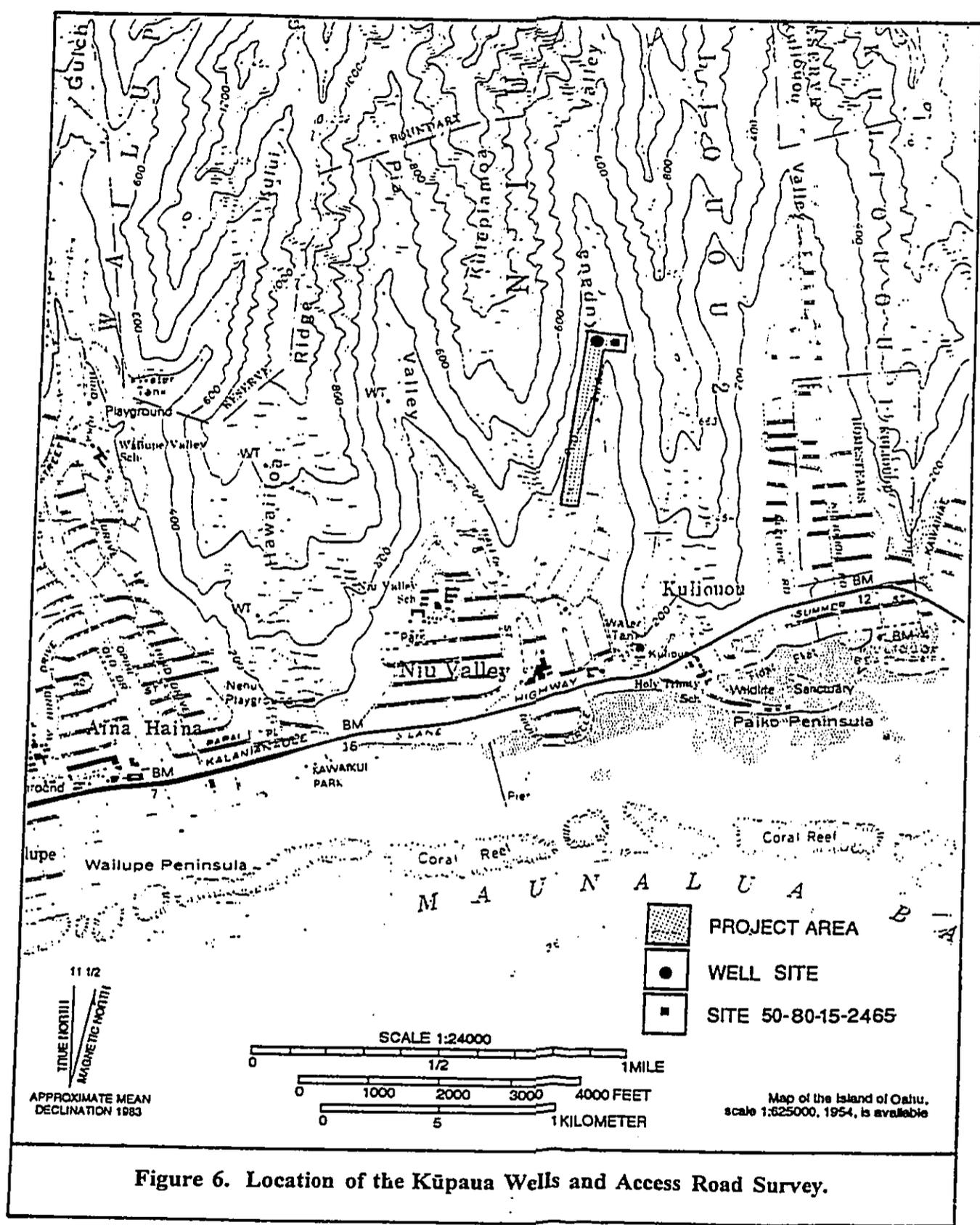


Figure 6. Location of the Kūpaua Wells and Access Road Survey.

## PREVIOUS ARCHAEOLOGY

A thorough review of the previous archaeology for each *ahupua'a* containing a proposed exploratory water well location is not required for an Environmental Assessment reconnaissance prior to an Inventory level-survey (SHPD 1989). Nevertheless, a cursory search of traditional sources in the archaeological literature on the island of O'ahu (McAllister 1933; Sterling and Summers 1978; James 1992) was conducted in advance of the field survey of all five proposed well locations. In no instance was a known archaeological site located within the immediate vicinity of these project areas, although none of these areas has ever been subject to a systematic archaeological survey, according to a search of Bishop Museum Anthropology Department files. Future research in any of the five well sites should include a review of State Historic Preservation Division files as well.

Archaeological remains expected for the five areas varied with the setting, influenced as much by environmental factors as by proximity to larger coastal population centers in pre- and early post-Contact periods. On the slopes behind Waimānalo, terracing of the windward soils might be expected, as was the case *mauka* of the Kuou Well III site along Luluku Stream in Kāne'ohe (Allen 1987). In Waipahu, just above the 'Ewa Plain, leeward agricultural utilization of the slopes might have produced minimal modification of the landscape similar to that encountered *makai* of the project area (Davis 1988). But a recent survey just *mauka* of the well location revealed severe disturbances due to Historical Period agriculture (Goodman and Nees 1991). The upper valley of Mānoa was famed for its taro ponds and Historical Period royal residences (Sterling and Summers 1978:281-290; McAllister 1933:78-80) while the lower Niu Valley supported a more leeward agricultural regime (Handy 1940:155) with a *heiau* (temple) situated at the foot of the middle ridge between both streams (McMahon 1988:3).

## FIELD METHODS

Methods employed during the archaeological reconnaissance varied with the degree of impact already found at each proposed water well location, but were restricted to pedestrian survey with no subsurface testing. At the Waipahu III and Mānoa well sites, only a cursory examination by the author was required, due to the extreme destruction of the previous landscape by agricultural and residential activities respectively. At the Kuou, Waimānalo, and Kūpaua well sites and access roads, a field crew of four ARG archaeologists conducted a pedestrian survey at 10-m-wide intervals across the entire length of the project areas. Bedrock outcrops were inspected for cultural modification and eroded gulleys, and surfaces were inspected to look for cultural materials.

## RECONNAISSANCE RESULTS

Archaeological reconnaissance of the five exploratory water well locations on the island of O'ahu revealed four of these to have been impacted sufficiently in the Historic to recent past to effectively erase any traces of Native Hawaiian utilization of the landscape on the surface. Inspection of the exposed surfaces, moreover, failed to yield any evidence of subsurface features or activity areas. It therefore seems likely that these four well locations (Waimānalo III, Waipahu III, Kuou III, and Mānoa) were never subject to any intensive habitation or agricultural use that would have produced obvious archaeological residues, probably due to the somewhat peripheral setting of these locations in relation to water resources and traditional or historic population centers.

This assessment does not negate the possibility of subsurface remains (i.e. firepits, *imu*, or human burials) being present at all these locales, however. Downslope erosion in the case of Waimānalo and Kūpaua, agricultural soil modification at the Waipahu and Kuo locations, and urban landscaping in Mānoa may well have buried pre-Contact period deposits once visible.

#### KŪPAUA WELL ACCESS ROAD

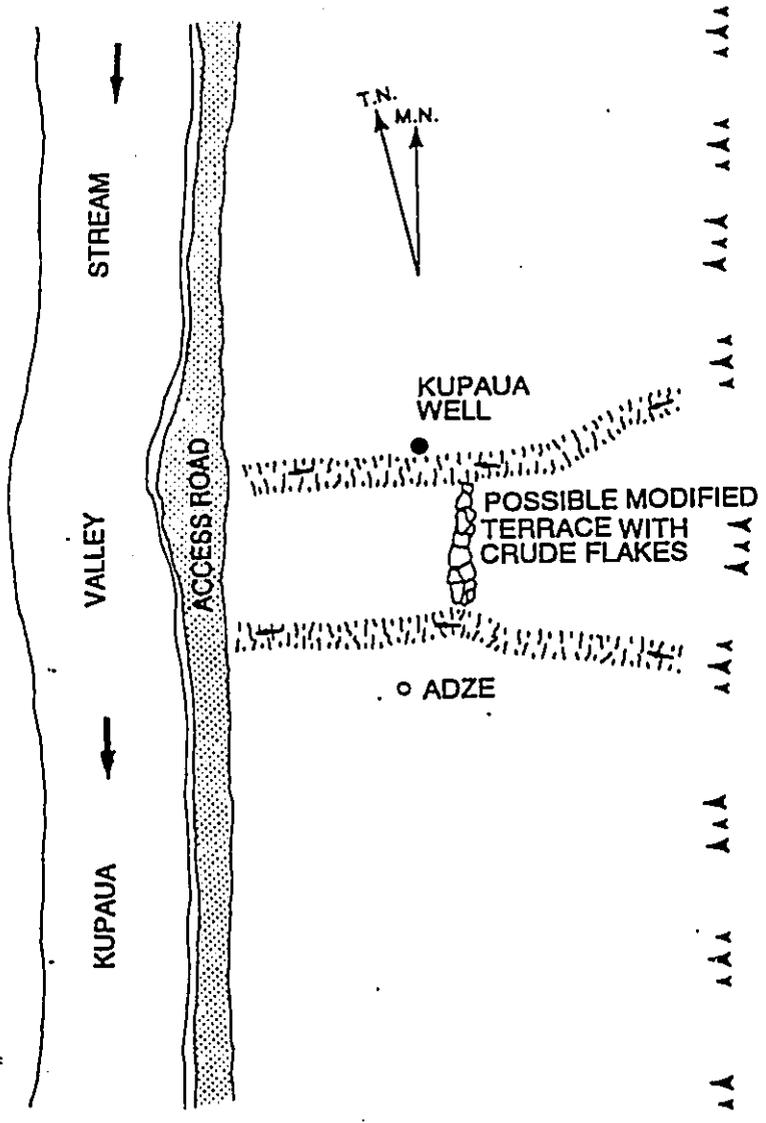
Surface reconnaissance of the proposed access road alignment to the well site on the west bank of the Kūpaua Stream was conducted with four ARG archaeologists traversing dense underbrush over extremely rough exposed bedrock in many places. While these field methods were found adequate to cover the first four well locations, it was felt that a more intensive form of surface survey with clearing of vegetation and subsurface testing would be necessary along this access road to ascertain the true nature of several possibly modified bedrock outcrops encountered during the pedestrian reconnaissance.

Especially in the lower reaches of the project area just above the spillway (Figure 7), large boulder alignments paralleling the stream bed were found to contain many smaller cobbles creating a somewhat clear area immediately behind these probably natural terraces. The actual location of the proposed exploratory well on the west bank of the stream, however, appears to be free of this type of modification.

Given the setting of these potential features immediately above a permanent stream bed less than 1 km *mauka* of a substantial Native Hawaiian fishpond and *heiau* (McAllister 1933:70), the likelihood that the landscape was utilized in the past is quite high. The identification of more convincing cultural remains on the other side of the stream during this surface reconnaissance demonstrates the validity of this hypothesis.

#### STATE SITE 50-80-15-2465

This site consists of at least one modified cobble terrace wall located on the east bank of the Kūpaua Stream approximately 5 m *makai* of an alternate well location proposed to avoid crossing the stream drainage (Figure 7). The terrace itself is roughly 10 m long, and only stands some 30 cm tall, being a modification of a natural alignment of bedrock, probably to impede soil loss from downslope erosion.



SCALE  
 0 5 10m

GULLY  
 SLOPE [STEEP]

Figure 7. Sketch Map of State Site 50-80-15-2465.

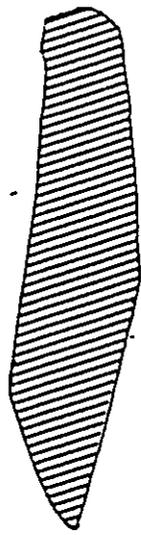
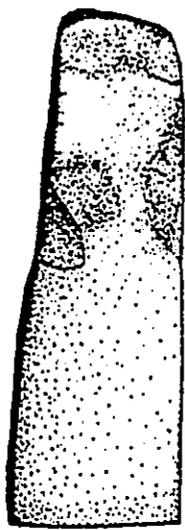
Several large primary flakes of reasonable quality basalt are also located within and around the feature, although a cursory inspection of the surface (admittedly overgrown and covered with sheetwashed soil) failed to yield any smaller flakes to indicate traditional tool manufacture. This possibility was strengthened, however, by the recovery of a small polished stone adze (Figure 8) on the surface approximately 5 m *makai* of the terrace wall (Figure 7).

The issue of whether this artifact represents local use of a raw material resource would have to be resolved by basalt sourcing analysis, although the nature of the Kūpaua Valley lithic material has yet to be established (Kevin Johnson, personal communication 1992). Regardless of these analyses, however, the presence of a small polished adze, more commonly associated with wood-working, rather than forest clearing, is interesting, given its association with probable agricultural terracing. It appears likely therefore, that evidence of domestic habitation may be present in the vicinity, but more likely further up the slopes above seasonal flash floods for which the Niu Valley is known today.

### CONCLUSIONS

Archaeological reconnaissance of five proposed exploratory water well locations on the island of O'ahu found four of these to contain no evidence of previous cultural remains or activities. The Waipahu III well site has been completely impacted by pineapple road construction and mechanized agriculture, as is the case for the Kuou III well site which is under banana production. The Mānoa well site, in turn, has been completely modified by landscaping associated with the construction of tennis courts adjacent to the Mānoa Elementary School. The Waimānalo III well site, on the other hand, has not been impacted by urban or commercial agricultural development, but does appear to have deforested and partially graded, both by historic ranching and more recent powerline construction.

The fifth location in the Kūpaua Valley, however, did contain artifactual and architectural evidence to suggest Native Hawaiian utilization of the area in the pre-



SCALE  
0 1 2 cm

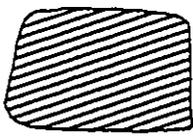


Figure 8. Stone Adze Recovered from State Site 50-80-15-2465.

or early post-Contact era. Recommended efforts to assess the nature of this occupation in Kūpaua Valley and the potential for subsurface deposits at the other four locations, are outlined below.

### RECOMMENDATIONS

Given the absence of cultural remains in four of the proposed water well locations and access roads, it is recommended that an archaeological monitor be present during construction at the Waimānalo Well III, Waipahu Well III, Kuou Well III, and the Mānoa Well, if surface disturbances are minimal. This assessment can also be recommended for the well site located on the west bank of the Kūpaua Stream, if access is provided from the east bank.

The presence of positively identified cultural remains at the location of the proposed Kūpaua Well on the east bank of the stream, however, make archaeological Site 50-80-15-2465 potentially eligible to the National Register of Historic Places under Criterion D, due to its potential contribution to knowledge of past history and lifeways. The same assessment may also be the case for possible agricultural terracing located along the access road to the Kūpaua well location on the west bank of the stream. It is therefore recommended that two courses of action be undertaken to avoid negative impact to these cultural resources:

- 1 Access the west bank exploratory well location from across the stream bed, via the existing jeep trail.
- 2 Perform an Archaeological Inventory level survey of the west bank access road corridor before the route is more firmly established, to ascertain the true nature of the possible cultural remains located during the reconnaissance survey.

## REFERENCES CITED

- Allen, Jane  
1987 *Five Upland 'Ili*. Departmental Report Series, Report 87-1, Department of Anthropology, Bishop Museum, Honolulu.
- Davis, Bertell  
1988 Archaeological Subsurface Survey of the Proposed Ewa Gentry Project Area, Honouliuli, O'ahu. MS on file, Department of Anthropology, Bishop Museum, Honolulu.
- Goodman, Wendy, and Richard Nees  
1991 Archaeological Reconnaissance and Inventory Surveys of 3,600 Acres in Waiawa Ahupua'a, 'Ewa, O'ahu. MS on file, Department of Anthropology, Bishop Museum, Honolulu.
- Handy, E. Craighill  
1940 *The Hawaiian Planter*. Honolulu: Bishop Museum Press.
- James, Van  
1992 *Ancient Sites of O'ahu*. Honolulu: Bishop Museum Press.
- McAllister, J. Gilbert  
1933 *The Archaeology of Oahu*. Honolulu: Bishop Museum Press.
- McMahon, Nancy  
1988 Archaeological Reconnaissance Survey of a Five-Acre Parcel in Niu Valley, O'ahu Island, Hawai'i, TMK 3-07-04:19 and Por. 1 and 12. MS on file, Anthropology Department, Bishop Museum, Honolulu.
- State Historic Preservation Division  
1989 Rules Governing Minimal Standards for Archaeological Inventory Surveys & Reports. Draft Guidelines - Title 13, Subtitle 6, Chapter 147. Honolulu: Department of Land and Natural Resources.
- Sterling, Elspeth, and Catherine Summers  
1978 *Sites of Oahu*. Honolulu: Bishop Museum Press.

**BOTANIST'S REPORT**

by

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Department of Botany  
Bishop Museum**

## Detailed Observations of Vegetation

**Summary.** Construction of water wells and attendant road systems does not appear to impact on any endangered or rare plant populations. The Hawaii Heritage Program's data base on the location of rare or endangered plants was searched in order to determine historical distributions of rare species. Only the Kupaua and Waimanalo Well Sites were located near known locations of rare plants. Field surveys of all sites were conducted to determine the present status of vegetation at the sites. None of the five proposed well sites have intact or high quality native ecosystems. In fact, the vegetation at four of the sites is composed entirely of alien plants. Only the Kupaua Well site has any native vegetation and this is composed entirely of scattered individual plants. Of the five native species found at this site, only two are endemic and neither of these are considered rare or endangered.

1. Proposed Manoa Well [TMK 2-9-36] is located entirely on a grassy lawn in a residential area of Manoa Valley. THERE ARE NO NATIVE PLANT COMMUNITIES WHICH COULD BE NEGATIVELY IMPACTED BY WELL CONSTRUCTION.
2. Proposed Waimanalo Well III [TMK 4-1-11] is located in a forest of alien weed trees. The dominant species are *Eucalyptus* sp., *Leucaena leucephala*, and *Rivina humilis*. Two species or rare plants are known from the vicinity of this well site; *Nesoluma polynesianum* and *Vigna o-wahuensis*. Neither species was observed in the area. THERE ARE NO NATIVE PLANT COMMUNITIES WHICH COULD BE NEGATIVELY IMPACTED BY WELL CONSTRUCTION.
3. Proposed Waipahu Well III is located in an existing agricultural field. No native plants were observed and there are no rare plants known from the area. THERE ARE NO NATIVE PLANT COMMUNITIES WHICH COULD BE NEGATIVELY IMPACTED BY WELL CONSTRUCTION.
4. Proposed Kuou Well III [TMK 4-5-41] is located in an existing banana plantation. No native plants were observed and there are no rare plants known from the area. THERE ARE NO NATIVE PLANT COMMUNITIES WHICH COULD BE NEGATIVELY IMPACTED BY WELL CONSTRUCTION.
5. Proposed Kupaua Well [TMK 3-7-04:01] is located in Niu Valley above existing residential areas. Niu Valley is one of the most famous collecting localities on Oahu. Many of the early Hawaiian botanists visited this valley so there is a good record of the vegetation present in the 1800's. The Hawaii Heritage Program data base has records from Niu Valley for 14 rare plants; *Bonamia menziesii*, *Cyanea grimesiana* ssp. *grimesiana*, *Eurya sandwicensis*, *Ctenitis squamigera*, *Tetraplasandra gymnocarpa*, *Delissea subcordata*, *Exocarpos gaudichaudii*, *Chamaesyce celastroides* var. *kaenana*, *Joinvillea ascendens* ssp. *ascendens*, *Lobelia monostachya*, *Phyllostegia parviflora* var. *parviflora*, *Rollandia lanceolata* ssp. *calycina*, *Melicope saint-johnii*, and *Schiedea nuttallii*. However, the current vegetation has only a few native plants, with the site dominated by alien weeds such as; *Leucaena leucephala*, *Schinus terebinthifolius*, *Asystasia gangetica*, and *Panicum maximum*. Four native species were observed; *Dodonaea viscosa* (a few scattered plants), *Sida fallax* (a small area with 20 to 30 plants), *Lipochaeta lobata* ssp. *lobata* (25 to 50 plants at the base of the cliffs), and *Erythrina sandwicensis* (several plants along the existing road on the east side of the creek). None of these species is considered rare or endangered and only the *Erythrina sandwicensis* should have special consideration (destruction of individual trees should be avoided). IT DOES NOT APPEAR THAT WELL CONSTRUCTION WOULD NEGATIVELY IMPACTED ON EITHER RARE PLANTS OR NATIVE PLANT COMMUNITIES.

**AGENCIES' REVIEWS & RESPONSES**

### Agencies' Reviews and Responses

<i>(Agency)</i> State of Hawaii Office of Environmental Quality Control	August 12, 1993
<i>(Response)</i> Board of Water Supply Office of Environmental Quality Control Brian J. J. Choy, Director	September 1, 1993
<i>(Agency)</i> City & County of Honolulu Planning Dept.	September 2, 1993
<i>(Response)</i> Board of Water Supply Planning Dept. Robin Foster, Chief Planning Officer	September 21, 1993
<i>(Agency)</i> University of Hawaii at Manoa Water Resources Research Center	September 22, 1993
<i>(Response)</i> Board of Water Supply UH Water Resources Research Center Jacquelin N. Miller	January 4, 1994
Tiana Partners (Laura L. Thompson)	September 15, 1993
<i>(Response)</i> Board of Water Supply Tiana Partners (Laura L. Thompson)	January 5, 1994
<i>(Agency)</i> State of Hawaii Dept. of Land & Natural Resources Keith W. Ahue, Chairperson	September 23, 1993
<i>(Response)</i> Board of Water Supply Dept. of Land & Natural Resources Keith W. Ahue, Chairperson	January 5, 1994

JOHN WAIHEE  
GOVERNOR

RECEIVED  
OFFICE OF WATER SUPPLY

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BRIAN J. CHOY  
Director

STATE OF HAWAII  
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

220 SOUTH KING STREET  
FOURTH FLOOR

HONOLULU, HAWAII 96813  
TELEPHONE (808) 586-4185

August 12, 1993

AUG 16 1993

Dep  
PE

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

Attention: Mr. Roy Doi

Dear Mr Hayashida:

Subject: Draft Environmental Assessment for the Proposed Kupaua  
Exploratory Well Project, TMK: 3-7-4:01, Kupaua, Oahu

Thank you for the opportunity to review and comment on the subject  
document. We have the following comment.

In the assessment process, the proposing agency must consult with  
other agencies having jurisdiction or expertise as well as citizen  
groups and individuals. Therefore, we recommend that you consult  
with the parties listed below:

1. State of Hawaii, Department of Land and Natural Resources,  
Office of Conservation and Environmental Affairs;
2. State of Hawaii, Department of Land and Natural Resources,  
Commission on Water Resources Management;
3. City and County of Honolulu, Department of Public Works; and
4. Tiana Partners/Hawaiian Humane Society.

If you have any questions, please call Jeyan Thirugnanam at  
586-4185. Thank you.

Sincerely,

*Brian J. Choy*

Brian J. J. Choy  
Director

*Choy*

September 1, 1993

Mr. Brian J. J. Choy, Director  
Office of Environmental Quality Control  
State of Hawaii  
220 South King Street, Fourth Floor  
Honolulu, Hawaii 96813

Dear Mr. Choy:

Subject: Your Letter Dated August 12, 1993 on the Draft Environmental Assessment  
for the Proposed Kupaua Exploratory Well Project, TMK: 3-7-04: 01, Kupaua,  
Oahu

Thank you for your comments on the subject document.

We are presently consulting with the parties listed in your letter.

If you have any questions, please contact Roy Doi at 527-5235.

Very truly yours,

KAZU HAYASHIDA  
Manager and Chief Engineer

MM:js  
cc: K. Hayashida  
R. Doi

93-2274

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PE

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

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BD OF WATER SUPPLY  
SEP 3 11 05 AM '93



FRANK F. FASI  
MAYOR

ROBIN FOSTER  
CHIEF PLANNING OFFICER  
ROLAND D. LIBBY, JR.  
DEPUTY CHIEF PLANNING OFFICER

MH 8/93-1928

September 2, 1993

MEMORANDUM

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

FROM: ROLAND D. LIBBY, JR., ACTING CHIEF PLANNING OFFICER  
PLANNING DEPARTMENT

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (DEA) FOR THE  
PROPOSED KUPAUA EXPLORATORY WELL PROJECT,  
TAX MAP KEY: 3-7-04: 01, KUPAUA, OAHU

In response to your agency's request of August 9, 1993, we have reviewed the subject DEA and have the following comments to offer:

1. The Project Description on pages 4 and 5 indicates that the Development Plan Land Use Map designation for the site is R-7.5. This should be corrected to indicate that the Development Plan designation is Preservation and that the zoning is P-1 Restricted Preservation District.
2. The Development Plan Public Facilities Map shows no proposed improvements for the subject site. This does not preclude implementation of the proposed exploratory well. However, an amendment to the Development Plan Public Facilities Map to add a well site would be necessary to establish a permanent and operational well site.
3. We have no objections to the proposed project provided that an Archaeological Inventory level survey is performed as recommended in the Archaeological Report of the appendix to the subject DEA..

JP

Kazu Hayashida, Manager and Chief Engineer  
Board of Water Supply  
September 2, 1993  
Page 2

Thank you for the opportunity to comment. Should you have any questions, please contact Matthew Higashida of our staff at 527-6056.



ROLAND D. LIBBY, JR.  
Acting Chief Planning Officer

RDL:ft

September 21, 1993

TO: ROBIN FOSTER, CHIEF PLANNING OFFICER  
PLANNING DEPARTMENT

FROM: For KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER  
BOARD OF WATER SUPPLY *Raymond B. Doi*

SUBJECT: YOUR MEMORANDUM REGARDING THE DRAFT ENVIRONMENTAL  
ASSESSMENT (DEA) FOR THE PROPOSED KUPAUA EXPLORATORY  
WELL PROJECT, TMK: 3-7-04: 01

Thank you for your comments on the DEA for the proposed project. We have the following responses to your comments:

1. The Development Plan Land Use Map designation and the zoning for the site will be changed to Preservation; and P-1, Restricted Preservation District; respectively.
2. We understand that a Development Plan Public Facilities Map (DPPFM) Amendment is not required for the proposed project. If the exploratory well is determined to be a viable production well, a DPPFM amendment will be submitted.
3. We are presently coordinating additional archaeological requirements with the State Historic Preservation Division.

If you have any questions, please call Roy Doi at 527-5235.

cc: Maguire Group

MM/BU:rk

cc: K. Hayashida  
R. Doi

93-2534

*(9/23)*



P-466/93

## University of Hawaii at Manoa

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

September 22, 1993  
EA: 00031

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

Dear Mr. Doi:

Environmental Assessment (EA)  
Kupaua Exploratory Well and Access Road  
Honolulu, Oahu

The Board of Water Supply proposes to drill an exploratory well in the Kupaua Valley mauka of Niu Valley. The project will involve constructing an access road on the west side of the stream, clearing a work area for test drilling, and drilling a hole about 14 inches in diameter to a depth of about 270 feet. Once drilling is completed, a 10 inch diameter steel casing will be grouted into place in the hole and a pump will be installed.

The Environmental Center has reviewed the proposed action with the assistance of Paul Ekern (Emeritus), Agronomy and Soils/Water Resources Research Center; Bion Griffin, Anthropology; and Carolyn McCool, Environmental Center.

### ARCHAEOLOGY

Due to the presence of positively identified cultural remains at the project site on the east bank of the stream and the evidence which suggests Native Hawaiian utilization of the area in the pre- or early post-contact era (Appendix), a more detailed investigation of the area subject to any ground disturbance should be conducted. Also, considering the likelihood of archaeological resources at the project site, will an on-site monitor be present during any excavations? If not, our reviewers strongly urge that such an archaeological monitor be on site during any excavations.

123 3 42 PM  
HAWAIIAN ENVIRONMENTAL CENTER

Board of Water Supply  
September 22, 1993  
Page 2

We appreciate the opportunity to provide comments and look forward to your response.

Sincerely,

*Jacquelin N. Miller*

Jacquelin N. Miller  
Associate Environmental Coordinator

cc: OEQC  
Roger Fujioka  
Paul Ekern  
Bion Griffin  
Carolyn McCool

January 4, 1994

Ms. Jacquelin N. Miller  
Associate Environmental Coordinator  
Environmental Center  
Water Resources Research Center  
University of Hawaii at Manoa  
Crawford 317  
2550 Campus Road  
Honolulu, Hawaii 96822

Dear Ms. Miller:

Subject: Your Letter Dated September 22, 1993 Regarding the Draft Environmental Assessment (DEA) for the Kupaua Exploratory Well Project, Kupaua, Oahu, TMK: 3-7-04: 01

Thank you for reviewing the DEA. An archaeological inventory survey of the proposed well site and access road will be conducted as required by the State Historic Preservation Division (SHPD) of the Department of Land and Natural Resources to identify and mitigate adverse impacts to any historic sites. We will comply with all requirements of SHPD, including archaeological monitoring if the inventory survey results warrant it.

If you have any questions, please call Barry Usagawa at 527-5235.

Very truly yours,



KAZU HAYASHIDA  
Manager and Chief Engineer

cc: Maguire Group, Inc.

MM/BU:rk

cc: K. Hayashida, Engineering Branch, B. Usagawa  
P-466/93

(1/7)

932644

TIANA PARTNERS  
440 A Puamamane St.  
Honolulu, Hawaii 96821  
Phone: 373-9387 Fax: 373-4485

RS DP  
PE  
SEP 15 1993

Mr. Kazu Hayashida  
Manager and Chief Engineer  
Board of Water Supply  
630 South Beretania Street  
Honolulu, Hawaii 96813

Dear Mr. Hayashida:

Thank you for sending the Maguire Group's Environmental Assessment for an Exploratory Well and Access Road at Kupaua, Oahu. I learned a lot about our valley, its soil, rock formation and plants.

This is my understanding of what will happen. Is it correct?

- 1: BWS, in its mission to provide water, needs to explore additional water sources.
2. Kupaua Valley's water potential is worth evaluating
3. An exploratory well will be drilled into the ground at the 230' elevation on the west side of the valley
4. Use of our existing road on the east side of the valley will be the means of access
5. The time frame for the test site drilling is 6 - 7 months
6. Any construction will be temporary and will be removed
7. If the test proves successful, a permanent well will be established at that site with access from the west side of the valley
8. Native plants will not be affected
9. Archeological value is a possibility

It was a pleasure to become acquainted with Brooks Yuen, Chester Lao of your office and also Ron Fenstermacher and Mr. Ching when they contacted me for permission to explore the valley.

But I am very surprised to read that people from the Bishop Museum made a pedestrian survey on both the west and east side of the stream without any notification.

In addition, I note that a stone adze was recovered from state site 50-80-15-2465. Where is the adze? If it was found on our property it belongs to our family and I would like it returned.

One of the impacts mentioned on page 17 is that a temporary ford will be constructed across Kupaua stream. There is no need to remove that structure.

+

Our agreement with you was to grant you permission to enter our property for the environmental assessment study and to drill a well. Let's leave it like that. Do not pursue archeological inventories nor National Register of Historic Places possibilities. (p.14).

Because the well will be located on our property and changes in terrain and privacy will obviously take place what are the benefits to our family? Will we be able to have free water or be charged at a lesser rate? Is there any compensation contemplated for the use of the land? What can we expect in the way of traffic, how much, how often and who? Will traffic be restricted to use only by the Board of Water Supply?

Do keep us informed as to what to expect and when. Many thanks.  
Sincerely yours,



Laura L. Thompson  
Partner, Tiana Partners

P.S. We note that the Sketch Map on page 12 locates the well site on the east side of Kupaua Valley. Is that an error?

9-12-93

January 5, 1994

Ms. Laura L. Thompson  
Tiana Partners  
440-A Puamamane Street  
Honolulu, Hawaii 96821

Dear Ms. Thompson:

Subject: Your Letter Dated September 12, 1993 Regarding the Draft Environmental Assessment (DEA) for the Kupaua Exploratory Well Project, Kupaua, Oahu, TMK: 3-7-04: 01

Thank you for reviewing the DEA and expressing your concerns regarding the potential project impacts of the well site being located on your property. We have the following response to your concerns:

1. We request that you allow us to pursue an archaeological inventory survey of the proposed access road and exploratory well site to ensure that our proposed construction activity will not adversely affect any significant historic sites which were identified in the DEA.

Under Chapter 6E, Hawaii Revised Statutes, the Historic Preservation Division of the State Department of Land and Natural Resources (SHPD) has determined that an archaeological inventory survey is required prior to any construction activity. The main objectives of this law are to ensure that any sites having historical, religious, or cultural value are not destroyed and to document any information that can lead to a better understanding of the past.

Our intent is to comply with all agency requirements as it relates to our exploratory well project. The historical significance of the rest of Kupaua Valley and any potential educational aspects such as a National Historic Sites designation are beyond the scope of our project and are subject to the landowner's discretion.

Ms. Laura L. Thompson  
Page 2  
January 5, 1994

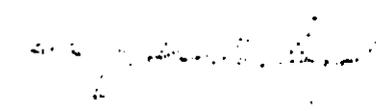
2. The Bishop Museum apologizes for conducting their preliminary archaeological survey without notifying you. The Bishop Museum thought that our consultant, the Maguire Group, had given you proper notification. Future site investigations, if allowable, will be coordinated with your permission and notification.
3. The Bishop Museum has the stone adze that was discovered on your property. To recover the stone adze, the Bishop Museum requires that a written request be submitted along with proof of property ownership. We are presently in the process of making that request to Bishop Museum to have the adze returned directly to you.
4. The Board of Water Supply prefers that the temporary ford crossing Kupaua Stream be removed upon completion of the project because of potential flooding liability and the numerous Federal and State requirements that would apply if the ford were to remain.
5. If well development becomes feasible, we will pursue land acquisition which will result in monetary compensation. Negotiated compensation for the well station site will be based on the appraised fair market value of the property. Other required access road and utility easements will be negotiated at a rate of 10 percent to 100 percent of the fair market value, depending on the location of the easements within the property. If the well is determined unfeasible, the well hole will be sealed and areas affected by construction will be restored.  
  
Special water rates would not be part of the compensation for BWS land acquisition because our policy does not associate water rates with land value.
6. During construction, traffic to the site would be on a daily basis, Monday through Friday, 7:30 a.m. to 3:30 p.m. Access will be limited to personnel from the BWS, consultants, contractors, and other various government agencies. If a permanent facility is built, access will be secured and limited to BWS personnel performing routine maintenance work on a weekly basis.

Ms. Laura L. Thompson  
Page 3  
January 5, 1994

7. Your understanding of the project, as stated in items 1 through 9 of your letter is correct.
8. To clarify the archaeological site map on Page 12 of the Archaeological Report showing a proposed well site on the East Bank: This is an alternative well site which was determined to be less feasible than the west bank site.

If you have any questions, please call Barry Usagawa at 527-5235.

Very truly yours,

  
KAZU HAYASHIDA  
Manager and Chief Engineer

cc: Maguire Group, Inc.

MM/GK/BU:rk  
cc: K. Hayashida  
Engineering Branch  
Land  
C. Lao  
B. Usagawa

93-2644

(1/11)

JOHN WAIHEE  
GOVERNOR OF HAWAII



32790 KEITH W. AHUE, CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES  
JOHN P. KEPPEL, II  
DONA L. MANAIKE

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 621  
HONOLULU, HAWAII 96809

REF:OCEA:RHU

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

File No.: 94-091  
DOC. ID.: 3499

SEP 23 1993

The Honorable Kazu Hayashida  
Manager and Chief Engineer  
Board of Water Supply  
City and County of Honolulu  
630 South Beretania St.  
Honolulu, Hawaii 96813

PE

Dear Mr. Hayashida:

Subject: Draft Environmental Assessment (DEA) for the Proposed Kupaua  
Exploratory Well Project, Kupaua, Oahu, TMK: 3-7-04: por. 1

We have reviewed the DEA information for the proposed exploratory well project transmitted by your letter dated August 9, 1993, and have the following comments:

Historic Preservation Division

The Historic Preservation Division (HPD) comments that the Board of Water Supply proposes to construct an approximately 1/2 mile long access road and drill an exploratory well on the slopes west of Kupaua stream.

An archaeological reconnaissance of the access road and exploratory well site is summarized in a report (Dixon 1992) appended to the DEA. This report is useful for information purposes, but it does not meet the minimal standards for an archaeological inventory survey, so HPD cannot determine if all historic sites with the potential to be adversely affected by the proposed project have been identified.

The report does note the possible presence of historic sites along the proposed access road, and documents a single historic site (50-80-15-2465) on the east side of the stream, in an area that appears to be outside of

the project area as it is currently proposed. The definite presence of site -2465 is cited by Dixon as evidence in favor of the idea that the densely over grown features of the west side of the stream are indeed historic sites.

The DEA summarizes this information by noting that "archaeological review has indicated that there are no archaeological resources within the immediate vicinity of the [proposed well] site" (p. 18), and that "the location of the proposed well appears to be free of modification" (p. 15). The DEA concludes that the exploratory well and access road construction "project will therefore not result in any adverse impacts to archaeological resources" (p. 19). If the exploratory well proves to be productive and development of a production well is planned, then the DEA recommends that "a more detailed investigation" (p. 15) be conducted.

HPD believes that the summary of the archaeological information in the DEA is incomplete and incorrect. The final EA should completely and correctly summarize this information. HPD cannot agree with the conclusion that construction of an access road and exploratory well will have "no effect" on historic sites.

Based on the information presented in the DEA, HPD believes it is likely that the proposed project will have an effect on historic sites, quite likely an "adverse effect" without appropriate mitigation. The final EA should reflect this determination of likely effect.

HPD believes that an inventory survey of the proposed access road and well site should be completed, and an acceptable inventory survey report submitted to their office, prior to the finalization of any plans for access road or exploratory well construction. In this way the project can be designed to minimize potentially adverse effects to historic sites, if these are present.

#### Office of Conservation and Environmental Affairs

The Office of Conservation and Environmental Affairs comments that they confirm the subject well site's location within that General "G" subzone of the Conservation District, and that the project will require that a Conservation District Use Application (CDUA) be filed with our Department and approved by the Board of Land and Natural Resources.

#### Division of Aquatic Resources

The Division of Aquatic Resources (DAR) comments that they believe that the stream runs only during wet periods and is otherwise completely dry. There is no information about the stream in the HSA or DAR databases. The area is generally dry, and it is unlikely that an exploratory well would have any significant impact on surface waters. DAR has no objections from the aquatic resources standpoint.

Mr. K. Hayashida

-3-

File No.: 94-091

Commission on Water Resource Management

The Commission on Water Resource Management's (CWRM) staff comments that they have received applications for the Well Construction/Pump Installation and Water Use Permits and are processing them. The applicant should be informed that a Stream Channel Alteration Permit (SCAP) will be required for any work done in or on the banks of Kupaua Stream.

We have no other comments to offer at this time. Thank you for the opportunity to comment on this matter.

Please feel free to call Steve Tagawa at our Office of Conservation and Environmental Affairs, at 587-0377, should you have any questions.

Very truly yours,

  
KEITH W. AHUE

January 5, 1994

Mr. Keith W. Ahue, Chairperson  
Board of Land and Natural Resources  
State of Hawaii  
P. O. Box 621  
Honolulu, Hawaii 96809

Dear Mr. Ahue:

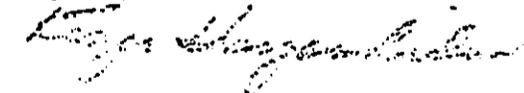
Subject: Your Letter Dated September 23, 1993 Regarding the Draft Environmental Assessment (DEA) for the Kupaua Exploratory Well Project, Kupaua, Oahu, TMK: 3-7-04: 01

Thank you for reviewing the DEA. We have the following responses to your comments:

1. An archaeological inventory survey will be conducted prior to construction of the access road and exploratory well to identify and minimize any possible adverse impacts to historic sites. As recommended by the Historic Preservation Division, the results of this survey will be submitted for their review and approval.
2. We note the proposed well is located within the General Subzone of the Conservation District and therefore, requires a Conservation District Use Application (CDUA). The CDUA and the Stream Channel Alteration Permit for the temporary stream crossing will be submitted for your review and approval once the EA is finalized.
3. We understand our Well Construction and Water Use permits are presently being processed and that the Division of Aquatic Resources has determined that there will be no significant impact on surface waters because the area is generally dry.

If you have any questions, please call Barry Usagawa at 527-5235.

Very truly yours,



KAZU HAYASHIDA  
Manager and Chief Engineer

cc: Maguire Group, Inc.

MM:rk

cc: K. Hayashida, Engineering Branch, B. Usagawa

93-2790

7/71