March 21, 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 Assessment for Kalihi Valley Exploratory Well, Kalihi Valley, Oahu, Hawaii. TMK: 1-4-18: 06

We request that our proposed project be published in the OEQC Bulletin as a Negative Declaration.

Attached are four copies of the assessment for your use.

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

Very truly yours,

[Signature]

KAZU HAYASHIDA
Manager and Chief Engineer

Attachment

SM: jy
cc: K. Hayashida
Engineering
L. Whang

Pure Water ... man's greatest need - use it wisely
Environmental Assessment

for

Kalihi Valley Exploratory Well

Kalihi Valley, Oahu, Hawaii

BOARD OF WATER SUPPLY
Honolulu, Hawaii

March 1990
ENVIRONMENTAL IMPACT ASSESSMENT
FOR EXPLORATORY WELL II
AT KALIHI VALLEY, OAHU, HAWAII
Tax Map Key: 1-4-18:06

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

March 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 Kalihi Valley Exploratory Well II 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 Final Regional Environmental Impact Statement (EIS) for Development of Wells, Reservoirs, Transmission Lines and Appurtenances at Honolulu, Hawaii (accepted September 1986). Relevant portions of the 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 Kalihi Valley Well II site has been identified as such a potential source.

2.2 PROJECT LOCATION

Kalihi is located in Honolulu at the Ewa edge of the primary downtown commercial district. The Kalihi Valley Well II site is about 75 feet above Kalihi Stream and north of the suburban residential area at about 550 feet elevation, 800 feet south of Likelike Highway. This well site is located within the Honolulu Watershed Forest Reserve area owned by the City and County of Honolulu Board of Water Supply (BWS). Access to the site is via Kalihi Street and then an unimproved road maintained by the BWS. Figure 1 shows the project location and Figure 2 the well site as seen from the BWS road.

Since the well site is already accessible by an existing road, a separate BWS access road for equipment and supplies used in the exploratory drilling and testing will not be required.
View of project site to the right as seen from the BWS access road gate.

View of the project site looking down the road. The gate can be seen at far right.

Interior view of the site.
2.3 PROJECT FEATURES

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

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<td>Type of Aquifer</td>
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<td>Land Owner</td>
<td>BWS</td>
</tr>
<tr>
<td>Nearest Access</td>
<td>BWS Road</td>
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</tbody>
</table>

* million gallons per day

2.4 PROJECT CONSTRUCTION

An area of about .75 to 1.0-acre will be cleared and graded at the project site to accommodate well drilling and support equipment and necessary supplies. All excess material from the clearing and grading the project site will be disposed at 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.
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 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 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 off site in an approved manner. The waste material generated from this drilling method 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 be used to pump air down to the drill bit. This will ensure that the drilling fluid does not enter the aquifer. This rotary drill 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 sustained pumping test will be undertaken. The well will be pumped 8 hours per day for four days, and 5 hours on the fifth day. This test is designed to determine the sustainable capacity of the well, monitor water quality, and to measure aquifer parameters by monitoring BWS Well No 2250-01, located about 1/2 northeast, or upstream, of the well site. (The sustainable capacity of a well is the rate at which the well can be continuously pumped without affecting nearby existing wells.)

In addition to monitoring the nearby well, Kalihi Stream will be monitored to identify adverse effects from the pumping. The BWS has contracted the U.S. Department of Interior Geological Survey (USGS) to conduct this monitoring during the test period. USGS Gage No. 2290, located about 2,400 feet downstream of the well site, will be used for this monitoring.
Water pumped 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 into Kalihi Stream. 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 wastes, 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 licenses. For planning purposes, the BWS estimates the exploratory well drilling at Kalihi Valley will occur within the Fiscal Year (FY) 1989-90.
CHAPTER 3

AFFECTED ENVIRONMENT

3.1 PHYSICAL ENVIRONMENT

3.1.1 Geology

The Island of Oahu is composed of the remnants of two elongated shield volcanoes, the Waianae and Koolau ranges, which are connected by the Schofield plateau. The Koolau volcano is the younger of the two and emerged east, sending lava flows westward to overlap and bank against the Waianae flank. In later periods, changes in sea level and the deposition of sediments contributed to the building of flat coastal plains.

Kalihi Valley is the product of extensive rain and spring water erosion on the Leeward side of the Koolau Shield Volcano. Koolau basalt makes up the valley walls. Dense vesicular jointed a’a and pahoehoe flows of basalt which generally floor valleys along the Koolau Range are found down the middle of Kalihi Valley, about 10 to 300 feet thick. Much of this basalt has been incised by Kalihi Stream, exposing the permeable rock above stream level. [Ref. 3]

3.1.2 Soils

Soil at the Kalihi well site is classified by the U.S. Department of Agriculture Soil Conservation Service as Lolekaa silty clay, 15 to 25 percent slope (LoD). The Lolekaa series are well-drained soils most often found on side slopes of terraces and along drainage ways. These soils develop from old, gravelly colluvium and alluvium. Soil runoff of LoD is medium, and the erosion hazard is moderate. [Ref. 4]
3.1.3 Climate and Air Quality

The average rainfall in the State is 73 inches per year. Due to its higher elevation, rainfall measurements (State Key No. 776.00) taken in upper Kalihi Valley indicate the site receives a mean annual rainfall of approximately 140 inches. There is little variation in rainfall on a month to month basis. Tropical storms occasionally bring heavy rains while the rest is orographic or comes from Kona storms, or those which approach from the southwest. [Ref. 5]

January is the coldest month, averaging 72 degrees Fahrenheit, and August is the warmest, averaging 78 degrees Fahrenheit. Average relative humidity is 72 percent in the mornings and 57 percent in the afternoons. [Ref. 6]

Air quality on most areas of Oahu is generally affected by vehicle traffic, stationary sources, and the prevailing tradewinds. High volumes of vehicle traffic pass within 800 feet of the well site but trees and undergrowth provide a dense barrier against air currents. This factor, coupled with the freshening effects of normal tradewind conditions, produces relatively good air quality at the well site. No agricultural activities occur nearby which might otherwise be a source of air pollutants.

3.1.4 Hydrology

3.1.4.1 Surface Water

There are no surface water sources, flood plains, or wetlands on the well site. However, Kalihi Stream has its source above the well site and lies about 75 feet below the road adjacent to the site. This stream is continuous flowing and is designated "Construct-Alter" by the DOH. According to this water quality standard, the stream has low environmental
and biological quality and may be restricted to the public for health and safety reasons. [Ref. 6]

Stream flow data is compiled by the USGS at specific points along some individual streams. Kalihi Stream is one of those gaged by the USGS (Gage 2290) within the Honolulu District. The data obtained on Kalihi Stream gage located about 2,400 feet downstream of the well site is summarized in Table 1. [Ref. 6 and Ref. 7]

The well site is included in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM). It is designated as Flood Zone D-- an area of undetermined, but possible, flood hazard. [Ref. 6]

3.1.4.2 Groundwater

The Koolau basalt, the principal aquifer in the Honolulu District, underlies a layer of Kalihi basalt and alluvium in the area of the well site. Recharge is transmitted and stored in open spaces within lava tubes, vesicles, and cooling cracks. Infiltrated rain water can also be perched atop layers of impermeable material such as dense lava flows, solidified ash, or clay-rich sediments. This is the nature of perched water located below the Kalihi Well II site. [Ref. 6]

The closest existing groundwater source to the well site is BWS Well No. 2250-01, an artesian well, located about 1/2 mile to the northeast (upstream). The latest records show water withdrawals of .1 mgd at this well. [Ref. 8] Water from this source is used by the BWS system.

There are a series of BWS water tunnels (Nos. 2249-01 to 04) constructed during the 1930's located about 1 mile northeast, or upstream, of the well site. Water recovered from these tunnels is moving through the Kalihi basalt and alluvium toward the floor of the valley. Although the latest water use records indicate withdrawals of about .27 million gallons per
STREAM FLOW DATA for KALIHI STREAM

USGS GAGE NO. 2290
ELEVATION: 464 FEET

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*Million gallons per day

N/A: Not Available

[Ref. 7]
day (MGD) from these tunnels, they are no longer used by the BWS as a source of groundwater. [Ref. 9]

3.1.5 Noise

In most areas of Oahu, including the Kalihi valley area, vehicle traffic is the primary source of noise. At the well site, noise sources consist of birds, running water from Kalihi Stream, and the distant sounds of traffic on Likelike Highway.

3.2 BIOLOGICAL ENVIRONMENT

3.2.1 Flora

A botanical survey of the well site was conducted in December, 1989 (See Appendix B). According to this survey, the well site is densely covered with introduced bamboo. Two indigenous taxa, hau and kamani trees, also appear at the site, as they do in many other low land sites on all the Hawaiian Islands. The ground cover consists of bamboo leaves and rose apple seedlings.

All other flora were found along the unimproved road adjacent to the well site. They include occasional oak fern, sword fern, lau'a'e, taro vine, syngonium, palm grass, red ginger, octopus tree, wedelia, sweet potato, Coster's curse, Moreton bay fig, Chinese banyan, strawberry guava, thimble berry, coffee, glorybower, and cayenne vervain. More common flora found along the roadway include taro, koka, and rose apple. (See Appendix B).

None of these species found during the survey is a Federal (U.S. Department of the Interior Fish and Wildlife Service) or State of Hawaii listed or candidate threatened or endangered plant species. [Ref. 10 and Ref. 11]
3.2.2 Fauna

Although a site survey for wildlife was not undertaken, an extensive population of wildlife most likely does not occur on the site. During the field survey, no wildlife or trace of significant fauna was observable. However, the well site could conceivably provide habitat for rats, mice, mongoose, feral pigs, feral cats, and feral dogs. None of these species is a Federal or State of Hawaii listed or candidate threatened or endangered species.

3.3 SOCIAL ENVIRONMENT

3.3.1 Population

The regional population of Kalihi Valley in 1985 was 17,696, an increase of about 0.5 percent from the 1980 figure of 17,613 persons. These data compare to about 811,100 persons on Oahu in 1985, an increase of 6.7 percent from the 1980 figure of 762,534 persons. [Ref. 12]

Within Census Tract No. 65 encompassing the upper Kalihi valley area, the resident population in 1985 was 4,114 persons, an increase of 1.9 percent from the 1980 figure of 4,037 persons. [Ref. 12] Two residences are located in the immediate area at the edge of the forest reserve, thereby fronting the well site.

3.3.2 Scenic and Visual Resources

The well site is located at the end of Kalihi Street just beyond the gate which establishes the beginning of the State Forest Reserve area. The well site is mostly bamboo interspersed with a variety of mature trees and other vegetation. Although there are two nearby residences, most other residential areas are located in the lower portion of the valley.
The hillsides and dense vegetation of the well site provide a visual relief from the intense urban development along Kalihi Street and other areas of Kalihi. The hillside location and dense vegetation means that the well site will not be visible from most of the lower areas of Kalihi and from Likelike Highway.

3.3.3 Archaeological and Historical Resources

An archaeological survey was conducted in January, 1989 and is included in Appendix C. This field investigation revealed no archaeological or historic structures, remains, objects, or artifacts at the well site. There are no structures on the well site listed on the National or State of Hawaii Register of Historic Places.

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

3.4.1 Land Use

The well site is within the Honolulu Watershed Forest Reserve and does not contain any buildings or structures. Other nearby land uses include an unimproved access road, two residences, and BWS well no. 2250.01.

3.4.2 Land Use Policies and Controls

The well site is located within the State Conservation Land Use District. Under this designation, any development requires approval by the State of Hawaii Board of Land and Natural Resources through a Conservation District Use Application (CDUA) Permit. The intent of the Board approval and CDUA is to assure the judicious development and utilization of Conservation Lands.

The Kalihi Valley II exploratory well does not appear on the City and County of Honolulu Development Plan Public Facilities (DPPF) Map. 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 P-1, Preservation, by the City and County of Honolulu. According to the City's Land Use Ordinance, a public facility such as the exploratory well is a permitted use in all zoning designations.

The well site is within the Honolulu 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 to reach the perched water source. 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 existing vegetation prior to the well drilling. According to the U.S. Department of Agriculture Soil Conservation Service, soils on the well site are classified as Lolekaa silty clay, 15 to 25 percent slope (LoD). The Lolekaa series are well-drained soils most often found on side slopes of terraces and along drainage ways. These soils develop from old, gravelly colluvium and alluvium. Soil runoff of LoD is medium, and the erosion hazard is moderate. [Ref. 4] Clearing of the site may cause some erosion.

4.1.3 Climate and Air Quality

The site clearing, well drilling and testing will take approximately six months to complete. These activities will create increased dust from clearing and grading the well site, and pollutant emissions from operation of vehicles and equipment. To mitigate the effects of site clearing activities, dust control measures, such as water sprinkling, will be implemented by the contractor to reduce dust levels, as necessary.

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4.1.4 Hydrology

4.1.4.1 Surface Water

Kalihi Stream flows along the opposite side of the access road to the well site. Impacts to Kalihi Stream could occur from decreased flow during the five-day pumping test. Stream flow will be monitored during development of the exploratory well. The BWS has contracted the U.S. Department of Interior Geological Survey to monitor streams and other water bodies during the test period.

If the monitoring shows stream flow in Kalihi Stream is adversely affected, mitigative measures acceptable to both the State Department of Land and Natural Resources and the U.S. Fish and Wildlife Service will be implemented.

This stream is continuous flowing and is designated "Construct-Alter" by the State of Hawaii Department of Health. According to this water quality standard, the stream has low environmental and biological quality and may be restricted to the public for health and safety reasons. [Ref. 6]

4.1.4.2 Groundwater

The groundwater resource below the Kalihi Valley well II site is perched and pumping from the resource may affect the existing nearby BWS well, water tunnels, and possibly Kalihi Stream. However, analysis of past stream flow data show the existing BWS well has not affected flows in Kalihi Stream.

Once the well has been drilled, a five-day (8 hours per day for four days and 5 hours on the fifth day) pumping test will be undertaken to determine the specific capacity, or yield, of the well. The drawdown will be measured at each pumping rate. The test is also used to determine what effect pumping will have on other sources.
4.1.5 Noise

The increased traffic from construction vehicles will not be significant, but may cause some minor inconveniences to area residents for the duration of construction. Because the nearest residences border the well site, noise generated during the drilling operations will 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. If the rotary drilling method is used, the operation will be quieter. In either case, drilling will be restricted to hours from 7:30 AM to 3:30 PM.

Noise permits will be required from the Noise and Radiation Branch of the Department of Health and contractors must comply with the conditions issued with the permits. Mufflers for noise control will be required for all construction equipment. All noise attenuating equipment will be maintained in proper operating condition and will be repaired or replaced as needed.

4.2 BIOLOGICAL ENVIRONMENT

4.2.1 Flora

According to the botanical survey, flora at the site consists mostly of bamboo and hau trees with a ground cover of bamboo leaves and rose-apple seedlings. Along the verge of the roadway, there are a number of other species. 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.
4.2.2 Fauna

During the field survey, no wildlife or trace of significant fauna was observable. However, the well site could conceivably provide habitat for rats, mice, mongoose, feral pigs, feral cats, and feral dogs. None of these species is a Federal or State of Hawaii listed or candidate threatened or endangered species.

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 Kalihi area. However, the crew size is not significant when compared to the population of Kalihi. There will be no adverse effects to the population of Kalihi from the project.

4.3.2 Scenic and Visual Resources

The well site is not visible from Likelike Highway and does not present a significant adverse visual impact to the general populace. However, clearing of the site's dense growth and the ensuing construction activities will be very visible to the several residences which border the area. Visual impact to these residents will be unavoidable but will decrease over time.

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. 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 proposed well site is within the Honolulu Watershed Forest Reserve and is not being used. The exploratory well will require removal of the existing vegetation for the drilling and support equipment. Once the drilling has been completed and the well capped, much of the well site can be returned in time to its natural state.

4.4.2 Land Use Plans, Policies, and Controls

The well site is within the State of Hawaii Land Use District designated as Conservation. Therefore, it will require approval by the Board of Land and Natural Resources for a Conservation District Use Application (CDUA) Permit to assure the judicious development and utilization of Conservation Lands. Approval of the CDUA will ensure the exploratory well is consistent with the policies of the Board.

The Kalihi Valley II exploratory well does not appear on the City and County of Honolulu Development Plan Public Facilities (DPPF) Map. The exploratory well does not require an amendment to the DPPF Map. In accordance with the City's Land Use Ordinance, public facilities such as the proposed water system improvements are permitted uses in all zoning designations. 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

Under the no action alternative, existing pumpages would be maintained and no new water sources would be developed in the Honolulu District. However, the Honolulu District is the most heavily populated area on the island and has the highest domestic water demand. Additional water sources are required to meet present and projected demands. If new water sources are not developed within the district, then water must be transported from surrounding areas. This will result in additional transmission, storage, and pumping costs. Thus, the no action alternative is not considered a viable alternative.

5.2 DELAYED ACTION

The proposed project is currently scheduled for fiscal year 1989-90. Delay of the project would likely increase the cost once construction ultimately begins. Delaying the project would not rule out its necessity in the near future.

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 Kalihi Valley well II 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 impact on the environment, and that an Environmental Impact Statement is not required.
REFERENCES


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
    Department of Land and Natural Resources
    State of Hawaii
    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. Kaliihi Valley Neighborhood Board No. 16
P.O. Box 19063
Honolulu, HI 96817
2. Life of the Land  
250 South Hotel Street, Room 211  
Honolulu, Hawaii 96813

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

* Respected. Letters included in Appendix A.
APPENDIX A
RESPONSE TO CONSULTATION
In reply
refer to W-6-2

John L. Sakaguchi
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) 445-9275.

Sincerely,

Lester Kaufman
Lester Kaufman, Chief
Underground Injection Control Section

cc: Tom Arizumi, HDOH

cc: L Whang, BWS
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. The 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:1a

cc: L WHANG, BWS
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, Kawaiola, 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 Kawaiola 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
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, Kawaiola, and Kalihi Valley - Oahu  
THK: 6-8-07: por. 2 (Mokuleia)  
6-1-06: por. 1 (Kawaiola)  
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 Kawaiola 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 Kawaiola 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 IIIa and IIe, respectively (soils with severe and moderate erosion potential if cultivated and not protected).  

The Mokuleia and Kawaiola sites have Land Study Bureau Overall Productivity Ratings and Land Types of "A2191" and "A121", respectively. By this method of classification, both sites have fair to excellent productivity potential for most agricultural uses.
Mr. John L. Sakaguchi  
November 14, 1989  
Page -2-

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
Chairperson, Board of Agriculture

cc: L.Wang; BWS
November 9, 1989

Mr. John L. Sakaguchi
Wilson Okamoto & Associates
7150 South King Street
Honolulu, Hawaii 96814

Dear Mr. Sakamoto:

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

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

Very truly yours,

[Signature]
JOHN P. WHALEN
Director of Land Utilization

JPW:s1
0338N/2

CC: L. Whang, BWS
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, Kawaiola, 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 Kawaiola) 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 927-6051.

Sincerely,

DONALD A. CLEGG
Chief Planning Officer

DAC:1h

CC: L. WHANG, BWS
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
TMIK: 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,

SAM CALLEJO
Director and Chief Engineer

CC: L. Whang, BWS
APPENDIX B

BOTANICAL SURVEY
BOTANICAL SURVEY REPORT FOR THE KALIHI VALLEY WELL SITE

Evangeline J. Funk Ph.D.

INTRODUCTION

The Kalihi Valley well site is located immediately south of Kalihi Valley stream at about 600 feet elevation (Figure 1), in a wet, lush setting. A botanical survey was conducted on the .5 acre site on December 7, 1989. One-hundred percent of the site was examined.

RESULTS

The absence of most native vegetation on this site, its proximity to a perennial fresh water stream, and some physical evidence of clearing, indicate that the area has been farmed some time in the past. At present it is covered by a dense stand of introduced bamboo, 40 to 50 feet in height. Bamboo was planted in this area in 1956 (Skolmen 1980). The emergent trees are scattered true kamani (Calophyllum inophyllum L.) which have attained a height of 60 feet or more. True kamani trees were valued and planted by prehistoric people for their medicinal properties and for their beautiful wood. The understory, aside from the bamboo, is almost entirely absent. The ground layer consists of bamboo leaves and rose apple seedlings (Eugenia jambos L.). All other listed taxa were found along the unimproved road that separates the site from Kalihi Stream.

ENDANGERED 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 in December 1989.
CONCLUSIONS

The Kalihi Valley well site is densely covered with introduced bamboo. Two indigenous (found in Hawaii and in many other warm places) taxa, hau (Hibiscus tiliaceus L.), and the kamaani trees, which occur on this site are found in many other low land sites on all the Hawaiian Islands.

LIMITATIONS OF THE SURVEY

This survey was carried out in December 1989. All parts of the site were visited. A species list prepared at a different time of year would probably differ slightly from the one presented here due to weather conditions and the growth habits of the plants.

LITERATURE CITED

Degener, O. 1932 present. Flora Hawaïensis. Privately Published.


SPECIES LIST

The plant families in the following species list have been alphabetically arranged within three groups, Ferns, Monocotyledons, and Dicotyledons. The genera and species are arranged alphabetically within families. The taxonomy and nomenclature follow that of Neal (1965), St. John (1973), and Haselwood and Motter (1976). For each taxon the following information is provided:

1. An asterisk before the plant name indicates a plant which has been introduced to Hawaii since the arrival of Capt. James Cook or by the Polynesians.

2. The name of the plant family to which the taxon belongs.

3. The scientific name of the taxon.

4. The Hawaiian name and or the most widely used common name.

5. Abundance ratings are for this site only and they have the following meanings:

   Uncommon - a plant that was found less than five times.

   Occasional - a plant that was found between five to ten times.

   Frequent - a plant that was found in widely scattered parts of the site in low numbers.

   Common - a plant considered an important part of the vegetation.
CORRECTION

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

The plant families in the following species list have been alphabetically arranged within three groups, Ferns, Monocotyledons, and Dicotyledons. The genera and species are arranged alphabetically within families. The taxonomy and nomenclature follow that of Neal (1965), St. John (1973), and Haselwood and Motter (1976). For each taxon the following information is provided:

1. An asterisk before the plant name indicates a plant which has been introduced to Hawaii since the arrival of Capt. James Cook or by the Polynesians.

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   Frequent – a plant that was found in widely scattered parts of the site in low numbers.

   Common – a plant considered an important part of the vegetation.
# Checklist of Plants Found on the Kahili Valley Well Site

## Ferns and Fern Allies

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Abundance</th>
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<tbody>
<tr>
<td>POLYPODIACEAE - Common Ferns</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Dryopteris dentata</em> (Frer.). C. Chr.</td>
<td>Oak Fern</td>
<td>Occasional</td>
</tr>
<tr>
<td><em>Nephrolepis exaltata</em> (L.) Schott</td>
<td>Sword Fern</td>
<td>Occasional</td>
</tr>
<tr>
<td><em>Polypodium scolopendrium</em> Brum. f.</td>
<td>Laua'e</td>
<td>Occasional</td>
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## Monocotyledonae

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<tr>
<th>Scientific Name</th>
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<tbody>
<tr>
<td>ARACEAE - Arum Family</td>
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<td></td>
</tr>
<tr>
<td><em>Calocasia esculenta</em> (L.)</td>
<td>Taro</td>
<td>Common</td>
</tr>
<tr>
<td><em>Scindapsus aureus</em> Engl.</td>
<td>Taro Vine</td>
<td>Occasional</td>
</tr>
<tr>
<td><em>Syngonium auritum</em> (L.) Scott</td>
<td>Syngonium</td>
<td>Occasional</td>
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<th>Scientific Name</th>
<th>Common Name</th>
<th>Abundance</th>
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<tr>
<td>GRAMINEAE - Grass Family</td>
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<td></td>
</tr>
<tr>
<td><em>Bambusa sp.</em></td>
<td>Bamboo</td>
<td>Common</td>
</tr>
<tr>
<td><em>Setaria palifolia</em> (Koen.) Slapf.</td>
<td>Palm grass</td>
<td>Occasional</td>
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<th>Scientific Name</th>
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<tbody>
<tr>
<td>ZINGIBERACEAE - Ginger Family</td>
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</tr>
<tr>
<td><em>Alpinia purpurata</em> K. Schum</td>
<td>Red ginger</td>
<td>Occasional</td>
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## Dicotyledonae

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<th>Scientific Name</th>
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<tr>
<td>ARALIACEAE - Ginseng Family</td>
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</tr>
<tr>
<td><em>Brassia obovata</em> (L.) Lam.</td>
<td>Octopus tree</td>
<td>Occasional</td>
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<tbody>
<tr>
<td>COMPOSITAE - Sunflower Family</td>
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<tr>
<td><em>Wedelia triloba</em> Hitchc.</td>
<td>Wedelia</td>
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<tbody>
<tr>
<td>CONVOLVULACEAE - Morning glory Family</td>
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</tr>
<tr>
<td><em>Ipomoea batatas</em> (L.) Lam.</td>
<td>Sweet potato</td>
<td>Occasional</td>
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<th>Scientific Name</th>
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<tbody>
<tr>
<td>EUPHORBIACEAE - Spurge Family</td>
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<td></td>
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<tr>
<td><em>Bispotia javanica</em> Bl.</td>
<td>Koka</td>
<td>Common</td>
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<th>Scientific Name</th>
<th>Common Name</th>
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<tbody>
<tr>
<td>GUTTIFERA - Mangosteen Family</td>
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<td></td>
</tr>
<tr>
<td><em>Gnetum inophyllum</em> L.</td>
<td>Kamani</td>
<td>Common</td>
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<th>Abundance</th>
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<tbody>
<tr>
<td>MALVACEAE - Mallow Family</td>
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</tr>
<tr>
<td><em>Heterostegia tiliacea</em> L.</td>
<td>Hau</td>
<td>Occasional</td>
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<th>Abundance</th>
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<tbody>
<tr>
<td>MELASTOMATACEAE - Melostoma Family</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Gleditsia hirsuta</em> (L.) D. Don</td>
<td>Costers' curse</td>
<td>Occasional</td>
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<tbody>
<tr>
<td>MORACEAE - Fig Family</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ficus macrophylla</em> Desc.</td>
<td>Moreton Bay fig</td>
<td>Occasional</td>
</tr>
<tr>
<td><em>Ficus microcarpa</em> L.</td>
<td>Chinese banyan</td>
<td>Occasional</td>
</tr>
<tr>
<td>SCIENTIFIC NAME</td>
<td>COMMON NAME</td>
<td>ABUNDANCE</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>MYRTACEAE - Myrtle Family</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Eugenia jamboe L.</td>
<td>Rose Apple</td>
<td>Common</td>
</tr>
<tr>
<td>*Psidium cattleianum Sabine</td>
<td>Strawberry guava</td>
<td>Occasional</td>
</tr>
<tr>
<td>ROSACEAE - Rose Family</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Rubus rosaeolius Sm.</td>
<td>Thimble berry</td>
<td>Occasional</td>
</tr>
<tr>
<td>RUBIACEAE - Coffee Family</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Coffee arabica L.</td>
<td>Coffee</td>
<td>Occasional</td>
</tr>
<tr>
<td>VERBENACEAE - Verbena Family</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Clerodendrum paniculatum L.</td>
<td>Glorybower</td>
<td>Occasional</td>
</tr>
<tr>
<td>*Stachyterpheta cayennensis Vahl.</td>
<td>Cayenne vervain</td>
<td>Occasional</td>
</tr>
</tbody>
</table>
APPENDIX C
ARCHAEOLOGICAL SURVEY

February 18, 1990

Mr. John Sakaguchi
Planner
Wilson Okamoto & Associates
PO Box 3530
Honolulu, Hawaii 96814

Dear Mr. Sakaguchi:

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

The proposed well site is located just mauka of the residential area on the Likelike Highway side of the valley. The subject property is small (10,000 square feet) and situated in the middle of a bamboo thicket. Visibility was good between the trees and it is unlikely that any features were overlooked.

A check of the records at the Department of Land and Natural Resources, Historic Sites Section, indicates that there has been no previous study of this small piece of property nor are there any previous sites recorded. Our examination failed to produce any surface indication of cultural materials.

The author is aware that a great number of sites are still located in the upper Kaliihi area. These are however, located farther upstream and quite a distance from the study area. Most recently a contract archaeological firm (ERC) has been doing subsurface monitoring for Board of Water Supply stream crossings in the general area; according to a briefing presented to Wilson Okamoto & Associates dated January 27, 1990, ERC has to date, found nothing of significance.
Based on the information presented above, it is our opinion that no further archaeological work is necessary at this particular location.

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

Aloha,

[Signature]

Joseph Kennedy
Consulting Archaeologist