

**BOARD OF WATER SUPPLY**

CITY AND COUNTY OF HONOLULU

630 SOUTH BERETANIA STREET

HONOLULU, HAWAII 96843



July 24, 1991

'91 JUL 29 P12.54

FRANK F. FASI, Mayor

DONNA B. GOTH, Chairman  
WALTER O. WATSON, JR., Vice Chairman  
SAM CALLEJO  
EDWARD Y. HIRATA  
MAURICE H. YAMASATO

KAZU HAYASHIDA  
Manager and Chief Engineer

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

OFFICE OF ENVIRONMENTAL  
QUALITY CONTROL

Dear Mr. Choy:

Subject: Environmental Impact Assessment for the Kaluanui Exploratory Well II,  
Oahu, Hawaii, TMK: 5-3-04: 4

We request that our proposed well 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 Bert Kuioka at 527-5235.

Very truly yours,

KAZU HAYASHIDA  
Manager and Chief Engineer

Attachment

**FILE COPY**



ENVIRONMENTAL IMPACT ASSESSMENT  
FOR AN EXPLORATORY WELL AND ACCESS ROAD  
AT KALUANUI OAHU

Tax Map Key: 5-3-4:4

April 1991

OA - FEA -  
1991-08-08 - ~~FEA-DA~~



ENVIRONMENTAL IMPACT ASSESSMENT  
FOR AN (EXPLORATORY WELL AND ACCESS ROAD  
AT KALUANUI) OAHU

Tax Map Key: 5-3-4:4

April 1991

Proposing Agency

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

Contact: Mr. Burt Kuioka, Telephone 527-5235

Prepared by

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

## TABLE OF CONTENTS

TABLE OF CONTENTS		Page
1.	INTRODUCTORY AND SUMMARY	i
1.1	Applicant/Proposing Agency	1
1.2	Approving Agency	1
1.3	Agencies Consulted in Making the Assessment	1
1.4	Project Background and Objectives	1
1.5	Project and Site Description	1
1.6	Potential Impacts, Mitigation Measures, and Alternatives	2
1.7	Governmental Permits and Approvals	2
2.	PROJECT DESCRIPTION	
2.1	Project Site	3
2.1.1	Location and Description	3
2.1.2	Land Ownership	3
2.1.3	Land Use Designation and Control	3
2.2	Proposed Facilities and Activities	3
2.3	Project Schedule and Cost	4
2.4	Need for the Project	5
3.	EXISTING CONDITIONS	
3.1	Physical Environment	6
3.1.1	Geology	6
3.1.2	Hydrology	6
3.1.3	Topography	7
3.1.4	Climate	7
3.1.5	Soil	7
3.1.6	Natural Hazards	8
3.1.7	Flora	8
3.1.8	Fauna	9
3.1.9	Archaeology	10
3.2	Socio-Economic Environment	11
4.	SUMMARY OF POTENTIAL IMPACT AND MITIGATION MEASURES	
4.1	Temporary Impacts During Construction of the Access Road, Drilling and Pumpage Tests	12
4.2	Impacts on Stream Flow and Stream Environment	12
4.3	Impacts on Archaeological Resources	13

Table of Contents (continued)

	Page
5. POSSIBLE ALTERNATIVES	
5.1 No Action	14
5.2 Delayed Project	14
5.3 Alternate Well Sites	14
6. DETERMINATION	15
7. REFERENCES	16
FIGURE 1. Location Map	
FIGURE 2. Photos of Well Site and Access Road Corridor	
FIGURE 3. Vicinity Map	
APPENDIX A: BOTANICAL INVESTIGATION	
APPENDIX B: ARCHAEOLOGICAL INVESTIGATION	

## CHAPTER 1

### INTRODUCTION AND SUMMARY

#### 1.1 APPLICANT/PROPOSING AGENCY

Board of Water Supply, City and County of Honolulu

#### 1.2 APPROVING AGENCY

Office of the Governor, State of Hawaii

#### 1.3 AGENCIES CONSULTED IN MAKING THE ASSESSMENT

Office of Environmental Quality Control

#### 1.4 PROJECT OBJECTIVES AND BACKGROUND

In the fiscal year ending June 30, 1990, the Honolulu Board of Water Supply (BWS) system served a population of over 860,000. Average daily water demand on the island during this period was 153 million gallons (mg). According to BWS projections, average daily water demand in the year 2010 will be 191 mg, an increase of 25 percent.

To meet growing demand, BWS has initiated a comprehensive groundwater development program. It proposes to drill an exploratory well on the west slope of Kaluanui stream, mauka of Hauula town, to determine the yield and quality of potable water at this location.

#### 1.5 PROJECT AND SITE DESCRIPTION

The proposed exploratory well will be located on a densely wooded slope north of Kaluanui stream, about a mile southwest (mauka) of Kamehameha Highway. The site is at an elevation of about 120 feet on the west slope of Kaluanui stream. It is on land owned by the State.

A temporary construction road will be required to provide access to the well site; the tentative road alignment is illustrated in Figure 1. The project will involve drilling a hole about 18 inches in diameter to a depth of about 400 feet. Once the drilling is completed, a 14-inch diameter steel casing will be grouted into place and a pump installed. A series of aquifer tests will be conducted to determine the sustained well capacity and water quality. Upon completion of the test pumping, the well driller will remove the pump, cap the well, and clean the area. The estimated project duration is six to seven months.

1.6 POTENTIAL IMPACTS, MITIGATION MEASURES, AND ALTERNATIVES

No significant adverse impacts are expected during the drilling and pumpage test, and no permanent impacts are anticipated. Short-term impacts during construction of the access road include noise from equipment and erosion. Measures will be carried out to minimize or alleviate the impacts.

Three alternatives to the projects have been considered--no action, delayed project, and alternate sites--but none of these would enable the Board of Water Supply to achieve its stated objectives.

1.7 GOVERNMENTAL PERMITS AND APPROVALS

The following permits/approvals will be required:

Conservation District Use Permit - Department of Land and Natural Resources  
Well Drilling Permit - Department of Land and Natural Resources

## CHAPTER 2

### PROJECT DESCRIPTION

#### 2.1 PROJECT SITE

##### 2.1.1 Location and Description

The site for the proposed exploratory well is on the west slope of Kaluanui stream, about a mile and a half inland from Kamehameha Highway near Hau'ula town. The well site will cover an area of about 900 square feet (30' X 30') on a densely wooded slope overlooking the stream. It is at an elevation of approximately 120 feet above sea level, and the slope is in the range of 25 percent. (See Figure 1, Location Map, and Figure 2, Photos of Well Site and Access Road Corridor.)

The proposed access road will be approximately 12 feet wide and 300 feet long running generally north from an existing 12 feet wide access road serving an existing well and control building. The access road will generally run on a side slope pattern in a northwesterly direction from the existing road to the proposed well site, rising at an approximately 7% grade.

##### 2.1.2 Land Ownership

The well site and access road are located on State-owned land in the Sacred Falls State Park (Tax Map Key 5-3-4:4).

##### 2.1.3 Land Use Designations and Controls

On the City and County of Honolulu Development Plan Land Use Map, the proposed site is within an area designated P-1, "Preservation".

#### 2.2 PROPOSED FACILITIES AND ACTIVITIES

The project will involve the following:

2.2.1 Clearing and grading of a dirt access road, approximately 300 feet in length, from an existing access road serving another well and pump control building to the site of this new exploratory well. The road will follow a side hill slope up of about 7%, and the right-of-way will be 12 feet wide.

2.2.2 Clearing and grading of the well site, which will cover a 900 square feet area.



2.2.3 Drilling and pumpage tests. A hole about 18 inches in diameter and approximately 400 deep will be drilled to reach fresh dike basal ground water. (This is groundwater that floats on top of salt water and is partially prevented from moving seaward by relatively impermeable dikes in the basaltic lava flows of the Koolau Range.) Two possible drilling methods are available: cable tool drilling or rotary drilling. Given the expected depth of the well, the cable tool drilling method will probably be used. (Rotary drilling is generally more expensive and used for drilling to depths of more than 800-1,000 feet.) Drilling is expected to last about three to four months. Once it is completed, a 14-inch diameter steel casing will be grouted into place, a pump will be installed, and test pumping will commence to determine the extent and quality of the aquifer. Two pumpage tests will be conducted: a short-term yield drawdown test and a continuous test for five days. The well driller will then remove the pump, cap the well, and clean the area.

If the results show that source development is feasible, the Board of Water Supply expects to convert the test hole into a production facility. It is estimated that this Kaluanui source will yield approximately 1.0 million gallons per day (mgd), but this can only be confirmed by test pumping. The test results will indicate the facilities needed for source development, including the well pump and required appurtenances. The well will be part of the proposed Hau'ula 180 system, including new reservoir and well facilities in Ma'akua, Hau'ula, Waialele and Laie. The majority of the water from these wells will be boosted, via the proposed Hauula line booster, to the Windward 272' system. BWS must obtain the necessary permits and approvals to carry out this final phase. Installation and operation of a production well is subject to the environmental review process stipulated in Chapter 343, Hawaii Revised Statutes, and Chapter 200 of the State Department of Health Regulations.

### 2.3 PROJECT SCHEDULE AND COST

The project is expected to begin in mid-1991. Drilling contractors are usually allowed a year to complete an exploratory well. After clearing and grading of the access road and well site, estimated to take about a month, drilling will commence and be completed in about three to four months. One or two weeks will be required for installing the casing and another two weeks for installing the pump and running the pumpage tests. Demobilization will take approximately two weeks. Total project duration is estimated to be six or seven months.

The estimated cost is \$250,000 (approximately \$50,000 for the road and \$200,000 for the exploratory well). Funds are available in the BWS budget for the fiscal year ending June 30, 1990.

#### 2.4 NEED FOR THE PROJECT

The Board of Water Supply currently serves a population of more than 860,000 in the fiscal year ending June 30, 1990, island-wide average daily water demand was 153 mgd. The BWS's Honolulu District, extending from Aliamanu to Hawaii Kai, is the most heavily populated and has the highest domestic water demand on the island. In the 1989-90 fiscal year, average daily water demand in Honolulu was 85 mgd. Over half of this amount (48 mgd) was produced from sources within the district, while the remainder had to be imported from the Pearl Harbor District (36.14 mgd) and the Windward District (0.95 mgd). Pumpage from the Pearl Harbor aquifer, however, cannot be further increased without risking serious encroachment of sea water into the basal water lens. (The Department of Land and Natural Resources, Commission on Water Resource Management, currently limits the Honolulu District's total allowed draft from the Pearl Harbor aquifer to 38.14 mgd.)

Demand for water in the Honolulu District is projected to increase by 8 percent between 1990 and 2010 to 92 mgd. During this same period, islandwide water demand is projected to rise by 25 percent. To meet growing demand, the Board of Water Supply is seeking to identify, test, and develop new groundwater sources in the Windward District. Kaluanui and other proposed Windward Oahu potable water sources are estimated to have a maximum potential yield of about 41 to 45 mgd. Some of this will go toward meeting the projected demand on the windward side, which is estimated to increase from 19.0 mgd (FY 1989-90) to 19.7 mgd in the year 2010. The remainder will be pumped around Makapu'u to Honolulu. If the Kaluanui source is determined feasible for development, an estimated 1.0 mgd may be added to the BWS system.

The Board of Water Supply has considered a number of alternatives to potable groundwater sources, such as desalination, development of surface and brackish water sources, and the recycling of treated wastewater. Until these alternatives become acceptable from a technical, health, and/or cost standpoint, BWS will continue its emphasis on the development of groundwater sources.

CHAPTER 3  
EXISTING CONDITIONS

3.1 PHYSICAL ENVIRONMENT

3.1.1 Geology

Windward Oahu is the remnant of the Ko'olau Volcano. Valleys were carved into the basalt of the Ko'olau Range as eruptions became less frequent. Some of the gravel and clay formed by weathering and erosion of the shield were deposited on valley floors and fringing coastal plain. In addition, alluvium of marine origin accumulated in the valleys as the sea level rose and fell during inter-glacial and glacial periods.

The Kaluanui area is part of the northwest rift zone of the Ko'olau Volcano, which extended from the main caldera (centered around Kailua and Kaneohe) to Kahuku. A major feature of the Ko'olau Range is an extensive dike system formed in the rift zone. These intrusive dikes were formed when molten rock flowing through fissures in the volcano cooled and solidified in the fissures. Because the lava solidified while still under pressure, the rock that formed the dikes is much denser and less permeable than the older, surrounding lava flows. Rain fall that is not lost to evapotranspiration or surface runoff infiltrates into the highly porous Ko'olau basalt and is stored as groundwater between the relatively impermeable dikes. The nearest visible dike is located approximately 2,600 feet upstream. Undiscovered dikes may also occur closer.

3.1.2 Hydrology

These dike compartments are typically found in higher elevations of the Ko'olau. At a lower elevation, extending 11 miles between Punalu'u and Kahuku, is the Ko'olauloa Basal Aquifer. This substantial body of basal groundwater floats on top of salt water and is confined by either sedimentary caprock or occasional dikes. It is recharged primarily by leakage and overflow of dike-impounded groundwater from higher elevations and by infiltration of rainfall and stream flow. Kaluanui stream is located south of the proposed access road and well site. It is a small perennial stream that drains from Kaliuwaa (Sacred Falls) Gulch in the Hauula Forest Reserve into the ocean. Below the USGS gauging station the flow is often intermittent. It is expected that the proposed exploratory well at Kaluanui will tap a partially confined dike basal water source that is part of the Ko'olauloa Basal Aquifer.

### 3.1.3 Topography

The proposed exploratory well is located on a hillside at an elevation of about 120 feet above sea level. Slope at the well site is approximately 25 percent.

### 3.1.4 Climate

Average monthly temperature in the Kahuku area, about six miles to the northwest of Hau'ula, ranges from approximately 72 degrees F. in the coolest month to 79 degrees F. in the warmest month (State of Hawaii Data Book, 1987). Exposed to the prevailing northeast tradewinds off the ocean, the windward coast experiences very little variation in temperature between day and night. Average annual rainfall at Kaluanui is approximately 75 inches, and the winters tend to be wetter than the summers (Atlas of Hawaii, 1973).

### 3.1.5 Soil

Soil in the project area is classified by the U.S. Department of Agriculture Soil Conservation Service (August 1972) as Waialua stony silty clay, 3 to 8 percent slope (W1B) at the lower elevations near the Kaluanui stream bed, and Waialua very stony silty clay, 12 to 20% slope, (WmD) and Waikane silty clay, 40 to 70% slope, (WpF) at higher elevations on the west slope away from the stream bed. The Waialua series consists of moderately well drained soils on alluvial fans. These soils developed in alluvium weathered from basic igneous rock and are nearly level to steep. They are used for sugarcane, truck crops, orchards and pastures. The Waikane series consists of well drained soils on alluvial fans and terraces. They developed in alluvium and colluvium derived from basic igneous rock. These soils are used for pasture, truck crops and homesites. Waialua and Waikane soils are considered only fair as a top soil. Waialua stony silty clay (W1B) has cultivation capability ratings of IIIe (irrigated) which indicates severe erosion if not cultivated and IIIs (nonirrigated) which indicates severe limitations because of stoniness, unfavorable texture, shallowness or low water-holding capacity. Waialua very stony silty clay (WmD) has a capability rating of VIIs (nonirrigated) which indicates severe limitations for cultivation because of stoniness or unfavorable texture, and is not rated as an irrigated soil. Waikane silty clay (WpF) has a capability rating of VIIe (nonirrigated) which indicates very severe cultivation limitations due to risk of erosion, and is not rated as an irrigated soil.

The proposed exploratory well site and access road corridor are on what appear to be long-abandoned farm land but are not in agricultural use, and they are not located on agricultural land of importance to the State.

### 3.1.6 Natural Hazards

According to the National Flood Insurance Program Flood Insurance Rate Map, the proposed well site is Zone D, an area in which flood hazards are undetermined (Federal Emergency Management Agency, 1987). The well site is upslope from Kaluanui stream, so the risk of flooding appears to be slight.

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

### 3.1.7 Flora

On November 7, 1990, Evangeline J. Funk, Ph.D., of Botanical Consultants conducted a botanical survey of the proposed well site and access road. The site appears to be long-abandoned farm land. The remains of an old, concrete irrigation system and many large Mango trees (*Mangifer indica* L.) indicate earlier human occupancy of the site.

3.1.7.1 Flora: The vegetation of the site is almost entirely introduced. The scattered, emergent trees are 12 to 15 m mango, Java plum (*Syzygium cumini* (L.) Skeels), and Gunpowder or charcoal (*Trema orientalis* (L.) Blume) trees. The tree layer or canopy of the site is composed of octopus trees (*Schefflera actinophylla* (Endl.) Harms). These small trees, 7 to 8 m, provide 50 to 75% cover. The understory is made up of Christmas berry trees (*Schinus terebinthifolius* Raddi). These shrubby, 5 to 6 m trees provide a thin, scant 25 to 30% cover.

The ground is rocky and the herb layer is composed of leaf litter, seedlings, ferns and a wide variety of weedy, alien species. The most common taxon is laua'e-haole (*Phlebodium aureum* (L.) J. Sm). In this area it attains a height of 40 to 100 cm.

There are a few indigenous (known to exist naturally in Hawaii and other places) species. *Poa* or *Psilotum nudum* (L.) Griseb. was found in several places and two 'akia or fish poison (*Wikstroemia oahuensis* (A.) Gray) Rock shrubs were found under the canopy.

3.1.7.2 Species List: The plant families in the following species list have been alphabetically arranged within two groups, Monocotyledons and Dicotyledons. The genera and species are arranged alphabetically within families. The taxonomy and nomenclature follow that of St. John (1973) and Wagner, Herbst and Sohmer (1990). For each taxon the following information is provided:

(a) An asterisk before the plant name indicates a plant introduced to the Hawaiian Islands since Cook or by the aborigines.

(b) The scientific name.

(c) The Hawaiian name and/or the most widely used common name.

(d) Abundance ratings are for this site only, and they have the following meanings:

Uncommon - a plant that was found less than 5 times.

Occasional - a plant that was found 5 to 10 times.

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

Locally abundant - plants found in large numbers over a limited area, for example the plants found in grassy patches.

A species list contained in Appendix A of this report is the result of an extensive survey of this site at the beginning of the rainy season (November 1990) and it reflects the vegetative composition of the flora during a single season. Minor changes in the vegetation will occur due to introductions and losses and a slightly different species list would result from a survey conducted during a different growing season.

3.1.7.3 Endangered Species: No proposed or listed threatened or endangered plant species were found during this survey (USFWS 1990, State of Hawaii 1990).

3.1.7.4 Conclusions: The proposed site is located in an area which is almost entirely covered with introduced or alien vegetation. Botanically, there is no reason why this project cannot be undertaken.

### 3.1.8 Fauna

Terrestrial Wildlife : It is unlikely that the project site provides an important habitat for any endangered native bird species. The botanical survey confirmed that introduced vegetation dominates the Kaluanui area, and apart from waterbirds, most endemic birds on the island are limited to native forests. Exceptions include the 'elepaio (*Chasiempis sandwichensis*), which has been found in some areas where nearly all of the vegetation is composed of introduced plants, and the pueo or Hawaiian short-eared owl, which is found in open grassland, pastures, forests, lava flows, and residential areas. It is possible that these birds frequent the Kaluanui project area, but the more common species found in a guava mixed forest habitat include the cardinal, barred dove, spotted dove, ricebird, and Japanese white eye (mejiro)-all of which are introduced (Atlas of Hawaii, 1973).

Stream Fauna : As part of the environmental impact statement prepared for the Windward Oahu Regional Water System Improvements, a biological survey of 32 perennial streams from Waimanalo to Kahuku was conducted in 1983-84 by Kelly M. Archer, Aquatic Biologist (1984). The purpose of the survey was to determine the diversity and abundance of native stream animals and to rank the streams according to biological quality. Based on the survey, as well as previous studies, Archer assigned stream quality ratings to show how the Windward Oahu streams compare with each other. Because of the location of the project, stream fauna will be unaffected by this project.

### 3.1.9 Archaeology

An archaeological survey of Kaluanui Valley was conducted in 1973 by Paul H. Rosendahl of the B. P. Bishop Museum and 23 sites were located. The sites recorded on the coastal plain, which was previously in sugar cane production, included irrigation canals and ditch trails. The sites on the slopes of the valley included dryland terraces, stone mounds, habitat platforms, and additional historic irrigation ditches.

A more intensive survey of proposed park use areas was conducted by State Parks archaeologists in 1980-81. At this time, State site number 50-80-05-290 was assigned to Kaluanui Valley with a series of consecutive numbers (290-1 through 290-20), designating the sites located during the 1973 and 1981 surveys. The 1981 survey located additional mound features and platforms. Testing conducted on several mound features indicated a lack of cultural materials and suggested that these features represent agricultural clearing mounds.

On November 22, 1990, State Parks archaeologists Martha Yent and Marc Smith conducted a field check and their report is contained in Appendix B. It was their recommendation that Sites 290-21, 290-22 and 290-24 be flagged prior to the use of machinery in the area to prevent inadvertent damage. The significance of these sites is related to their research potential however, based on the fact these sites are structural features, it is not likely that testing will yield additional information. Recording of the sites during this field trip was hampered by the density of vegetation, so it is therefore recommended that State Park archaeologists be notified when clearing work for the roadway and drilling site is to begin as this clearing may permit photographing of the archaeological sites.

### 3.2 SOCIO-ECONOMIC ENVIRONMENT

Hau'ula is a rural beach community situated on Oahu's windward coast, with Punalu'u to the southeast and Laie to the northwest. In 1980, Hau'ula had a population of about 3,000 (Hawaii State Data Book, 1987). It is a residential community composed largely of single-family homes. Economic activities include small-scale agriculture and retail establishments to serve both local residents and those driving along the scenic coastal road. Hau'ula has a small shopping center, as well as an elementary school, fire station, and a County beach park.



## CHAPTER 4

### SUMMARY OF POTENTIAL IMPACTS AND MITIGATION MEASURES

The impacts associated with construction of the access road and the exploratory drilling and testing will be temporary, lasting no longer than the duration of the project--about six or seven months. No long-term impacts are foreseen.

#### 4.1 TEMPORARY IMPACTS DURING CONSTRUCTION OF THE ACCESS ROAD, DRILLING, AND PUMPAGE TESTS

Construction of the access road and preparation of the well site will require clearing of existing vegetation and grading. Erosion is a potential adverse impact. With the vegetation cover removed, runoff may occur during grading and result in sediment deposit in nearby Kaluanui stream. This impact can be minimized by having the site revegetated with grass species already in the area as soon as possible.

Noise will not be a problem because of the project's distance from populated areas. There will be some noise from equipment during construction of the access road, however, this part of the work, carried out during regular working hours, will take place remote from any residential area. Noise generated during the drilling and pump test phases of the project will have no impact at the isolated well site. Other impacts, such as increases in traffic, dust, and emissions from vehicles and equipment, are expected to be insignificant.

#### 4.2 IMPACTS ON STREAM FLOW AND STREAM ENVIRONMENT

The perennial flow of Kaluanui stream is fed, for the most part, by groundwater leaking out of the dike system in the high rainfall upper reaches. To the extent that the pumpage tests lower the groundwater level, they will reduce the hydraulic head and may affect the groundwater leakage into the stream. In practice, however, the reduction is likely to be so small as to be undetectable because Kaluanui Stream is perched on the valley fill with minimal hydraulic connection. No significant adverse effect on stream flow or the stream ecosystem is anticipated.

Additional study may be required to ascertain the longer term effects of a production well on stream flow if development of the well is considered feasible. Since no discernable effects were noticed from test pumping of the previous two wells, no adverse effects are expected.

#### 4.3 IMPACT ON ARCHAEOLOGICAL RESOURCES

The significance of Sites 290-21, 290-22 and 290-24 is related to their research potential however, based on the fact these sites are structural features, it is not likely that testing will yield additional information. The recommendations that they be flagged prior to construction to prevent inadvertent damage, and that State Park archaeologists be notified when clearing work for the roadway and drilling site is to begin to permit photographing of the archaeological sites, will provide a level of protection and opportunity for documentation consistent with their limited significance.

CHAPTER 5  
POSSIBLE ALTERNATIVES

5.1 NO ACTION

The proposed project is part of an overall groundwater development program intended to increase the municipal water supply to meet growing demand. Its immediate objective is to determine the yield and quality of the site as a potential source of potable water to serve the Board of Water Supply's Honolulu and Windward Districts. Under the "no action" alternative, neither of these objectives would be achieved.

5.2 DELAYED PROJECT

Delay of the project would initially have the same effects as the "no action" alternative. Drilling and testing at a later date may result in higher costs due to inflation.

5.3 ALTERNATE SITES

The Board of Water Supply has plans to test a number of other potential well sites in the Windward District, so an alternative is to commence with one or more of these sites and delay the Kaluanui project. However, Kaluanui is a favorable location because of its relatively high expected yield of 1.5 mgd and remoteness from homes and public facilities. Botanical and archaeological surveys indicate there are no significant impediments to the project.

CHAPTER 6

DETERMINATION

In accordance with Chapter 343, Hawaii Revised Statutes, it has been determined that an Environmental Impact Statement is not required for the proposed Kaluanui exploratory well and access road. The determination has been made based primarily on the short duration of the project and its minimal impact on the environment. Several potentially negative impacts have been identified, but they would be minimized or alleviated by the suggested mitigation measures.

## CHAPTER 7

### REFERENCES

- Archer, K. M. (August 1984). Biological survey and quality rating of windward Oahu Streams. Prepared for VTN Pacific, Inc.
- Barrera, William Jr.. (November 28, 1980). Letter Report to Mr. Fred Proby, VTN Pacific, regarding Kaluanui well sites.
- Barrera, William Jr.. (August 16, 1982). Letter Report to Mr. Fred Proby, VTN Pacific, regarding Kaluanui Exploratory Well #2 at Sacred Falls.
- Belt Collins & Associates. (September 1986). Environmental assessment, Hau'ula autistic school and housing project, Hau'ula, Ko'olaupia District, Island of O'ahu, TMK: 5-4-04-02. Prepared for ELC Foundation.
- Chamberlain, Levi. (1828). Trip Around Oahu by Levi Chamberlain in 1828. Hawaiian Mission Children's Library.
- Federal Emergency Management Agency, National Flood Insurance Program. (September 4, 1987). Flood insurance rate map, City and County of Honolulu. Panel 15 of 135; community panel number 150001 0015 B.
- Handy, Craighill. (1940). The Hawaiian Planter, Volume 1: His Plants, Methods, and Areas of Cultivation. B. P. Bishop Museum Bulletin 161. Bishop Museum Press.
- Hawaii, State of, Department of Business and Economic Development. (November 1987). The State of Hawaii data book, 1987; a statistical abstract. Honolulu.
- Hawaii, State of, Department of Land and Natural Resources. (1990). Endangered and Threatened Species.
- Hawaii State Census Statistical Areas Committee, Department of Planning and Economic Development. (June 28, 1984). Census tracts in Hawaii, 1937-1984. Report No. CTC-56.
- Honolulu, City and County. Board of Water Supply. (April 6, 1987). Draft environmental impact statement for Windward Oahu regional water system improvements, volume I. Prepared by VTN Pacific.
- Honolulu, City and County. Board of Water Supply. (March 18, 1987). Technical appendices for environmental impacts statement for Windward Oahu regional water system improvements, volume II. Prepared by VTN Pacific.
- Honolulu Board of Water Supply. (1987). Annual report and statistical summary, July 1, 1986-June 30, 1987.

- International Conference of Building Officials. (1979 Edition). Uniform Building Code. Whittier, California.
- Rosendahl, Paul (September 1973). Kaluanui Survey: Completion of fieldwork report. B. P. Bishop Museum.
- Rosendahl, Paul (1973). An Archaeological Walk-Thru Survey of the Kaluanui Lands, Oahu. B. P. Bishop Museum report for Sakoda Realty.
- St. John, H. (1973). List of the Flowering Plants of Hawaii. Pacific Tropical Botanical Garden. Memoir 1. Lawai, Kauai.
- University of Hawaii, Department of Geography. (1983). Atlas of Hawaii, Second Edition. Honolulu: University of Hawaii Press.
- U.S. Department of Agriculture Soil Conservation Service. (August 1972). Soil survey of islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.
- U.S. Fish and Wildlife Service. (1990). Endangered and Threatened Wildlife and Plants. 50 CFR 17.11 & 17.12. U.S. Government Printing Office. Washington, D.C.
- Wagner, W. L., Herbst, D. R., and Sohmer, S.. (1990). Manual of the Flowering Plants of Hawaii, Vols. 1 & 2. University of Hawaii Press.
- Yent, Martha and Ota, Jason. (May 1981). Archaeological Investigations: Sacred Falls State Park, Kaluanui, Koolauloa, Oahu. Division of State Parks, Department of Land and Natural Resources.

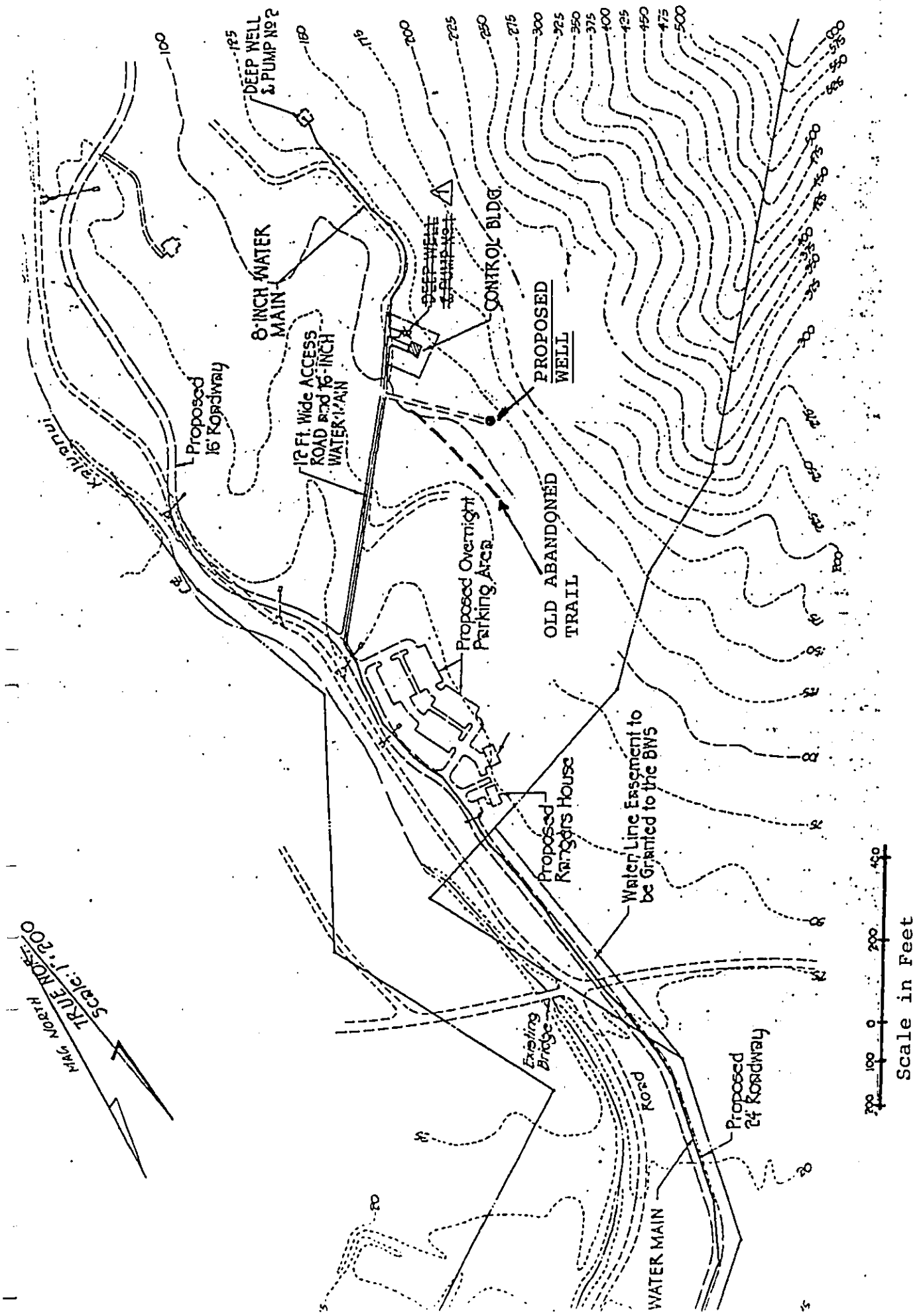


FIGURE 1 - LOCATION MAP



Access Road Corridor Seen from Existing Access Road



Well Site

FIGURE 2 - PHOTOS OF WELL SITE AND ACCESS ROAD CORRIDOR



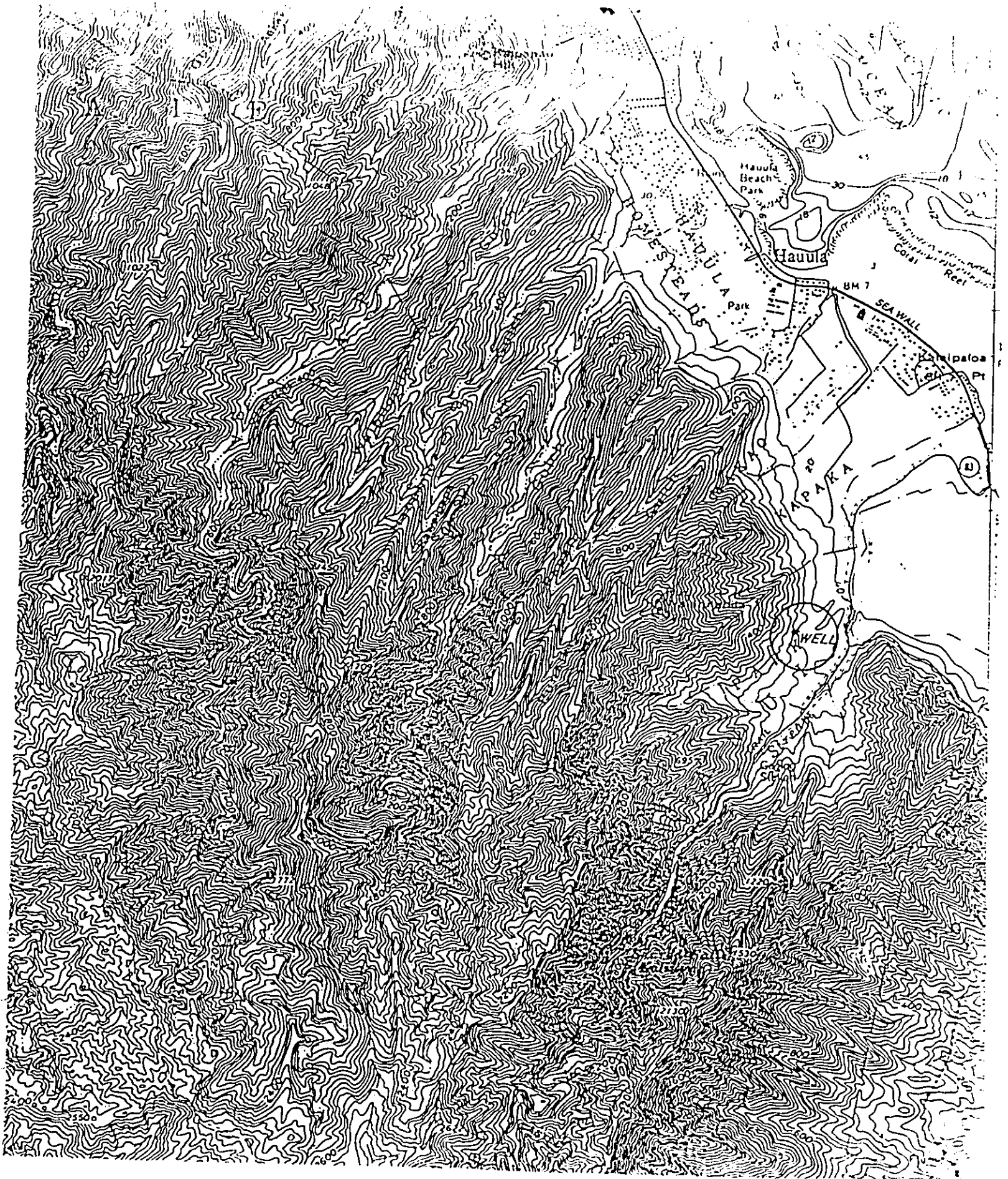


FIGURE 3 - VICINITY MAP

APPENDIX A: BOTANICAL INVESTIGATION

BOTANICAL CONSULTANTS

---

P.O. BOX 90765  
HONOLULU, HI 96835

(808) 923-4193

NOVEMBER 9, 1990

Mr. Jeff M. McCormick - Project Manager  
Maguire Group, Inc.  
1600 Kapiolani Boulevard  
Honolulu, Hawaii 96814

Dear Mr. McCormick

As requested by the Maguire Group, Inc. on November 7, 1990 (MGI Job No. 13223), Botanical Consultants conducted a botanical survey of the proposed Kaluanui Exploratory Well No. 11 and Access Site which is located in Sacred Falls State Park, Punalu'u, Hawaii on November 8, 1990.

The Kaluanui Exploratory Well No. 11 and Access Site is at about 200 feet elevation in what appears to be long abandoned farmland. The remains of an old, concrete irrigation system and many large Mango Trees (*Mangifer indica* L.) indicate earlier human occupation of this site.

FLORA

The vegetation of the Kaluanui Well and Access site is almost entirely introduced. The scattered, emergent trees are 12 to 15 m mango, Java plum (*Syzygium cumini* (L.) Skeels), and Gunpowder or charcoal (*Trema orientalis* (L.) Blume) trees. The tree layer or canopy of the site is composed of octopus trees (*Schefflera actinophylla* (Endl.) Harms). These small trees, 7 to 8 m, provide 50 to 75% cover. The understory is made up of Christmas berry trees (*Schinus terebinthifolius* Raddi). These shrubby, 5 to 6 m trees, provide a thin, scant, 25 to 30% cover.

The ground is rocky and the herb layer is composed of leaf litter, seedlings, ferns and a wide variety of weedy, alien species. The most common taxon is laua'e-haole (*Phlebodium aureum* (L.) J. Sm). In this area it attains a height of 40 to 100 cm.

There are a few indigenous (known to exist naturally in Hawaii and other places) species. Poa or *Psilotum nudum* (L.) Griseb. was found in several places and two 'akia or fish poison (*Wikstroemia oahuensis* (A. Gray) Rock shrubs were found under the canopy.

ENDANGERED SPECIES

No proposed or listed threatened or endangered plant species were found during this survey (USFWS 1990, State of Hawaii 1990).

#### CONCLUSIONS

The proposed well site is located in an area which is almost entirely covered with introduced or alien vegetation. Botanically, there is no reason why this project cannot go forward.

#### LITERATURE CITED

- St. John, H. 1973. List of the Flowering Plants in Hawaii. Pacific Tropical Botanical Garden. Memoir 1. Lawai, Kauai.
- Wagner, W. L., D. R. Herbst, and S. Sohmer. 1990. Manual of the Flowering Plants of Hawaii. Vols. 1 & 2. University of Hawaii Press.
- State Of Hawaii 1990. Endangered and Threatened Species. DLNR.
- USFWS. 1990. Endangered and Threatened Wildlife and Plants. 50 CFR. 17.11 & 17.12. US Government Printing Office. Wash. DC.

## SPECIES LIST

The plant families in the following species list have been alphabetically arranged within two groups, Monocotyledons, and Dicotyledons. The genera and species are arranged alphabetically within families. The taxonomy and nomenclature follow that of St. John (1973) and Wagner, Herbst and Sohmer (1990). For each taxon the following information is provided:

1. An asterisk before the plant name indicates a plant introduced to The Hawaiian Islands since Cook or by the aborigines.
2. The scientific name.
3. The Hawaiian name and or the most widely used common name.
4. 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.

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

Locally abundant - plants found in large numbers over a limited area, for example the plants found in grassy patches.


This species list is the result of an extensive survey of this site at the beginning of the rainy season (November 1990) and it reflects the vegetative composition of the flora during a single season. Minor changes in the vegetation will occur due to introductions and losses and a slightly different species list would result from a survey conducted during a different growing season.

CHECKLIST OF ALL PLANTS FOUND ON THE KALUANUI EXPLORATORY WELL STUDY SITE

Scientific Name	Common Name	Abundance
FERNS AND FERN ALLIES		
PSILOACEAE - Psilotum Family		
<i>Psilotum nudum</i> (L.) Griseb.	Moa	Occasional
POLYPODIACEAE - Polypod Family		
<i>Dryopteris dentata</i> (Forsk) C. Chr.	Oak Fern	Common
* <i>Nephrolepis exaltata</i> (L.) Schott	Sword fern	Common
* <i>Phlebodium aureum</i> (L.) J. Sm.	Laua'e fern	Abundant
MONOCOTYLEDONES		
GRAMINEAE - Grass Family		
* <i>Brachiaria mutica</i> (Forsk.) Staph	Paragrass	Locally abundant
* <i>Cenchrus echinatus</i> L.	Sandbur grass	Occasional
* <i>Oplismenus hirtellus</i> (L.) P. Beauv.	Basketgrass	Locally abundant
* <i>Panicum maximum</i> Jacq.	Guinea grass	Common
* <i>Sorghum halepense</i> (L.) Pers.	Johnson grass	Occasional
ORCHIDACEAE - Orchid Family		
* <i>Spathoglottis plicata</i> Bl.	Malayan ground orchid	Occasional
PALMAE - Palm Family		
* <i>Phoenix sylvestris</i> Roxb.	Date palm	Uncommon
DICOTYLEDONES		
ANACARDIACEAE - Mango Family		
* <i>Mangifera indica</i> L.	Mango	Common
* <i>Schinus terebinthifolius</i> Raddi	Christmas berry	Common
ARALIACEAE - Ginseng Family		
* <i>Schefflera actinophylla</i> (Endl.) Harms	Octopus tree	Common

Scientific Name	Common Name	Abundance
COMPOSITAE - Sunflower Family		
* <i>Bidens alba</i> (L.) DC	Bidens	Common
* <i>Emilia sonchifolia</i> (L.) DC	Lalac puale	Common
* <i>Erechtites hieracifolia</i> (L.) Raf	Fireweed	Occasional
* <i>Pluchea odorata</i> (L.) Cass.	Pluchea	Occasional
* <i>Sonchus olerarceus</i> L.	Pualele	Occasional
* <i>Vernonia cinerea</i> (L.) Lees.	Little ironweed	Occasional
EUPHORBIACEAE - Spurge Family		
* <i>Chamaesyce hirta</i> L.	Hairy spurge	Common
* <i>Chamaesyce hypericifolia</i> Mellsp.	Graceful spurge	Common
* <i>Phyllanthus niruri</i> L.	Niruri	Occasional
LEGUMINOSAE - Bean Family		
* <i>Chamaecrista nictitans</i> (L.) Moench	Partridge pea	Common
* <i>Crotalaria incana</i> L.	Fuzzy rattle-pod	Occasional
* <i>Desmodium incanum</i> DC	Spanish clover	Locally abundant
* <i>Indigofera suffrutcosa</i> Mill.	Indigo	Occasional
* <i>Leucaena leucocephala</i> deWit	Koa-haole	Common
* <i>Mimosa pudica</i> L.	Sensitive plant	Common
MYRTACEAE - Myrtle Family		
* <i>Syzygium cumini</i> L.	Java plum	Common
MYRSINACEAE - Myrsine Family		
* <i>Ardisia elliptica</i> Thinb.	Shoebuttan ardisia	Common
RUBIACEAE - Coffee Family		
* <i>Morindia citrifolia</i> L.	Noni	Occasional
* <i>Paederia scandens</i> (Lour.) Merr.	Maile pilau	Common
THYMELAEACEAE - 'Akia Family		
<i>Wikstroemia oahuensis</i> (A. Gray) Rock	'Akia	Occasional
ULMACEAE - Elm Family		
* <i>Trema orientalis</i> (L.) Blume	Gunpowder tree	Common

Prepared by,

  
Evangeline J. Funk, Ph.D. - Botanist

APPENDIX B: ARCHAEOLOGICAL INVESTIGATION



JOHN WAIHEE  
GOVERNOR OF HAWAII



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

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

DEPUTIES  
HERBERT 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 HISTORIC PRESERVATION  
STATE PARKS  
WATER AND LAND DEVELOPMENT

November 29, 1990

Mr. Kenneth Rappolt, Vice-President  
Macquire Group Inc.  
1600 Kapiolani Boulevard  
Honolulu, Hawaii 96814

Dear Mr. Rappolt:

SUBJECT: ARCHAEOLOGICAL FIELDCHECK OF PROPOSED WELL SITE WITHIN  
SACRED FALLS STATE PARK, KALUANUI, KOOLAULO, OAHU.  
TMK: 5-3-11: 9

Please find enclosed a copy of the report on the archaeological survey conducted for the proposed well site at Sacred Falls State Park. It is our understanding that the Board of Water Supply is proposing to drill a second well approximately 200 feet to the north of the existing well and pump at Sacred Falls State Park. The archaeological survey of this project area was conducted on November 22, 1990 by State Parks archaeologists Martha Yent and Marc Smith with the assistance of Jeff McCormack from your firm.

Also attached are the two reports on the previous archaeological surveys conducted for the Board of Water Supply well sites. If you have any questions regarding these archaeological reports or the survey, please contact Martha Yent at 548-2682.

Yours very truly,

RALSTON H. NAGATA  
State Parks Administrator

Enclosure

ARCHAEOLOGICAL SURVEY:  
PROPOSED WELL SITE AT SACRED FALLS STATE PARK,  
KALUANUI, KOOLAULOA, OAHU  
(TMK: 5-3-11: 9)

Prepared by:  
Martha Yent, Archaeologist  
Division of State Parks  
Department of Land and Natural Resources

NOVEMBER, 1990

## INTRODUCTION

The Board of Water Supply is proposing to drill a second well approximately 200 feet to the north of the existing well and pump at Sacred Falls State Park, Kaluanui, Koolauloa, Oahu. The existing well and pump site are located on the west (Hauula) side of Kaluanui Stream and approximately 3,800 feet (3/4 mile) mauka (southwest) of the coastline and Kamehameha Highway (see Map 1). The paved access road to the existing well and pump site runs upslope from the dirt road and trail to the falls. Access to the proposed second well will use this existing roadway. Both the existing and proposed well sites are located at an elevation of about 110 feet above sea level (see Map 2).

A fieldcheck was conducted on November 22, 1990 by State Parks archaeologists Martha Yent and Marc Smith who were accompanied by Jeff McCormack of Maguire Group. The survey area has a dense growth of Christmas berry, Java plum, octopus trees, guava, and koa haole. There is an old roadbed that runs parallel to the contour in the project area. This road was noted on a map during the survey for the first well site in 1980 (see Map 2). A continuation of this road on the makai side of the paved access road will be used for the secondary access to the proposed well site. The proposed drilling location is just upslope of this bulldozed road.

## HISTORICAL OVERVIEW

The valley floor of Kaluanui during the prehistoric and early historic periods was probably covered by irrigated taro terraces and sweet potato was grown in the front kula lands (Handy, 1940: 91). In 1828, Levi Chamberlain toured Oahu and reported one school in Kaluanui. He also wrote that he was supplied with pig, potato, and taro at Kaluanui which supports the agricultural use of Kaluanui. The lands of Kaluanui were awarded to Victoria Kamamalu during the Great Mahele (1848). There were smaller, individual awards made on the makai, coastal plain portion of Kaluanui.

The major changes in Kaluanui Valley occurred in the early 1900s when the valley bowl and coastal plain were acquired and modified for sugarcane cultivation. Ditches and flumes were constructed on the slopes to divert water from the streams to the sugarcane fields. There is also an abandoned cane haul road that corresponds to the former railroad bed that ran across the valley. Sugarcane cultivation in Kaluanui Valley is believed to have lasted from circa 1906 until the 1950s.

## PREVIOUS ARCHAEOLOGY

The Bishop Museum survey of Kaluanui Valley in 1973 located a total of 23 sites. The sites recorded on the coastal plain, which was previously in sugarcane cultivation, included irrigation channels and ditch trails. The sites on the slopes of the valley included dryland terraces, stone mounds, habitation platforms, and additional historic irrigation ditches.

The more intensive survey of proposed park use areas was conducted by State Parks archaeologists in 1980-1981. At this time, State site number 50-80-05-290 was assigned to Kaluanui Valley with a series of consecutive numbers (290-1 through 290-20) designating the sites located during the 1973 and 1981 surveys. The 1981 survey located additional mound features and platforms. Testing conducted on several mound features indicated a lack of cultural materials and suggested that these features represent agricultural clearing mounds.

During the archaeological survey in 1980 for the first well site, several sites were identified (Barrera, 1980 and Yent & Ota, 1981). The sites included a small cobble paving or platform (290-7) and two large rock mounds (290-6). These sites were in proposed locations for the well which were not selected for construction. The present well site corresponds to well site #2 on Map 3.

#### ARCHAEOLOGICAL FINDINGS

The survey for the second well site located several features in the vicinity of the project area. The features located in 1990 have been numbered according to the earlier system. The location of these features relative to each other and the proposed well site is shown on Map 4.

Site 290-21, Feature 1. Concrete-lined auwai (ditch) running parallel to the 107 foot contour line and generally N-S. The auwai is located approximately 12 meters upslope of the bulldozed road and 7 meters upslope from the proposed well site. The ditch measures 30cm in depth and 1 meter wide with concrete only on the upper edges of the ditch alignment. There are boulders on the downslope side of the ditch which may have been a well-stacked retaining wall previously. The ditch runs to the existing well site but the makai (N) extend of the ditch was not determined. It is likely that this ditch was used to irrigate the sugarcane fields on the coastal flat at the mouth of Kaluanui Valley from Waimanama Stream. Ditch is overgrown with Christmas berry.

Site 290-21, Feature 2. Second auwai on the 116 foot contour which runs parallel to the first auwai and is located approximately 10 meters upslope of the first auwai. This upper auwai is not concrete-lined and there is no evidence of rock-lining. The auwai is 80cm wide and 50cm deep. This auwai also runs to the existing well site and is overgrown with Christmas berry.

Site 290-22. Stacked retaining wall located about 20 meters to the northeast of the proposed well site. The wall is built parallel to the contour and measures 12 meters in length and 1.5 meter in height. Huge boulders have been used in the construction with smaller boulders and cobbles stacked between the huge boulders. Site covered by Christmas berry and guava.

Site 290-23. Double alignment of boulders about 5 meters downslope (NE) of the well site. The alignments measure about 7-8 meters in length and are 1.5 meters apart. These alignments may be related to the construction of the bulldozed road. There is no stacking or wall construction evident. The level area upslope of these alignments has been selected as the best drilling location by the geologist.

Site 290-24. Retaining wall/mound of large and huge basalt boulders on the downslope (NE) side of the bulldozed road. This site is about 10 meters makai (N) of where the proposed access road to the well site angles upslope.

Based on the proposed access to the second well site, the only site that appears to be subject to impact during the drilling project is 290-23. The drilling machinery will be setup from the bulldozed road. Therefore, site 290-21 which is about 7 meters upslope of the well site should not be affected. Likewise, sites 290-22 and 290-24 are located at least 10 meters makai (NE) of the access to the drilling site and should not be impacted.

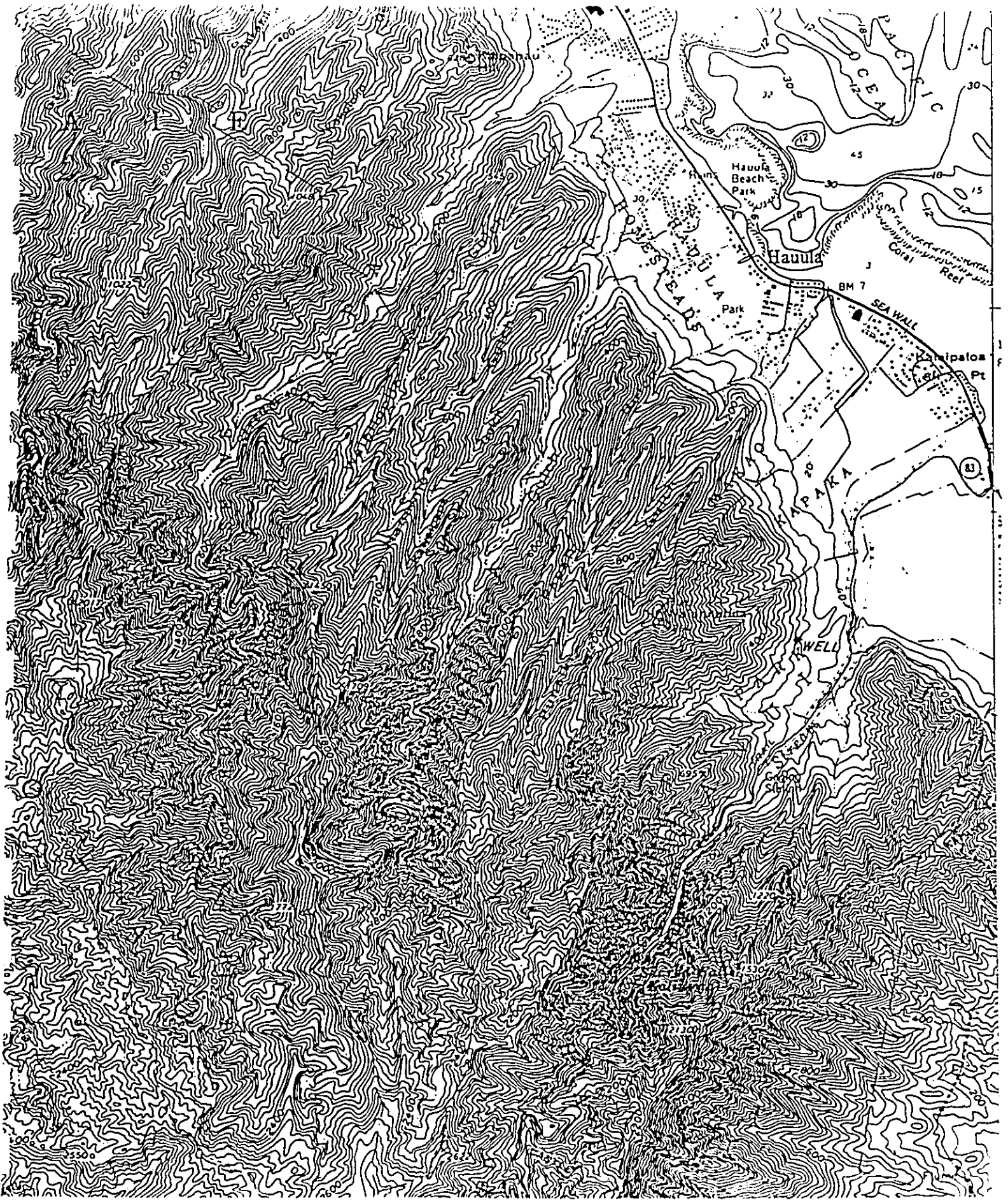
#### RECOMMENDATIONS

Sites 290-21, 290-22, and 290-24 should be flagged prior to the use of machinery in the area to prevent inadvertent damage to these sites. From the previous surveys and testing in Kaluanui Valley, it appears that these sites are related to agricultural activities. The ditches are probably historic based on the presence of concrete and were used to divert water from Waimanamana Stream to the sugarcane fields on the coastal plain. The presence of site 290-24 adjacent to the bulldozed road suggests that this feature may have been built to retain the slope on the downslope side of the road.

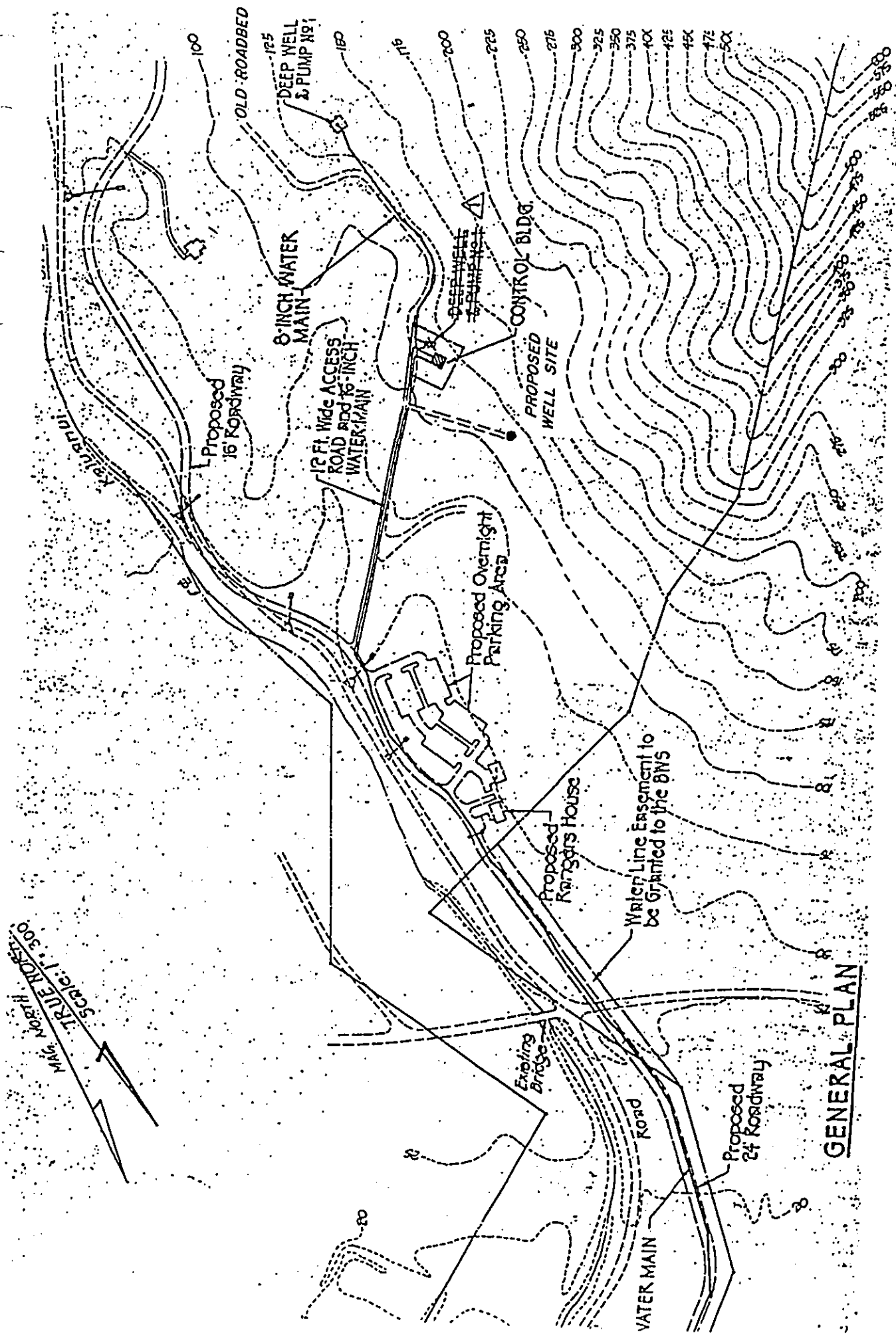
The significance of these sites is related to their research potential. However, based on the fact that these sites are structural features, it is not likely that testing will yield additional information. Recording of the sites during the November, 1990 fieldtrip was hampered by the density of the vegetation. Therefore, it is recommended that the State Parks archaeologists be notified when clearing work for the roadway and drilling site is to begin as this clearing may permit photographing of the archaeological sites.

#### REFERENCES

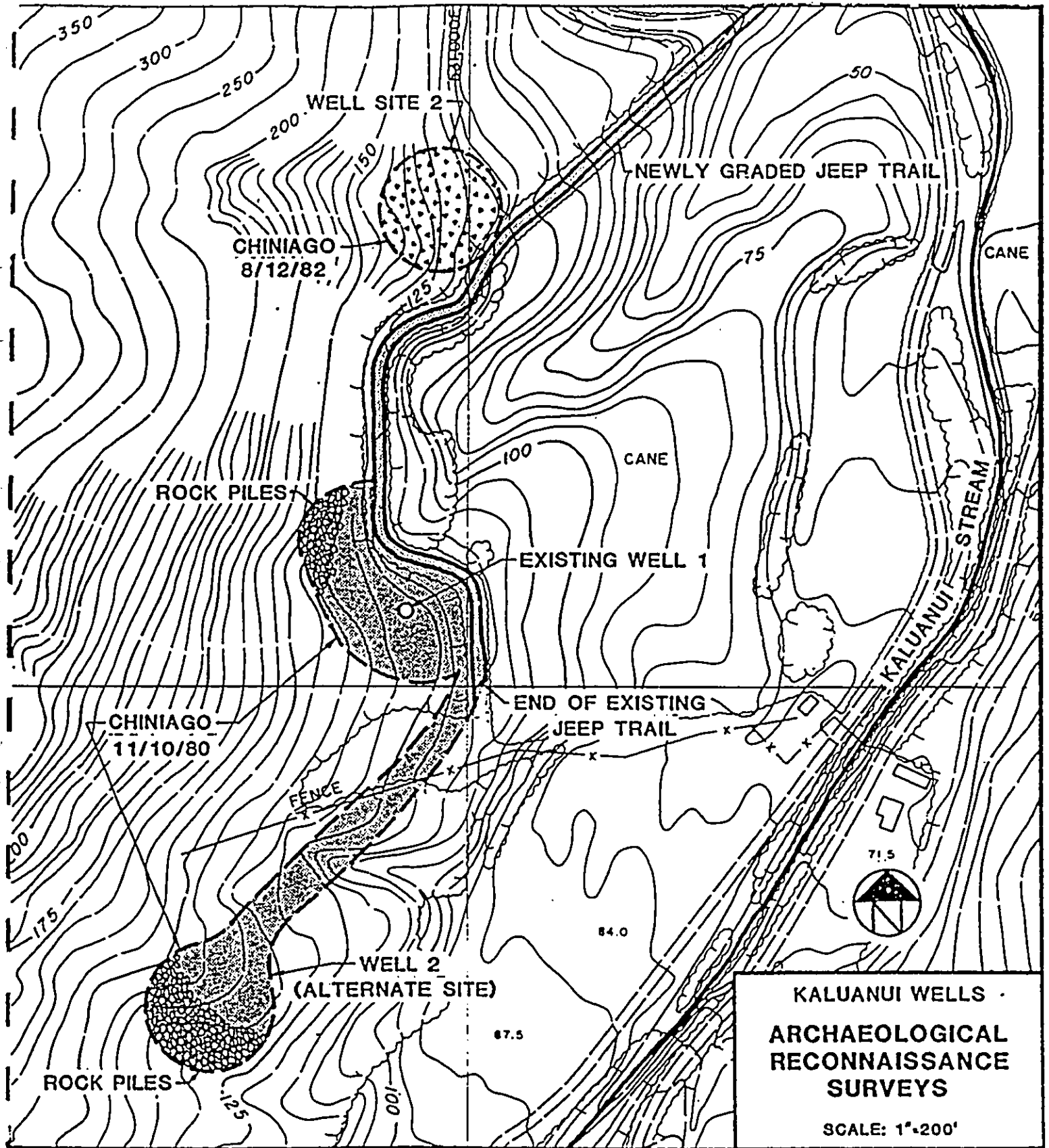
- Barrera, William Jr.  
1980 Letter Report to Mr. Fred Proby, VTN Pacific, regarding Kaluanui well sites. November 28, 1980.
- 1982 Letter Report to Mr. Fred Proby, VTN Pacific, regarding Kaluanui Exploratory Well #2 at Sacred Falls. August 16, 1982.
- Chamberlain, Levi  
1828 Trip Around Oahu by Levi Chamberlain in 1828. Hawaiian Mission Children's Library.
- Handy, Craighill  
1940 The Hawaiian Planter, Volume 1: His Plants, Methods, and Areas of Cultivation. B.P. Bishop Museum Bulletin 161. Bishop Museum Press.
- Rosendahl, Paul  
1973 An Archaeological Walk-Through Survey of the Kaluanui Lands, Oahu. B.P. Bishop Museum report for Sakoda Realty.
- Yent, Martha and Jason Ota  
1981 Archaeological Investigations: Sacred Falls State Park, Kaluanui, Koolauloa, Oahu. Division of State Parks, Department of Land and Natural Resources. May, 1981.



MAP 1 - Location of existing well site within Sacred Falls State Park, Kaluanui, Oahu.

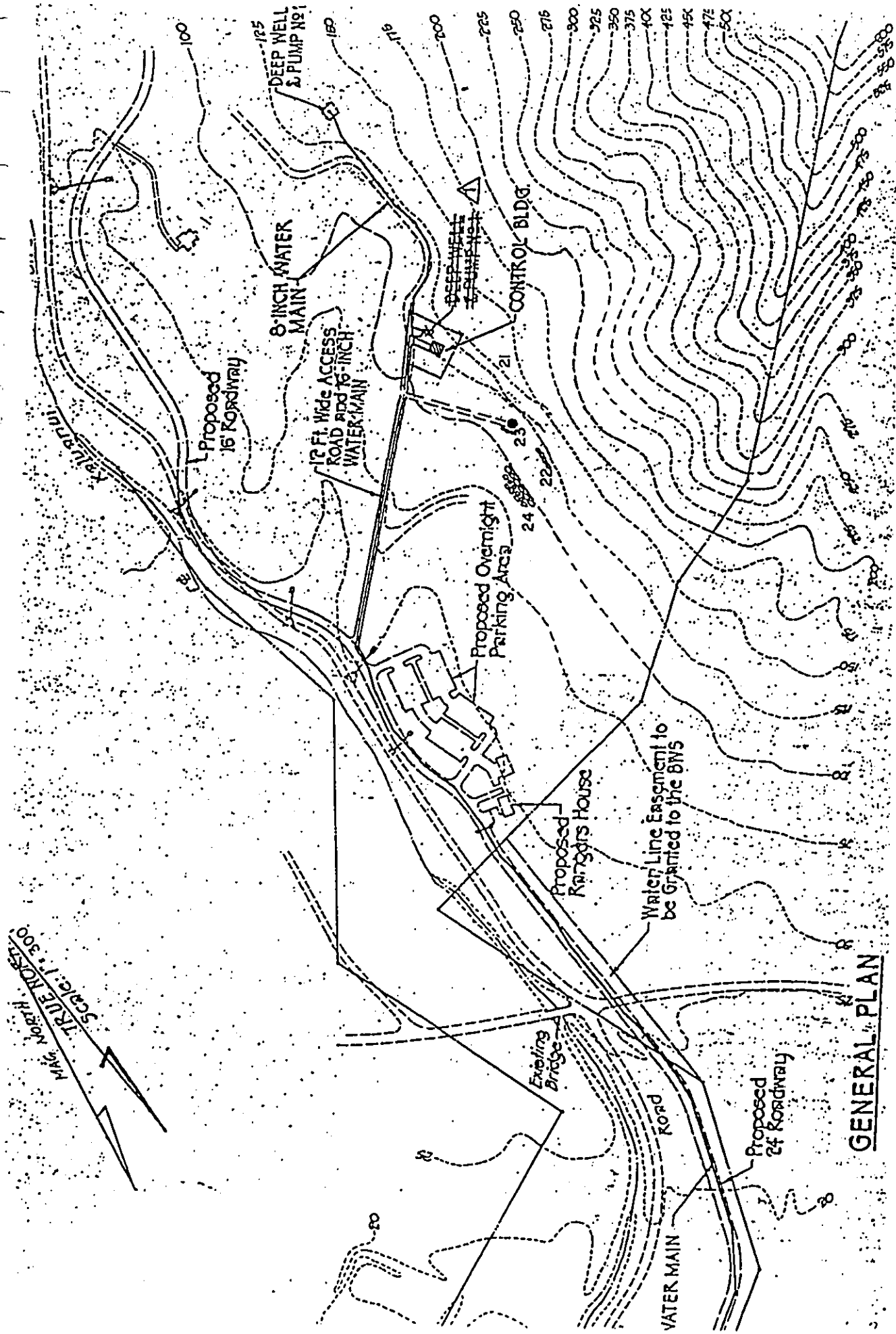


MAP 2 - Map of project area, including location of existing and proposed well sites.



MAP 3 - Location of archaeological sites located during previous surveys for well sites (taken from Barrera, 1982).





MAP 4 - Location of archaeological sites in proposed well site area (1990 survey).

# CHINIAGO INC.

Archaeological Consulting

76 N. KING STREET, ROOM 202 • HONOLULU, HAWAII 96817 • TELEPHONE: (808) 521-2785

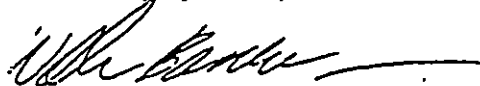
November 28, 1980

Mr. Fred Proby  
VTN Pacific  
1164 Bishop Street  
Suite 906  
Honolulu, Hawaii 96813

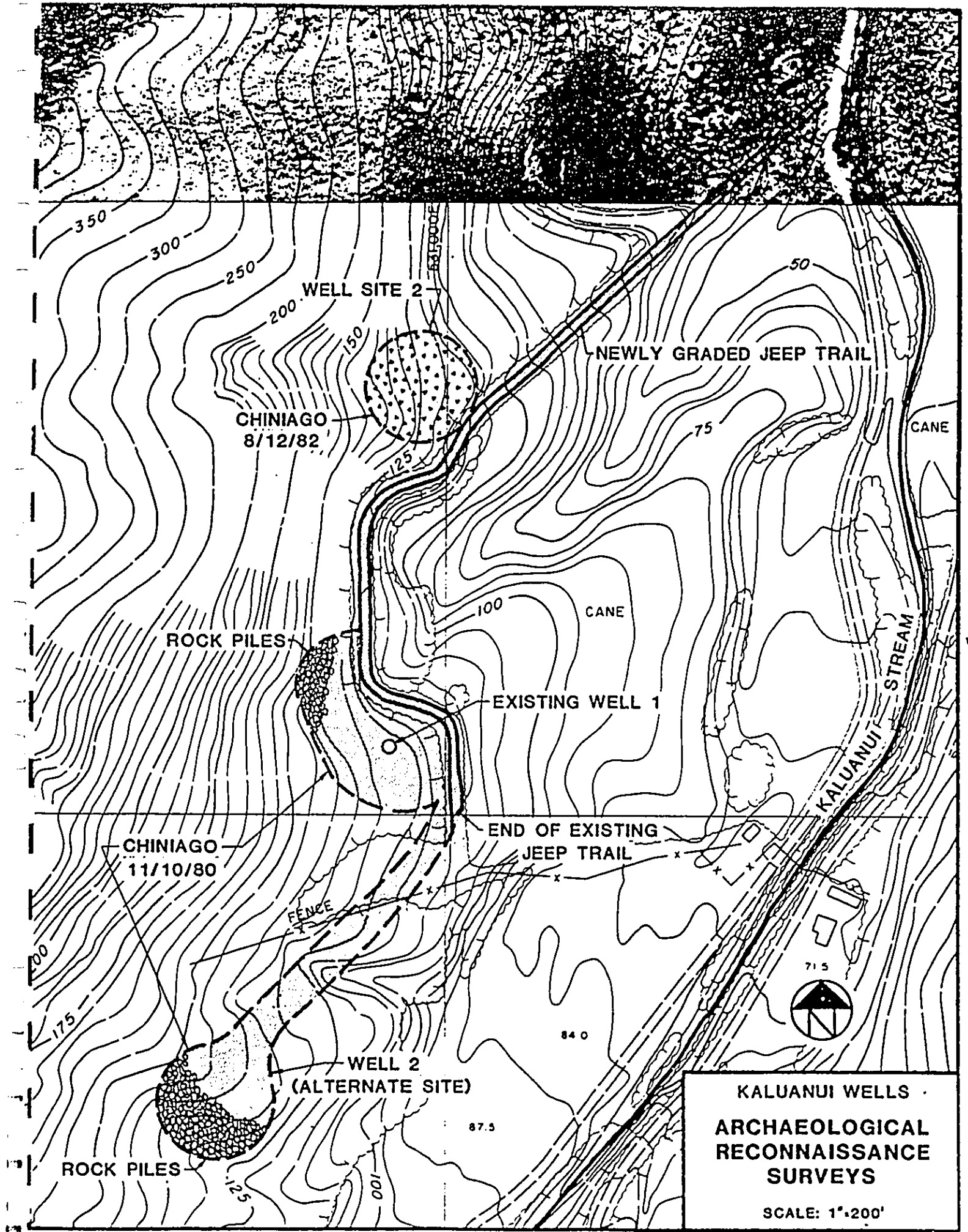
Dear Mr. Proby:

On November 10 we conducted an archaeological reconnaissance survey of two proposed well-sites at Kaluanui Valley, Oahu, each of which consisted of a 200-foot diameter circle [indicated on the enclosed map], plus a proposed roadway connecting them to the main valley access road. No definite archaeological or historical remains were found, but the presence of rock piles which may be of human origin requires that caution be exercised during construction. These remains, which are located at the northern edge of the easternmost well-site and on the western half of the westernmost well-site, should not represent any impediment to the project as there appears to be sufficient space available for the construction activities. We will be happy to show the Board of Water Supply people the locations of the areas which we recommend that they avoid.

Sincerely yours,



William Barrera, Jr.  
President



# CHINIAGO INC.

Archaeological Consulting

1040-B SMITH STREET • HONOLULU, HAWAII 96817 • TELEPHONE: (808) 521-2785


August 16, 1982

Mr. Fred Proby  
VTN Pacific  
1164 Bishop Street  
Suite 906  
Honolulu, Hi. 96813

Dear Mr. Proby:

On August 12, 1982 I accompanied you, Mr. Larry Whang of the Department of Water Supply and Ms. Martha Yent of the Division of State Parks on an inspection of the proposed site of Kaluanui Exploratory Well #2 at Sacred Falls, Oahu. This letter is to confirm that nothing of archaeological or historical interest was located and that in our opinion the project may proceed as planned without fear of disturbing any such sites.

Sincerely yours



William Barrera, Jr.  
President