BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

630 SOUTH BERETANIA STREET

HONOLULU, HAWAII 96843

July 3, 1990

Dr. Marvin T. Miura, Director
Office of Environmental
Quality Control
State of Hawaii
Kekuanaoa Building, #104
465 South King Street
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Environmental Impact Assessments for: (1) Kawailoa Exploratory Well and (2) Mokuleia Exploratory Well

We request that our proposed projects be published in the EQC Bulletin as a Negative Declaration.

Attached are four copies of the assessment of each project for your use.

If you have any questions, please contact Lawrence Whang at 527-6138.

Very truly yours,

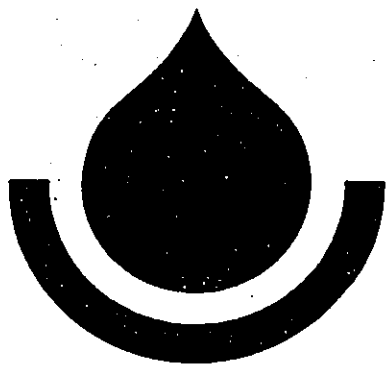
KAZU HAYASHIDA
Manager and Chief Engineer

Attachment

1990-07-23-OA-FEA

Environmental Assessment
for
Mokuleia Exploratory Well

Mokuleia, Oahu, Hawaii



BOARD OF WATER SUPPLY
Honolulu, Hawaii

June 1990

ENVIRONMENTAL IMPACT ASSESSMENT

FOR AN EXPLORATORY WELL

AT MOKULEIA, OAHU, HAWAII

Tax Map Key: 6-8-07:2

Proposing Agency:

BOARD OF WATER SUPPLY
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843
Contact: Lawrence Whang, Tel.
527-6138

Prepared by:

WILSON OKAMOTO & ASSOCIATES, INC.
1150 South King Street, Suite 800
Honolulu, Hawaii 96814

June 1990

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CHAPTER 1

INTRODUCTION

Chapter 343, Hawaii Revised Statutes (HRS), requires that proposed actions be assessed to determine potential adverse environmental impacts, and that these impacts be documented. Chapter 200 of Title 11, State of Hawaii Department of Health Environmental Impact Statement Rules, sets forth the requirements for documentation of the environmental impacts. [Ref. 1 and Ref. 2]

This Environmental Assessment (EA) has been prepared to meet the requirements of Chapter 343 HRS and Chapter 200 of Title 11 by documenting the environmental effects from the development of the Mokuleia exploratory well project proposed by the City and County of Honolulu Board of Water Supply (BWS). Agency and public consultation on this project is documented in Appendix A.

The environmental impacts from construction and operation of this well have been previously examined in the Waialua to Kahuku Regional Water System Improvements Final Environmental Impact Statement (EIS) (accepted August 1989). Relevant portions of the Waialua to Kahuku EIS are incorporated by reference in this EA.

CHAPTER 2

PROJECT DESCRIPTION

2.1 INTRODUCTION

The BWS is responsible for the management, control and operation of the municipal water system for certain areas of Oahu. As part of this responsibility, the BWS first identifies potential well sites based on the subsurface geologic and groundwater characteristics of the area. If the site appears promising as a source of groundwater, the BWS then conducts exploratory drilling and certain tests to determine the suitability of the well for eventual production of potable water. The Mokuleia well site has been identified as such a potential source.

2.2 PROJECT LOCATION

Mokuleia is located on the North Shore of Oahu, about 25 miles north of the central city of Honolulu. Other nearby communities include Waialua and Haleiwa. The Mokuleia exploratory well site is located about 4000 feet south of Farrington Highway in a sugarcane field below the 200 foot elevation contour immediately adjacent to the Mt. Kaala Federal Aviation Administration (FAA) Access Road. These roads provide sufficient access to the site and eliminate the need for a separate BWS access road to transport equipment and supplies to the well site. Figure 1 shows the project location and Figure 2 the site as seen from Mt. Kaala Road.

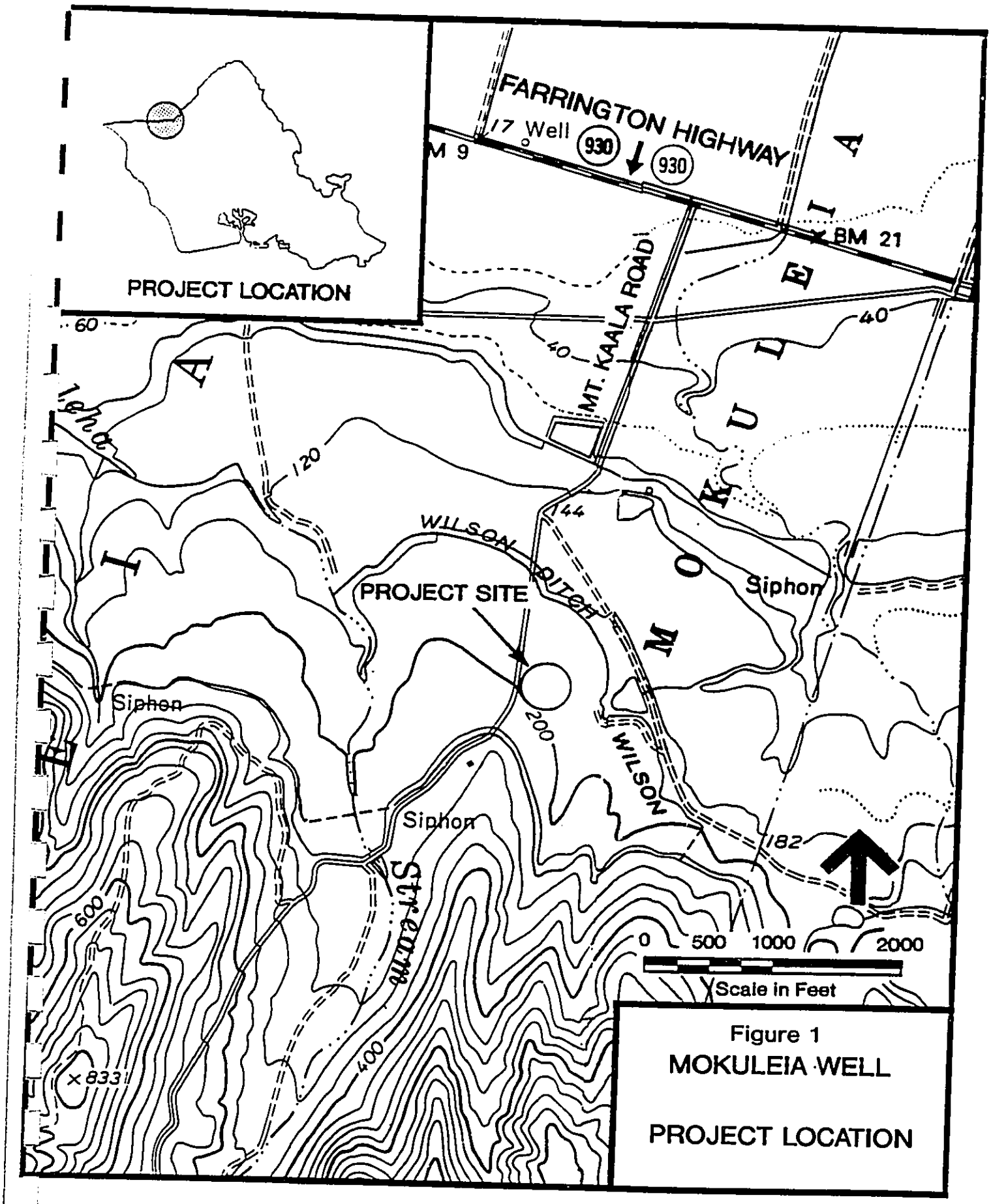
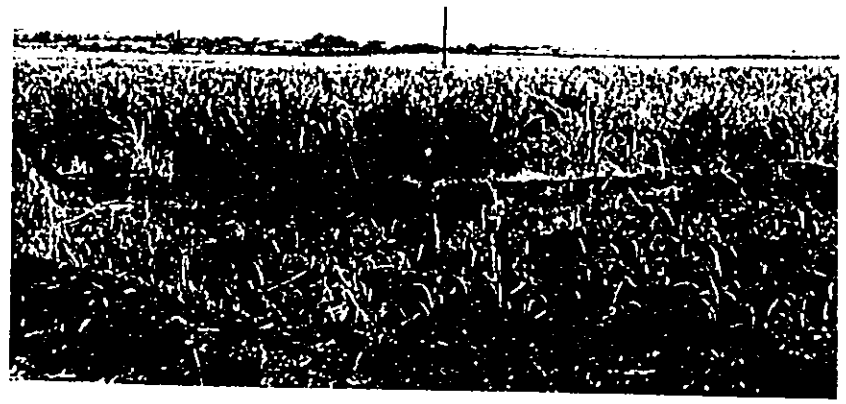


Figure 1
MOKULEIA WELL

PROJECT LOCATION

Project location looking southeast from Mount Kaala Road.

Irrigation ditch along Mount Kaala Road. Project location is to the left.



View of Waialua town as seen from project location.

FIGURE 2

2.3 PROJECT FEATURES

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

Item	Mokuleia
Tax Map Key (TMK)	6-8-07:2
Total parcel area (acres)	887.5
Total land needed (acres)	.75 - 1.0
Flood Insurance Rate Map (FIRM) Flood Zone	Undetermined
State Land Use District	Agricultural
State Water Management Area	Waialua
City and County of Honolulu Development Plan	Agriculture
City and County of Honolulu Development Plan Public Facilities Map	Site determined, (within 6 yrs.)
City and County of Honolulu Zoning	Agriculture (AG-1)
Approximate depth to aquifer	350 FT
Estimated yield of production well	.5 to 2 mgd*
Type of Aquifer	Basal
Land Owner	Castle & Cooke
Nearest Access	Mt. Kaala Road

* million gallons per day

2.4 PROJECT CONSTRUCTION

An area of about .75 to 1.0-acre will be cleared and graded at the site to accommodate the well drilling and support equipment and necessary supplies. All material from the clearing and grading operations will be disposed of to an approved location for this type of material. Once the area has been cleared, a temporary fence may be erected to secure the project site.

The clearing and grading will be restricted to hours from 7:30 AM to 3:30 PM on weekdays. No activities will occur on the project site 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 16 inches in diameter will be drilled at the 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 raising and dropping a heavy drill bit. All waste material from the 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 material will be disposed off site in an approved manner. The waste material generated from the drilling does not contain any contaminants. Depending on the depth and lava formations encountered, the well drilling may require up to a maximum of six months to complete.

If the rotary drilling 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 drill 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 is complete, the drilling mud will be taken off the project site and disposed in an approved manner.

Once the water table is reached, instead of drilling fluid, an air compressor will pump air down to the drill bit to airlift the cuttings.

This will ensure that the bentonite clay does not enter the aquifer. This rotary method of drilling may require up to three to four months to complete.

Upon completion of the drilling operation, a 12-inch diameter steel casing will be grouted into the drilled hole and a pump will be installed.

2.5 PUMPING TEST

Two types of pumping tests 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, or 120-hour, sustained pumping test will be undertaken. This test is designed to determine the sustainable capacity of the well, monitor water quality, and to measure aquifer parameters by monitoring nearby observation wells, if any. (The sustainable capacity of a well is the rate at which the well can be continuously pumped without adverse salinity changes or impacts to nearby existing wells.)

Water generated during the pumping 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 as surface runoff. The water will not be considered a source of drinking water

according to the State of Hawaii Department of Health (DOH) Potable Water Systems Regulation set forth in Title 11, Chapter 20, DOH Rules.

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 waste, sewage, or household garbage. According to the U.S Environmental Protection Agency (EPA) 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.

2.6 PROJECT SCHEDULE

The project schedule will depend upon approval of required permits and other necessary approvals. At present, exploratory well drilling at Mokuleia is not scheduled.

CHAPTER 3

AFFECTED ENVIRONMENT

3.1 PHYSICAL ENVIRONMENT

3.1.1 Geology

Basaltic lava from the Waianae Shield Volcano underlies the site at depth. At the surface, the site is underlain by older alluvium. The Waialua-Mokuleia coastal plain is underlain by interbedded marine and terrestrial sediments deposited when the Great Ice age caused fluctuations in sea-level. These sediments confine the basal groundwater that occurs within the basaltic lava flows. [Ref. 3]

3.1.2 Soils

Soil at the site is classified by the U.S. Department of Agriculture Soil Conservation Service as Ewa silty clay loam, 6 to 12 percent slopes (EaC). Its soil capability classification is IIIe; soils with severe erosion potential if cultivated and not protected. These are well-drained soils found in basins and on alluvial fans on Maui and Oahu. They developed in alluvium derived from basic igneous rock and present a slight to moderate erosion hazard. Runoff is also slow to medium. Soil of this nature is commonly used for sugarcane and pasturing. [Ref. 4]

The well site is currently planted with sugarcane. The State Agricultural Land Classification for the site is "Prime", meaning that it has the soil quality, growing season, and moisture supply needed to produce sustained high yields economically when treated and managed properly. [Ref. 5]

The well site has also been classified in a study by the University of Hawaii Land Study Bureau. This study evaluated the quality, or productive capacity, of certain lands on Oahu in two ways: (1) for selected crops or

uses, and (2) for overall suitability in agricultural use. A five-class productivity rating was established (A,B,C,D and E) with A representing the highest and E the lowest. According to this classification, the well site is has an overall productivity rating of "C". [Ref. 6]

3.1.3 Climate and Air Quality

The general climate of north-central Oahu is characteristically mild, with temperature averages ranging from 70 degrees Fahrenheit in the coldest month to 78 degrees Fahrenheit in the warmest. Tradewinds in the area are persistent, usually blowing 4 to 12 miles per hour out of the east. Humidity ranges from 60 to 80 percent. [Ref. 5]

Rainfall along the North Shore of Oahu and the Mokuleia area averages about 30 to 40 inches annually. The rain gage station closest to the proposed Mokuleia well (State Key No. 843.00) records approximately 35.5 inches mean annual rainfall. Most of the rain occurs during the winter months. [Ref. 7]

Air quality on most areas of Oahu is generally affected by vehicle traffic, stationary sources, and the prevailing tradewinds. The general lack of high volumes of vehicle traffic and stationary sources, and the normal tradewind conditions indicates the air quality to be good for the North Shore area. Dust from agricultural activities in the area would be the only source of air pollutants near the well site. However, under most conditions, the tradewinds keep air quality and visibility good.

3.1.4 Hydrology

3.1.4.1 Surface Water

There are no natural surface water bodies, flood plains or wetlands on the project site. Man-made irrigation culverts above and below the well site and along Mt. Kaala Road provide water for the sugarcane production at the

site and in adjacent fields. Makaleha Stream, the closest natural surface water source, is located approximately one-quarter mile west of the well site. The stream is dry most of the time with significant flows only occurring during the winter months. It is classified, based on the State DOH water quality standards, as "exploitive-consumptive" which means it is a stream with moderate to low natural environmental-biological and/or water quality, intended for water related recreational activities. [Ref. 5]

There are five wetland areas outlined in the National Wetlands Inventory map which are located within one-half mile to the north, east, and west of the proposed well. All five areas are described below and indicated in Figure 3.

Area	Description
a).	Riverine; Intermittent; Streambed; Non-Tidal; Seasonal
b).	Palustrine; Forested; Broad-Leaved Evergreen; Non-Tidal; Temporary
c).	Palustrine; Open Water/Unknown Bottom; Non-Tidal; Permanent; Diked/Impounded
d).	Riverine; Intermittent; Streambed; Non-Tidal; Seasonal
e).	Palustrine; Open Water/Unknown Bottom; Non-Tidal; Permanent; Diked/Impounded

The U.S. Fish and Wildlife Service (USFWS) has outlined certain areas within the State of Hawaii to protect endangered species. These include wetlands of significance-- such as Ukoa Pond and the Kahuku wetlands, both on the North Shore-- necessary for protecting endangered waterbirds such as the Hawaiian stilt, coot, gallinule and duck. In addition, other North Shore area habitats such as Crowbar Ranch ponds, AmOrient prawn ponds, Haleiwa lotus fields and Waimea Falls Park are considered primary habitats for the recovery of endangered Hawaiian waterbirds, as listed in the Hawaiian Waterbirds Recovery Plan (U.S. Fish and Wildlife Service, September 1985).

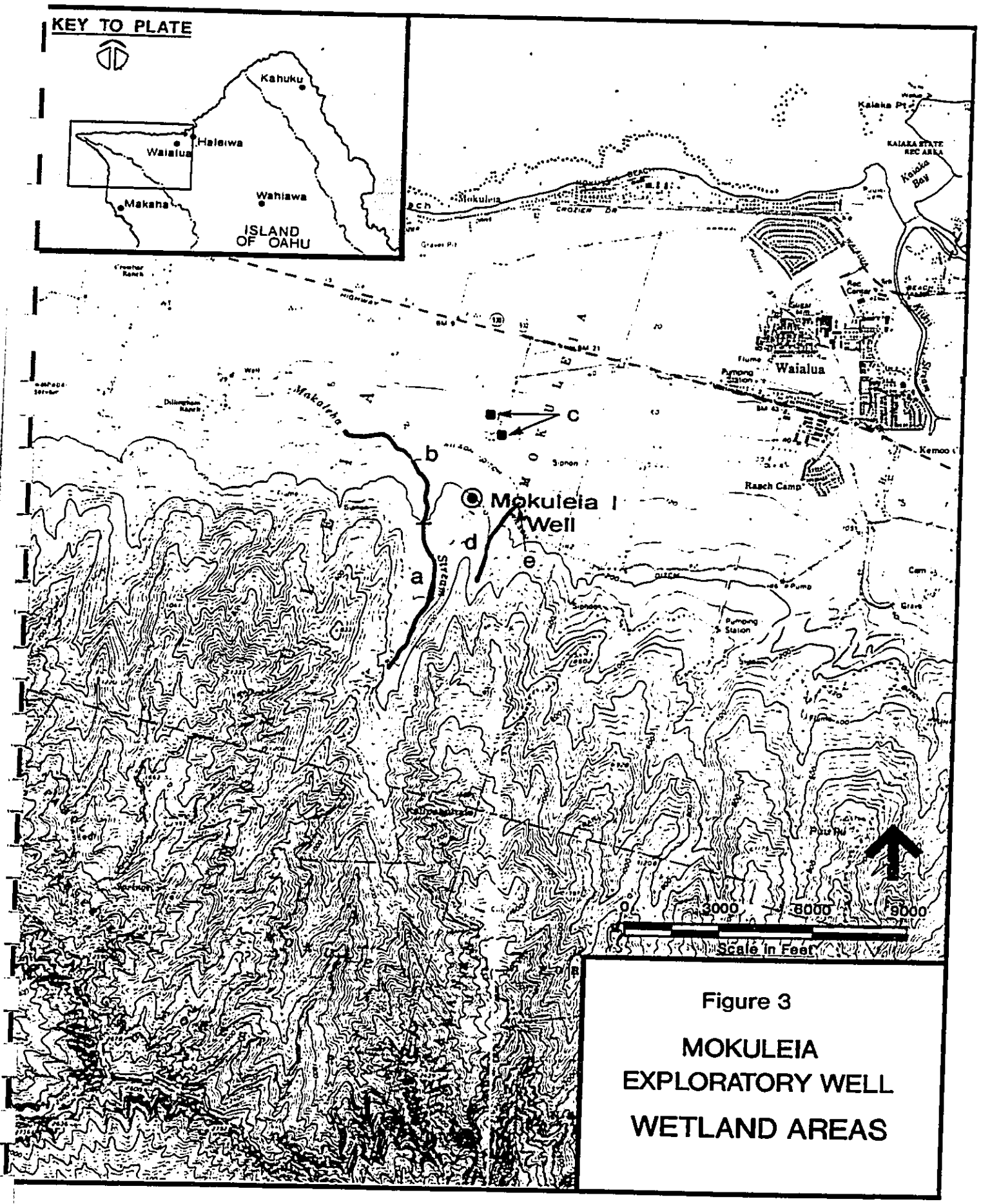


Figure 3

MOKULEIA
EXPLORATORY WELL

WETLAND AREAS

The wetland areas located within one-half mile of the proposed exploratory well are not wetlands of significance, and they are not named or listed in the Recovery Plan. [Ref. 8]

The well site is designated as Flood Zone D on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map, an area of undetermined, but possible, flood hazard. [Ref. 5]

3.1.4.2 Groundwater

Most of Oahu, including the North Shore area, is underlain with permeable volcanic rock which stores and transmits water readily. As a result, the island below sea level is saturated with saline water of ocean salinity, except where significant recharge of fresh water accumulates as a fresh water lens in a condition known as basal groundwater. This type of groundwater occurs below the Mokuleia well site. [Ref. 9]

According to the Department of the Interior U. S. Geological Survey, there are six main groundwater bodies along the North Shore. The Mokuleia area's fresh basal groundwater reservoir is located under the lower north slope of the Waianae Range from Waialua to the west end of Dillingham Field. Groundwater in the Mokuleia area originates from rainfall in the Waianae Range and deep percolation irrigation water known as return irrigation. Water levels in the Mokuleia groundwater body stand 16 to 20 feet above sea level compared to 12 feet in the Waialua groundwater body and less than 10 feet in the adjacent Kaena groundwater body.

Alluvium along the coastal areas of Mokuleia partially confine ground water as it moves seaward. West of Mokuleia, the alluvium layer is thin and unable to effectivvely impede the flow of groundwater to the ocean. Groundwater also leaks into marine sedimentary material. A thin body of fresh to brackish water within coralline limestone is located along the Mokuleia coastline. [Ref. 3]

There are two existing wells near the well site, both owned by U.S. Department of the Interior Geological Survey. The first, Well No. 3308-01, is an observation well located about 2,000 feet to the east of the well site. The second, Well No. 3409-20, is located about 3,000 feet to the north of the well site. No other information about these wells is available.

3.1.5 Noise

The well site is about three-quarters of a mile from Farrington Highway, distant enough to be unaffected by noise generated from automobile and truck traffic along the road. The road alongside the well site is used sporadically by FAA personnel and their vehicles. Birds may sometimes be heard.

3.2 BIOLOGICAL ENVIRONMENT

3.2.1 Flora

The well site is located in a sugarcane field. According to the botanical survey of the well site conducted in December 1989, vegetation found in the surrounding area include sugarcane, keawe, Java plum, guava, lantana, ironwood and California grass. None of these species is a Federal (U.S. Department of the Interior Fish and Wildlife Service) or State of Hawaii threatened or endangered species. A more detailed botanical survey is included in Appendix B.

3.2.2 Fauna

No wildlife was observed at the well site during a site inspection, though it could conceivably provide habitat for rats, mice, mongoose, feral pigs, feral cats, and feral dogs. Distant flocks of birds were visible in wetland area "e". (See Figure 3). Wetland areas provide habitats for

several endangered waterbirds which may include the Hawaiian Stilt, Hawaiian Coot, Hawaiian Gallinule, and Hawaiian Duck.

3.3 SOCIAL ENVIRONMENT

3.3.1 Population

The regional population of the North Shore area in 1985 was 13,227 persons, an increase of about 1.3% from the 1980 figure of 13,061 persons. These data compare to about 811,096 persons on Oahu in 1985, an increase of 6.7% from the 1980 figure of 762,534 persons. [Ref. 10]

Within Census Tract 99.01 in the Mokuleia-Waialua area, the resident population in 1985 was 5,473 persons, a 2.2% increase from the 1980 figure of 5,350 persons. Thus, the Mokuleia area has been growing at a slower rate than other areas of Oahu. [Ref. 10]

3.3.2 Scenic and Visual Resources

The well site is not visible from Farrington Highway and is not within a common view plain. However, the well site would be visible from the FAA buildings above the site.

3.3.3 Archaeological and Historical

An archaeological survey was conducted on the well site in January, 1990. The findings indicate the well site is located in an area of Mokuleia that does not indicate any previous archaeological activity. The surface survey revealed no archaeological or historic structures, remains, objects, or artifacts at the site. (See Appendix C). This finding is consistent with the agricultural use of the well site.

3.4 LAND USE, LAND USE PLANS, POLICIES, AND CONTROLS

3.4.1 Land Use

The well site is currently being used for the agricultural production of sugarcane. A field inspection showed that most of the surrounding nearby areas were also in sugarcane production. The closest developed areas are along Farrington Highway, about one mile away.

3.4.2 Land Use Plans, Policies and Controls

The well site is within the State Agricultural Land Use District and has a Land Study Bureau overall productivity rating of "C". Public facilities are a permitted use on agricultural lands. [Ref. 5]

On the City and County of Honolulu Development Plan Land Use Map, the proposed well site is within an area designated "Agriculture". The Mokuleia exploratory well is shown on the City and County of Honolulu Development Plan Public Facilities (DPPF) Map as "PF", site determined within 6 years. The exploratory well does not require an amendment to the DPPF Map. However, an amendment will be required if a production well is to be constructed.

The well site is zoned AG-1, Restricted Agriculture. According to the City and County of Honolulu Land Use Ordinance, a public facility such as the proposed exploratory well is a permitted use in all zoning designations.

Negotiation with the private landowner (Castle & Cooke) will be necessary for use of the site for well development.

The well site is within the Waialua Water Management Area (WMA). This designation is made by the State Commission on Water Resource Management when it can be reasonably determined that the water resources in an area may be threatened by existing or proposed withdrawals or diversions.

CHAPTER 4

POTENTIAL IMPACTS AND MITIGATIVE MEASURES

4.1 PHYSICAL ENVIRONMENT

4.1.1 Geology

The exploratory well will require a bore hole to be placed into the subsurface basalt rock. Once the exploratory well has been constructed and the five-day pumping test completed, the well will be capped. Once capped, there will be no adverse affects to the geologic resources of the area.

4.1.2 Soils

The well site will be cleared of all of the existing sugarcane prior to the well drilling. Soil at the site is classified by the U.S. Department of Agriculture Soil Conservation Service as Ewa silty clay loam, 6 to 12 percent slopes (EaC). Its soil capability classification is IIIe; soils with severe erosion potential if cultivated and not protected. Runoff on this soil is slow to medium and its erosion hazard is light to moderate. However, surrounding vegetation (principally sugarcane) should contain any soil runoff. Thus, the exploratory well should not have significant adverse affect to soil conditions on the well site.

4.1.3 Air Quality

The site clearing, well drilling and testing will take approximately six months to complete. These actions will create increased dust from clearing and grading the well site, and pollutant emissions from operation of vehicles and equipment. However, the normal tradewind pattern along the North Shore should disperse pollutant emissions generated by activities at the well site.

4.1.4 Hydrology

4.1.4.1 Surface Water

There are no surface water sources, flood plains, or wetlands on the well site. Man-made irrigation culverts above and below the site and along Mt. Kaala Road water sugarcane at the project site and in adjacent fields. Makaleha Stream, the closest natural surface water source, is located approximately one-quarter mile west of the well site. The stream is dry most of the time with large flows only occurring during the winter months. It is classified, based on the State DOH water quality standards, as "exploitive-consumptive" which means it is a stream with moderate to low natural environmental-biological and/or water quality, intended for water related recreational activities.

Five wetland areas within one-half mile of the proposed well are outlined in the National Wetlands Inventory map. The U.S. Fish and Wildlife Service has designated certain areas within the State of Hawaii to protect endangered waterbirds species. These include wetlands of significance--such as Ukoa Pond and the Kahuku wetlands, both on the North Shore--necessary for protecting endangered waterbirds such as the Hawaiian stilt, coot, gallinule and duck. In addition, Crowbar Ranch ponds, AmOrient prawn ponds, Haleiwa lotus fields and Waimea Falls Park are considered primary habitats for the recovery of endangered Hawaiian waterbirds, as listed in the Hawaiian Waterbirds Recovery Plan (U.S. Fish and Wildlife Service, September 1985).

The wetland areas located within one-half mile of the proposed exploratory well are not wetlands of significance, and they are not named or listed in the Recovery Plan. [Ref. 8]

At this time, the BWS does not anticipate monitoring these surface water sources during the pumping test period. If monitoring were to be

undertaken, the BWS would contract the U.S. Department of Interior Geological Survey to conduct the monitoring.

4.1.4.2 Groundwater

The groundwater resource below the Mokuleia well site is basal which indicates the fresh water is floating on top of saline water of ocean salinity. Once the well has been drilled, a five-hour step-drawdown test will be undertaken to determine the specific capacity (number of gallons withdrawn per foot of drawdown) of the well. The drawdown will be measured at each pumping rate.

The five-day, 120-hour pumping test will create a temporary disturbance to the equilibrium conditions in the basal aquifer. However, upon completion of the test, the well will be capped. Once this is done, the basal aquifer should return to the equilibrium conditions which existed prior to the test. Thus, there will be no significant adverse affect to the groundwater resources of the area from the test pumping.

4.1.5 Noise

The well site is located about one mile south of Kamehameha Highway, a distance far enough so that vehicle traffic is not a major source of noise. Site clearing, well drilling and testing will create noise from equipment and vehicles used during these operations.

Since the nearest residences are approximately one mile below the site, noise generated during these operations should not be intrusive. If the cable tool drilling method is used, noise will result from the drill bit hitting rock (like a pile driver, only quieter) and from the operation of a diesel engine.

Drilling will be restricted to hours from 7:30 AM to 3:30 PM to mitigate any potential adverse noise impacts.

4.2 BIOLOGICAL ENVIRONMENT

4.2.1 Flora

According to the botanical survey, the well site is primarily cultivated sugarcane production fields. Along the verges of the production fields and roadways, there are a number other species, mostly weeds. None of the species found on the well site are Federal or State of Hawaii listed or candidate threatened or endangered species. The exploratory well will not have a significant adverse effect, loss, or destruction to the flora of this area of Hawaii. [Ref. 10 and 11]

4.2.2 Fauna

Due to the sugarcane production at the well site, an extensive population of wildlife most likely does not occur on the site. However, the well site could provide habitat for rats, mice, mongoose, feral pigs, cats and dogs. None of these species is a Federal or State of Hawaii listed or candidate threatened or endangered species. The exploratory well will not have a significant adverse affect, loss, or destruction to the fauna of this area of Hawaii. [Ref. 10 and 11]

4.3 SOCIAL ENVIRONMENT

4.3.1 Population

The well drilling will be contracted by the BWS to a contractor who will be responsible for all aspects of the project, including supplying a drilling crew. Most likely, the crew members will come from all areas of Oahu, including some from the North Shore area. However, the crew size is not significant when compared to the population of the North Shore. There will be no adverse effects to the population of the North Shore from the project.

4.3.2 Scenic and Visual Resources

The well site is about one mile from Kamehameha Highway and is generally not visible. Although the well rig may be visible from the Highway, it will not be a significant structure and will not block any views of nearby areas. There should be no significant adverse effects to the visual quality of the North Shore area of Oahu.

4.3.3 Archaeological and Historic Resources

The archaeological field investigation revealed no archaeological or historic structures, remains, objects, or artifacts at the well site. The site is located in a sugarcane field that has been disturbed by heavy agricultural equipment over a number of years. In addition, the site is in a section of Mokuleia that has not indicated any previous activity.

There are no structures on the well site listed on the National or State of Hawaii Register of Historic Places. The lack of cultural resources indicates there will be no significant adverse effects from the exploratory well.

Should any unforeseen archaeological or historical artifact be encountered during construction, all work will be stopped and the State Historic Preservation Office will be notified.

4.4 LAND USE, LAND USE PLANS, POLICIES, AND CONTROLS

4.4.1 Land Use

The well site is currently being used for the agricultural production of sugarcane. The exploratory well will require removal of the existing production area for the drilling and support equipment. Once the drilling has been completed and the well capped, the well site can be returned to

the production of sugarcane. There will be no adverse effect to the land use of the well site.

4.4.2 Land Use Plans, Policies, and Controls

The well site is within the State of Hawaii Land Use District designated as Agricultural. Public facilities are a permitted use on agricultural lands.

The well is designated on the City and County Development Plan Public Facilities (DPPF) Map as "PF", site determined within 6 years. The exploratory well will not require an amendment to the DPFF Map. The site is zoned AG-1, Restricted Agriculture, which permits public facilities such as an exploratory well. Thus, the exploratory well is consistent with City and County of Honolulu land use plans and policies.

CHAPTER 5

POSSIBLE ALTERNATIVES

5.1 NO ACTION

The proposed project is part of an overall groundwater development program intended to meet anticipated consumer demands for potable water within the BWS Waialua-Kahuku Water Use District. The objective of the exploratory well is to determine the potential of the Mokuleia well as a future source of potable water. Under a no action alternative, neither of these objectives would be achieved. The no action alternative is not considered a feasible option to the proposed project.

5.2 DELAYED ACTION

Although the proposed project is not currently scheduled, delay of the project once budgeted would only serve to increase the cost when construction ultimately begins. Delaying the project would not rule out its necessity in the near future. The delayed action alternative is not considered a feasible option to the proposed project.

5.3 ALTERNATE SITES

The BWS is responsible for management, control, and operation of the municipal water system for certain areas of Oahu. As part of this responsibility, the BWS must identify well sites for exploratory drilling and eventual production of water. A number of factors are considered by the BWS in the selection of potential alternative exploratory well sites, including subsurface geologic and groundwater characteristics, depth of drilling to the water resource, nearby surface water sources, elevation of the site in relation to the distribution system, ease of access, surrounding terrain, natural and cultural resources, and environmental impacts.

The Mokuleia well site was selected after consideration of all of these factors. Thus, there are no alternative sites which meet the determining factors established by the BWS at this site.

CHAPTER 6

DETERMINATION

In accordance with the provisions of Chapter 343, Hawaii Revised Statutes, and the significance criteria set forth in Section 11-200-12 of Title 11 Chapter 200, this assessment has determined that the project will have no significant adverse impact on the environment, and that an Environmental Impact Statement is not required.

REFERENCES

1. Hawaii Revised Statutes, comprising the Statutes of the State of Hawaii, Volume 5, Titles 16-19, Chapters 281-344, 1985.

2. Title 11, Chapter 200, State of Hawaii Department of Health Environmental Impact Statement Rules, 1985.

3. J.C. Rosenau, E.R. Lubke, and R.H. Nakahara, Water Resources of North-Central Oahu, Hawaii, U.S. Department of the Interior, Geological Survey Water-Supply Paper 1899-D, Prepared in Cooperation with the State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development, 1971.

4. Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii, August 1972. U.S. Department of Agriculture, Soil Conservation Service, in cooperation with the University of Hawaii, Agricultural Experiment Station.

5. Waialua-Kahuku Regional Water System Improvements, Final Environmental Impact Statement, Board of Water Supply, City and County of Honolulu, prepared by Wilson Okamoto & Associates, September 1988.

6. Detailed Land Classification-Island of Oahu, Land Study Bureau, University of Hawaii, December 1972.

7. Thomas W. Giambelluca, Michael A. Nullet, and Thomas A. Shroeder, Rainfall Atlas of Hawai'i, Report R76, June 1986. Water Resources Research Center. Prepared for State of Hawaii Department of Land and Natural Resources, Division of Water and Land Development.

8. Hawaiian Waterbirds Recovery Plan, published by U.S. Fish and Wildlife Service, 1985.

9. Oahu Water Use and Development Plan, Technical Reference Document, Prepared for the City and County of Honolulu Department of General Planning, September 1989.

10. U.S. Bureau of the Census, 1980 Census of Population and Housing, Census Tracts, Honolulu, Hawaii, Standard Metropolitan Area.

11. Title 13, Chapter 124, Hawaii Administrative Rules, Department of Land and Natural Resources, Indigenous Wildlife, Endangered and Threatened Wildlife and Plants, and Introduced Wild Birds.

12. U.S. Fish and Wildlife Service, Endangered and Threatened Wildlife and Plants, January 1, 1989.

AGENCIES CONSULTED

FEDERAL AGENCIES

1. Mr. Ernest Kosaka
Environmental Coordinator
Department of the Interior
Fish and Wildlife Service
P.O. Box 50167
Honolulu, Hawaii 96850

2. Mr. William Myer
District Chief
Department of the Interior
Geological Survey
677 Ala Moana Blvd., Suite 415
Honolulu, Hawaii 96815

3. Mr. Warren M. Lee
State Conservationist
Department of Agriculture
Soil Conservation Service
P.O. Box 50004
Honolulu, Hawaii 96850

4.* Mr. Daniel W. McGovern
Regional Administrator
U.S. Environmental Protection Agency Region IX
215 Fremont Street
San Francisco, CA 94105

STATE AGENCIES

1.* Mr. Bruce Anderson, Ph.D.
Deputy Director for Environmental Health
State of Hawaii
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

2.* Mr. William Paty
Chairperson
State of Hawaii
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

3.* Mr. Yukio Kitagawa
Director
State of Hawaii
Department of Agriculture
1428 S. King St.
Honolulu, Hawaii 96814

4. Mr. John Harrison
Environmental Coordinator
University of Hawaii at Manoa
Environmental Center, Crawford 317
2550 Campus Rd.
Honolulu, Hawaii 96822

5. Mr. L. Stephan Lau, Ph.D.
University of Hawaii
Water Resources Research Center
2540 Dole St., Holmes Hall 283
Honolulu, Hawaii 96822

CITY AND COUNTY OF HONOLULU

1.* Mr. John Whalen
Director
City and County of Honolulu
Department of Land Utilization
650 South King Street
Honolulu, Hawaii 96813

2.* Mr. Donald Clegg
Director
City and County of Honolulu
Department of General Planning
650 South King Street
Honolulu, Hawaii 96813

3.* Mr. Sam Callejo
Director
City and County of Honolulu
Department of Public Works
650 South King Street
Honolulu, Hawaii 96813

OTHER INTEREST GROUPS

1. North Shore Neighborhood Board No. 27
P.O. Box 607
Haleiwa, Hawaii 96712

2.* Castle & Cooke, Inc.
P.O. Box 2990
Honolulu, Hawaii 96802

3. Life of the Land
250 South Hotel Street, Room 211
Honolulu, Hawaii 96813

4. Mr. Gary Anderson, Conservation Chair
Sierra Club
Honolulu Executive Committee
P.O. Box 11070
Honolulu, Hawaii 96828

* Responded. Letters included in Appendix A.

APPENDIX A

RESPONSE TO CONSULTATION

JS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, CA 94105

DEC 21 1989

In reply
refer to W-6-2

John L. Sakaguchi
Wilson Okamoto & Associates, Inc.
P. O. Box 3530
Honolulu, Hawaii 96811

Dear Mr. Sakaguchi:

I am writing in response to your request for comments and issues that should be addressed in each of the Environmental Assessments for the proposed exploratory well projects located near Mokuleia, Kawailoa and Kalihi Valley. Your letter was routed to our Section for reply.

The Underground Injection Control Section of the Region IX Environmental Protection Agency is primarily concerned with protecting underground sources of drinking water from contamination as a result of fluids being placed into injection wells. Since fluids will not be injected into your wells, these exploratory well projects are not directly under our program's jurisdiction. However, the Underground Injection Control Section is concerned with potential problems which may arise if, after evaluation, the decision is made not to put these wells into production. Unplugged or improperly abandoned water wells can easily become receptacles for the disposal of wastes. Whether intentional or unintentional, misuse may occur, involving disposal of various wastes which may ultimately contaminate underground sources of drinking water. Intentional misuse may involve disposal of hazardous wastes, sewage or simply household garbage. Unintentional injection through improperly plugged and abandoned wells may consist of surface run-off drainage into a well or the establishment of hydraulic connection between aquifers of different water quality.

Since these types of situations pose a great potential threat to underground sources of drinking water, we believe that plans for proper plugging and abandonment should be addressed in the EAs. The problems which arise when these wells are not properly

plugged and abandoned become issues that must be addressed by the appropriate authorities in Hawaii or by the EPA.

Should you have any questions, please call Donna Ann Ng of my staff at (415) 744-1640 or me at (415) ~~645~~ 454-9275.

Sincerely,

Lester Kaufman

Lester Kaufman, Chief
Underground Injection Control Section

cc: Tom Arizumi, HDOH

cc: L WHANG, BWS

JOHN WAIHEE
GOVERNOR OF HAWAII

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

JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

In reply, please refer to:
EPHSD

November 9, 1989

Wilson Okamoto & Associates, Inc.
1150 South King Street, Suite 800
Honolulu, Hawaii 96814

ATTENTION: John L. Sakaguchi

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR EXPLORATORY WELLS
MOKULEIA, KAWAILOA, AND KALIHI VALLEY

Dear Mr. Sakaguchi:

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

1. If the wells are to serve 25 or more individuals at least 60 days per year or has a minimum of 15 service connections, then the use of these wells as sources of drinking water will require compliance with the State's Potable Water Systems Regulations, Chapter 20, Title 11, Administrative Rules.

2. Department's Administrative Rules, Title 11, Chapter 20, "Potable Water Systems", Section 11-20-29 requires that any new source 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 stated in Section 11-20-29.

3. The Mokuleia Well lies approximately one mile east of Mokuleia Homesteads Wells 1 and 2, which are drilled but presently capped. Operation of the proposed well shall not be allowed to degrade the water quality of the Mokuleia Homestead wells, should they come into production.

4. The Kalihi Valley Well will be sited about 2000 feet from the BWS Kalihi Well. Effects of the proposed well, if any, on the Kalihi Well will no doubt be scrutinized by BWS engineers.

Should you have any questions, please contact the Safe Drinking Water Branch at 543-8258.

Sincerely yours,

BRUCE S. ANDERSON, Ph.D.
Deputy Director for
Environmental Health

AZ:la

cc: L WHANG, BWS

JOHN WAIHEE
GOVERNOR OF HAWAII

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

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES

LIBERT K. LANDGRAF
MANABU TAGOMORI
RUSSELL N. FUKUMOTO

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

REF:OCEA:SOR

DEC 6 1989

FILE NO.: 90-242
DOC. NO.: 6895E

RECEIVED
DEC 7 1989
WILSON OKAMOTO & ASSOCIATES

Mr. John L. Sakaguchi
Wilson Okamoto and Associates, Inc.
1150 South King Street, Suite 800
Honolulu, Hawaii 96814

Dear Mr. Sakaguchi:

SUBJECT: Environmental Assessment for Exploratory Wells, Mokuleia, Kawailoa, and Kalihi Valley

We have completed our review of the subject document and have the following comments to offer.

Our Division of Aquatic Resources identifies that it appears that two of the sites, in Kalihi Valley and Mokuleia, may be located near enough to streams to require some consideration for monitoring during the 5-day periods set for test operation, when runoff may be diverted into the streams. According to the documentation, the USGS will be contracted to monitor the streams during such periods and the EPA will conduct a variety of water quality tests. It is not anticipated that test operation under these conditions would represent any threat to aquatic habitats, so long as measures were taken to prevent erosion or introduction of toxins with the surface runoff.

Further, the Division of Water and Land Development concludes that well drilling and water use permits will be required.

The Historic Preservation Program finds that the Mokuleia Well site is in a sugarcane field and has never been archaeologically surveyed, as it was assumed that no historic sites would remain. There are very few recorded archaeological sites in Mokuleia, as there has been no systematic professional archaeological survey in the area. While it is probable that agricultural activities have destroyed any archaeological sites on the proposed well site, an archaeological survey of the site would provide the necessary information for an effect determination.

An archaeological field check was completed on the Kawailoa well site, and no archaeological sites were found. The archaeological report, which is included in the 1989 EIS, should also be attached to the proposed EA. A determination of "no effect" is appropriate.

The Kalihi Valley well site may be in an area containing archaeological sites. An archaeological survey in connection with the BWS Kalihi stream crossing project is now underway, and we will soon have more information on the area. Wilson Okamoto could also contact Allan Schilz of ERC, the archaeological contractor, for more information.

Finally, we have identified that the Kalihi well site is within the State Land Use Conservation District. As such, appropriate land use permit approvals are required.

Thank you for the opportunity to comment on this matter. Should you have any questions, please feel free to contact Ed Henry at the Office of Conservation and Environmental Affairs (548-7837).

Very truly yours,

WILLIAM W. PATY

cc: Larry Whang

JOHN WAIHEE
GOVERNOR

YUKIO KITAGAWA
CHAIRPERSON, BOARD OF AGRICULTURE

SUZANNE D. PETERSON
DEPUTY TO THE CHAIRPERSON

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2512

FAX: 548-6100

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822-0159

November 14, 1989

Wilson Okamoto and Associates, Inc.
1150 South King Street, Suite 800
Honolulu, Hawaii 96814

Attention: Mr. John L. Sakaguchi

Dear Mr. Sakaguchi:

Subject: Environmental Assessments for Exploratory Wells
Mokuleia, Kawailoa, and Kalihi Valley - Oahu
TMK: 6-8-07: por. 2 (Mokuleia)
6-1-06: por. 1 (Kawailoa)
1-4-18: por. 6 (Kalihi Valley)
Area: about one acre each

The Department of Agriculture has reviewed the subject proposals and offers the following comments.

Both the Mokuleia and Kawailoa project sites are classified "Prime" according to the Agricultural Lands of Importance to the State of Hawaii (ALISH) system. The Kalihi Valley site is not classified.

The Soil Conservation Service Soil Survey identifies the soils of the Mokuleia and Kawailoa sites as Ewa silty clay loam (EaC) with 6 to 12 percent slopes and Wahiawa silty clay (WaB) with 3 to 8 percent slopes, respectively. Both soils are used for sugarcane cultivation and have soil capability classifications of IIIe and IIe, respectively (soils with severe and moderate erosion potential if cultivated and not protected).

The Mokuleia and Kawailoa sites have Land Study Bureau Overall Productivity Ratings and Land Types of "A219i" and "A121", respectively. By this method of classification, both sites have fair to excellent productivity potential for most agricultural uses.

Should you have any questions on the above, please contact Mr. Earl Yamamoto of the Planning and Development Office at 548-7134.

Sincerely,

Yukio Kitagawa

YUKIO KITAGAWA
Chairperson, Board of Agriculture

cc: L WHANG; BWS

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4432

FRANK F. FASI
MAYOR

JOHN P. WHALEN
DIRECTOR

BENJAMIN B. LEE
DEPUTY DIRECTOR

LU10/89-6754(RF)

November 9, 1989

Mr. John L. Sakaguchi
Wilson Okamoto & Associates
1150 South King Street
Honolulu, Hawaii 96814

Dear Mr. Sakamoto:

Environmental Assessment for Exploratory Wells
Mokuleia, Kawailoa, and Kalihi Valley

We have reviewed the subject Environmental Assessment and have no comment at this time.

Very truly yours,

JOHN P. WHALEN
Director of Land Utilization

JPW:sl
0338N/2

cc: L WHANG ; BWS

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

FRANK F. FASI
MAYOR

DONALD A. CLEGG
CHIEF PLANNING OFFICER

GENE CONNELL
DEPUTY CHIEF PLANNING OFFICER

CT/KK/DGP 10/89-3850

November 7, 1989

Wilson, Okamoto & Associates
1150 South King Street, Suite 800
Honolulu, Hawaii 96814

Attention: John L. Sakaguchi

Gentlemen:

Proposed Environmental Assessments for
Board of Water Supply Exploratory Wells at
Mokuleia, Kawailoa, and Kalihi Valley

We have reviewed the material transmitted to us and offer the following comments.

1. The regulatory controls on the land and current uses are indicated in the table on page 2. This table should also indicate the Development Plan Public Facilities (DPPF) Map designations for the projects. Two of the sites (Mokuleia and Kawailoa) are shown on the North Shore DPPF Map as "Site Determined, Within 6 Years." The third site (Kalihi Valley) does not appear on the Primary Urban Center DPPF Map. The exploratory well project does not require a DPPF Map amendment, however, construction of a permanent well will require an amendment.

2. Soil Conservation Service soils information should be checked for possible limitations on construction of future pump houses at each site, should sustainable yields justify well development.

We have no specific information about the sites other than what you have listed on page 2 and what we have indicated about the public facilities map designations. We suggest that you contact BWS hydrology, geology or environmental staff for additional site information.

If you have any questions, contact Keith Kurahashi at 527-6051.

Sincerely,

DONALD A. CLEGG
Chief Planning Officer

DAC:lh

cc: L WHANG, BWS

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

FRANK F. FASI
MAYOR

SAM CALLEJO
DIRECTOR AND CHIEF ENGINEER

In reply refer to:
ENV 89-210(449)

November 8, 1989

Mr. John L. Sakaguchi, Planner
Wilson Okamoto and Associates
1150 South King Street
Honolulu, Hawaii 96814

Dear Mr. Sakaguchi:

Subject: Environmental Assessment (EA) for Exploratory Wells
TMK: 1-4-18: 06; 6-1-06: 01; and 6-8-07: 02

We have reviewed the subject EA and have the following comments:

1. There are no municipal sewers in the vicinity of the proposed exploratory wells.

2. We do not have any drainage comments at this time.

Very truly yours,

for SAM CALLEJO
Director and Chief Engineer

cc: L WHANG; BWS

CASTLE & COOKE, INC. P. O. BOX 2990 • HONOLULU, HAWAII 96802-2990
TELEPHONE (808) 548-6611

December 5, 1989

Wilson Okamoto & Associates, Inc.
1150 South King Street, Suite 800
Honolulu, Hawaii 96814

Attention: John L. Sakaguchi

Subject: Environmental Assessment for Exploratory Wells
Mokuleia, Kawailoa, and Kalihi Valley

We must apologize for the delay in responding to your letter of October 18, 1989.

We expect to have the comments from Waialua Sugar Company shortly and we will forward it to you.

Very truly yours,

George Yim, President
CASTLE & COOKE LAND COMPANY

cc: L WHANG

650 IWILEI ROAD, HONOLULU, HAWAII 96817

APPENDIX B

BOTANICAL SURVEY

BOTANICAL SURVEY REPORT FOR THE MOKULEIA WELL SITE

Evangeline J. Funk Ph.D.

INTRODUCTION

The Mokuleia Well Site is located in the coastal lowlands at about 200 feet elevation (Figure 1). It is on the south-west side (town side) of Mt. Kaala Road near the Wilson Ditch. A botanical survey of the approximately .5 acre site was conducted on November 22, 1989. The entire site was covered.

RESULTS

The site was found to be located in an area which was formerly low elevation scrub (Ripperton & Hosaka 1942) where the original vegetation was made up of two or three types of grasses and scrubby sandalwood (Funk 1988). The annual rainfall in this area is between 20 and 40 inches. Sugar (*Saccharium officinarum* L.) is presently being grown on the site.

The species composition of the flora was found to be limited to the following taxa:

CYPERACEAE - Sedge Family		
Cyperus rotundus L.	Nut grass	Introduced
Fimbristylis dichotoma (L.) Vahl.	Tall fringe rush	Introduced
GRAMINEAE - Grass Family		
Chloris inflara Link	Swollen Finger grass	Introduced
Panicum maximum Jacq.	Guinea grass	Introduced
Saccharium officinarum L.	Sugar	Introduced
CUCURBITACEAE - Gourd Family		
Momordica charantia L.	Bitter melon	Introduced
EUPHORBIACEAE - Spurge Family		
Ricinus communis L.	Castor bean	Introduced

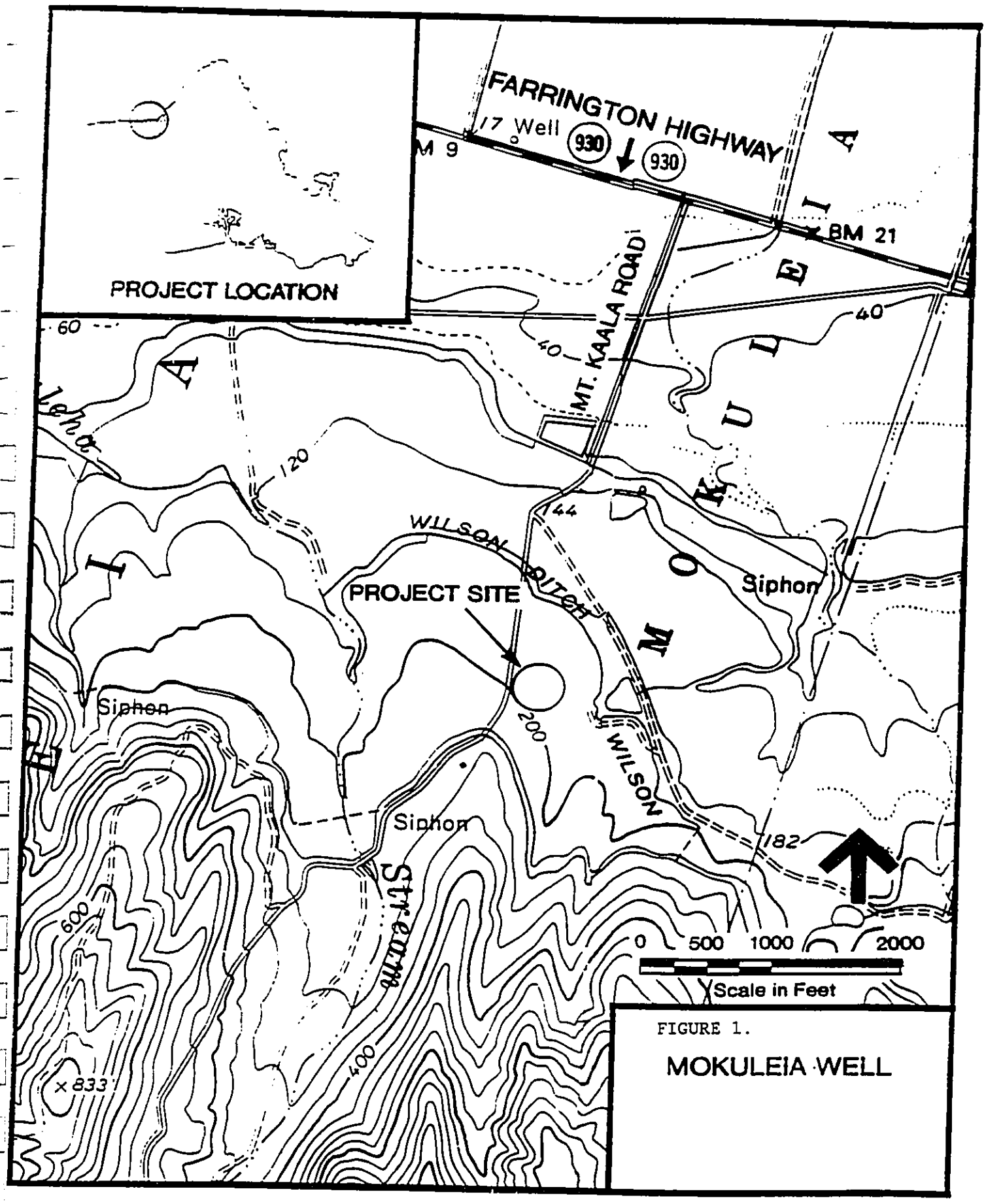


FIGURE 1.

MOKULEIA WELL

LEGUMINOSAE - Bean Family		
Crotalaria sp.	Rattle box	Introduced
Leucanea leucocephala (Lam.) deWit	Koa haole	Introduced
Alysicarpus vaginalis (L.) DC.	One leafed clover	Introduced

ENDANGERED AND THREATENED SPECIES

No U. S. Government (USFWS 1989) or State of Hawaii (DLNR 1986) proposed or listed threatened or endangered species of plants were found on this site.

CONCLUSIONS

All plants encountered during this survey are considered to be weeds (Haselwood & Motter 1966), except for the sugar which is a valued agricultural crop.

The taxonomy in this paper follows St. John (1973).

LITERATURE CITED

DLNR 1986. Hawaii Administrative Rules Title 13, Subtitle 5, Part 2 Wildlife, Cpt. 124.

Funk, E. J. 1988. The Notes of William Brackenridge Made During his Sandwich Islands Sojourn 1840-1841. Hawaii Botanical Society Newsletter:27(1).

Haselwood, E. L. and G. G. Motter. 1966. Handbook of Hawaiian Weeds. Hawaiian Sugar Planters' Association.

Ripperton, J. C. and E. Y. Hosaka. 1942. Vegetation Zones of Hawaii. Hawaii Agricultural Experiment Station Bulletin 89.

St. John, H. 1973. List and Summary of The Flowering Plants in the Hawaiian Islands. Pacific Tropical Botanical Garden Memoir Number 1. Lawai, Hawaii

U.S.F.W.S. 1989. Endangered and Threatened Wildlife and Plants 50 CFR 17.11 & 17.12. U.S. Government Printing Office.

APPENDIX C

ARCHAEOLOGICAL SURVEY

J.

ARCHAEOLOGICAL CONSULTANTS
of
HAWAII

59-624 Pupukea Rd.
Haleiwa, Hawaii 96712
(808) 638-7442

JOSEPH KENNEDY
Archaeologist

Mr. John Sakaguchi
Planner
Wilson Okamoto & Associates
PO Box 3530
Honolulu, Hawaii 96811

February 15, 1990

RE: Archaeological Reconnaissance for Mokuleia Exploratory Well Site, TMK:6-8-07:2, located at Mokuleia, Island of Oahu.

Dear Mr. Sakaguchi:

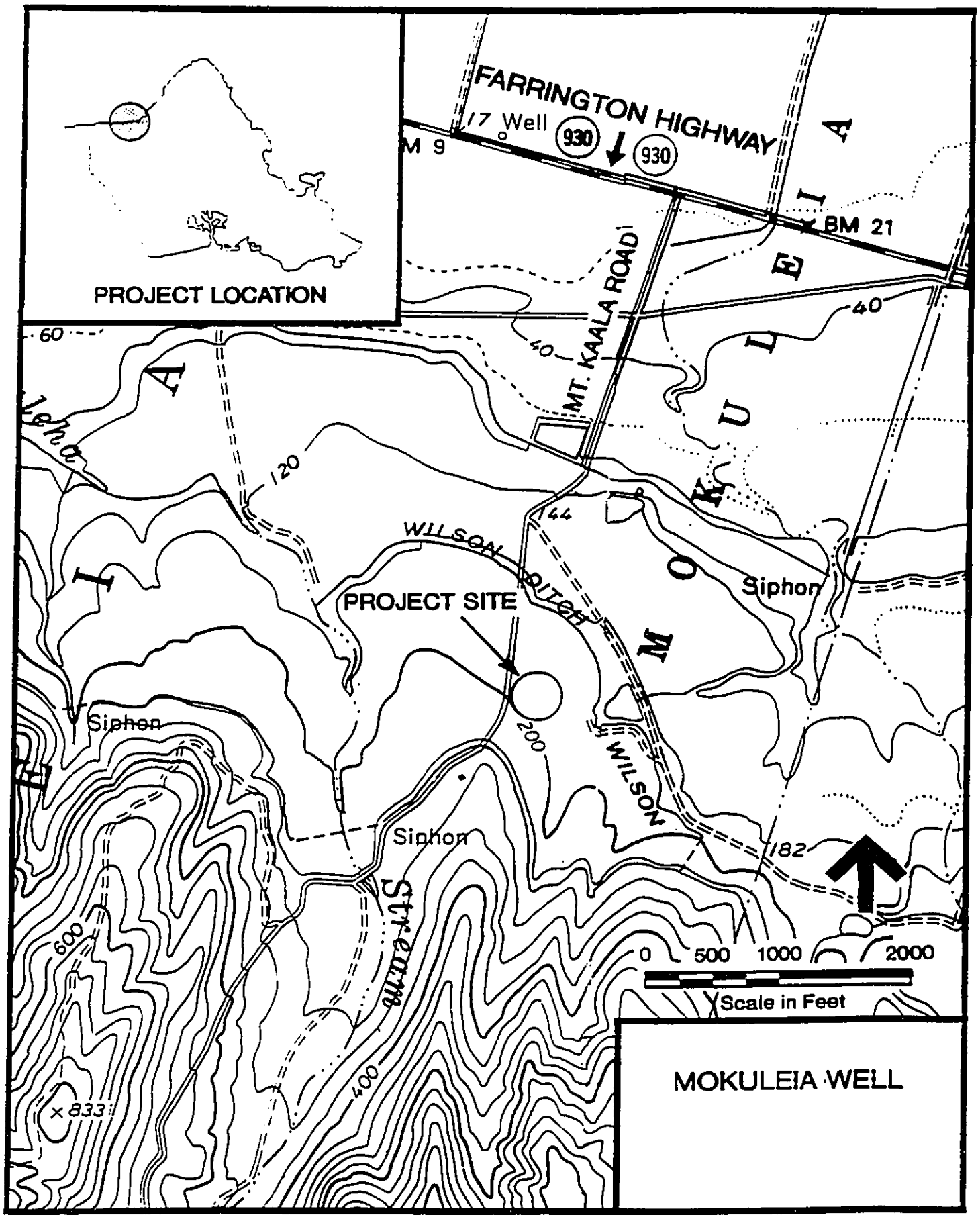
At the request of your office, Archaeological Consultants of Hawaii, Inc. has conducted a surface reconnaissance examination of the property described above.

The proposed well site is located in the middle of a sugarcane field. This particular small portion of Mokuleia has never been subjected to archaeological examination and there are no previously recorded sites on the property. Our examination of the property failed to produce any surface indications of cultural materials.

To date, the only work for the entire Mokuleia area has been limited to McAllister's work in the 1930's, a brief reconnaissance by Hommon in 1982, another by Barrera in 1986, four previous investigations by the author in 1986, 1987, 1989 and 1990, and some burial rescue efforts by the author and Bath in 1988. This makes Mokuleia one of the most poorly understood sections of the island of Oahu.

Some things we do know about the area is that there is evidence of a sizeable settlement located mauka of the Dillingham Airfield, burials associated with a well-defined occupation level in the Camp Mokuleia coastal area, two religious structures in the vicinity of the Kawaihapai Reservoir, and a third just mauka of Stanhope Ranch.

As mentioned, the subject property is located in a sugarcane field that has been subjected to the ravages of heavy equipment over a number of years. It should be noted that the potentially impacted area is also very small (10,000 square feet).


PROJECT LOCATION
FARRINGTON HIGHWAY
17 Well
930
930
M 9
BM 21
MT. KAALA ROAD
MOKULEIA
60
40
40
120
144
WILSON ROUTE
PROJECT SITE
Siphon
Siphon
Siphon
200
WILSON
182
Stream
600
400
833
0 500 1000 2000
Scale in Feet
MOKULEIA WELL

This sugarcane field is located in a section of Mokuleia that does not indicate any previous activity. A map prepared for the Conceptual Plan associated with the Kaena Point State Park lists a portion of the remaining cultural properties in Mokuleia and the general area in which the subject property is located is noticeably devoid of structures.

The subject property is very small, there are clearly no surface sites present, subsurface possibilities are greatly reduced if not nonexistent due to plantation activities, and preliminary indications point to other areas in Mokuleia which would be more likely to yield the much needed information for this area.

Based on the information presented above, it is our opinion that no further archaeological work is necessary at this location.

If there are any questions regarding this report, please feel free to contact me.

Aloha,

Joseph Kennedy
Consulting Archaeologist