

1996 - Oahu - FEIS -
Kailua 272 Reservoir

FILE COPY

FINAL
ENVIRONMENTAL IMPACT STATEMENT
FOR THE
KAILUA 272 RESERVOIR

Kailua, Oahu, Hawaii
Tax Map Key: 4-2-03:16, por. 9 & 17

Proposing Agency:

Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Prepared by:

Engineering Concepts, Inc.
250 Ward Avenue, Suite 206
Honolulu, Hawaii 96814

July 1996

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**BWS KAILUA 272' RESERVOIR
FINAL ENVIRONMENTAL IMPACT STATEMENT
EXECUTIVE SUMMARY**

Project Scope:

The Board of Water Supply proposes to construct a 4.0 million gallon (MG), reinforced concrete reservoir on Puu O Ehu Ridge above Kailua Road near the entrance to Kailua Town. BWS previously operated two reservoirs on Puu O Ehu Ridge which were taken out of service due to age and operational problems. The new reservoir's original construction cost of \$10.8 million has been increased by \$1.7 million for the design and construction of project features which address community concern about the visual impact of the facility. Due to the necessity of the project, it has been funded by the Board of Water Supply for construction in the 1996-97 fiscal year.

The reservoir is circular, approximately 185 feet in diameter and 22 feet in height. Its spillway is at the 272-foot elevation which is necessary for the reservoir to operate in the Windward low service water system. In addition, the project's scope calls for the construction of a concrete access road, instrument house, drain lines, landscaping, irrigation system, retaining wall and fencing; demolition of the abandoned 0.3 MG Kailua 275' reservoir adjacent to the site; and installation of 1,500 feet of 24-inch water main from Kailua Road to the tank with fire hydrants to provide needed fire protection for the Old Kukanono Community.

Need for the Project:

- There is a current deficit in reservoir storage capacity of approximately 3.5 MG for the Kailua area (Mokapu, Kaneohe MCBH, Kailua Town, Lanikai, Enchanted Lake, Olomana and Maunawili). BWS standards require 1.5 times the average-day demand to meet high use periods for domestic consumption and fire protection. Approximately 0.5 MG of storage could accommodate incremental growth of the Kailua community; however, the primary purpose of the reservoir is to address the needs of existing water consumers in the Kailua area.
- The reservoir will replace 4 other reservoirs taken out of service in the early 1980's due to deterioration and incompatible spillway elevations. The capacities of the abandoned and demolished reservoirs totaled 3.0 MG. The reservoirs sites are located in Lanikai and Kailua Heights and two on Puu O Ehu Ridge.
- Storage provides an adequate volume of water to sustain water pressures and flows for domestic consumption and fire protection. Kailua has no water sources to supplement inadequate storage. Water must be pumped to Kailua from Waihee and Punaluu, as far as 25 miles away.
- The transmission system serving Kailua has been subject to periodic main breaks and power outages that disrupt water service to areas with substandard water storage. The Windward low service system is the highest pressure system on Oahu, and the large transmission mains along Kamehameha Highway are below sea level and subject to frequent breaks due to corrosion. Kailua has experienced water shortages due to these main breaks resulting in appeals to the community to conserve water.

Alternative Sites

Reservoirs are very difficult to site and therefore have very few alternative sites available. An alternative site evaluation (discussed in Chapter 4 of the EIS) was conducted and identified two viable sites: Puu O Ehu Ridge and Pohakupu Ridge (See Figure 3-8). However, the Pohakupu site would cost an additional \$2.5 to \$5 million due to excavation quantities of 150,000 to 200,000 cubic yards. The Puu O Ehu site requires approximately 55,000 cubic yards of excavation. At \$12.5 million, the proposed Kailua reservoir is one of the most costly reservoirs that the BWS has ever budgeted.

Project Constraints:

- Within a water system such as the Windward low service system, reservoir spillways and floor elevations must be equal, as water in a static state seeks equal levels. If spillways are not equal, the reservoir with the lower spillway will be filled first, while the higher tank would be only partially filled. Effective storage will be reduced. At the required elevation the availability of land with stable soils is limited.
- Reservoirs need to be located close to the area of demand for the water to be used efficiently. The Puu O Ehu Ridge is immediately adjacent the large demand center of Kailua Town.
- Hydraulic headloss between the pumps and the target reservoirs must be equivalent in order to fill the tanks at approximately the same rate. At very different rates, a reservoir may be completely filled while another is only half full. To continue to try to fill the half empty reservoir would cause the full reservoir to overflow and lose water. Strategic placement of a reservoir within a water system is critical to its efficient use.

Summary of Impacts with Proposed Mitigation:

Chapter 3 of the EIS addresses existing conditions, probable impacts and mitigation measures. The primary long-term impact after construction is the visual impact discussed on Page 3-24. Figure 3-8 shows the affected view angles and indexes the color photos of the existing and expected views of the site.

Community concerns regarding visual impacts are shared by BWS. The reservoir will be screened by earthen berms on the exterior face of a retaining wall surrounding the visible portions of the tank. Space requirements will limit the height of the wall and berm to about 10' which is one-half the height of the reservoir. However, the elevated berm will allow low profile landscaping with native plants to screen the upper portions of the reservoir, instead of taller large canopy trees. In addition, the reservoir will be painted in earth tones to further blend in with the existing hillside. The addition of these mitigation measures has increased the project cost by \$1.7 million.

Consistency with the County General Plan

The Kailua 272' Reservoir fulfills the existing water storage deficit in the Kailua area. There is very little excess capacity being built. This is consistent with the County General Plan's Policies and Objectives to limit residential growth in the Koolaupoko Development Plan District. As such, the population projections for the Kailua area do not show any substantial growth. The General Plan directs Oahu's population growth to the Ewa, Central Oahu and the Primary Urban Center in southern Oahu. Therefore, there is no need to oversize the Kailua reservoir because the population distributions of the General Plan do not justify it.

Summary of Community Information Sharing:

There have been numerous and adequate community information sharing opportunities regarding the reservoir project over a span of approximately four years. These events have been mutually beneficial, both to inform the public and to receive constructive input to improve the EIS and the project itself.

The project was first presented to the public in the Development Plan Public Facilities Map amendment process, which was heard, reviewed and approved by the *Planning Commission* in 1991 and the City Council in 1992.

The Draft Environmental Impact Statement was filed with the Office of Environmental Quality Control on May 8, 1994. The EIS process has taken more than two years to address community concerns and develop mitigation measures.

The BWS staff has met and discussed the reservoir project with the Kailua Neighborhood Board on six occasions starting from June 6, 1994. During its July 6, 1994, meeting, the Kailua NHB voted on a motion to oppose the project; the motion failed to pass. BWS staff presented the earthen berm/retaining wall mitigation measures to the Kailua NHB at their February 2, 1995 meeting. BWS staff again answered questions on the project at the June 6, 1996 Kailua NHB meeting.

A field trip to the site was conducted on February 4, 1995, with members of the Kailua NHB, Kailua Urban Design Task Force, and the Kailua Outdoor Circle. The field trip was very instructive for all in attendance.

BWS staff met with the Kailua NHB Environmental Committee in June 1994 to discuss specific details including alternatives. The results were included in the EIS. Another meeting with this committee is scheduled for June 18, 1996. BWS staff has scheduled another meeting with the Kailua NHB in July 1996, to discuss the findings of the EIS.

The project has been covered by the news media on numerous occasions: three times in television newscasts, and four times in the *Windward Sun Press*.

In May 1996, the Board of Water Supply held a public hearing on construction funding for this project. Comments were heard and addressed, and the FY 96-97 budget was approved. The project site is located in the State Conservation District and the Special Management Area. Therefore, permit approvals will require more public hearings with the Board of Land and Natural Resources and the City Council prior to construction. As a result, there will be additional opportunity for public input.

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843
PHONE (808) 527-6180
FAX (808) 533-2714



May 31, 1996

JEREMY HARRIS, Mayor
WALTER O. WATSON, JR., Chairman
MAURICE H. YAMASATO, Vice Chairman
KAZU HAYASHIDA
MELISSA Y.J. LUM
FORREST C. MURPHY
KENNETH E. SPRAGUE
BARBARA KIM STANTON

RAYMOND H. SATO
Manager and Chief Engineer

TO: THE HONORABLE JEREMY HARRIS, MAYOR
CITY AND COUNTY OF HONOLULU

FROM: ~~FOR~~ *Raymond H. Sato*
RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: FORMAL ACCEPTANCE OF THE FINAL ENVIRONMENTAL IMPACT
STATEMENT (FEIS) FOR THE BOARD OF WATER SUPPLY'S (BWS)
KAILUA 272' RESERVOIR, KAILUA, OAHU, TMK: 4-2-03: PORTION 9,
16 AND PORTION 17

We transmit the FEIS for the Kailua 272' Reservoir project and request your acceptance.

BWS has completed the FEIS in accordance with the requirements of Chapter 343, HRS. We have determined that the document fulfills the definition of an Environmental Impact Statement and adequately describes and discloses all identifiable environmental impacts. In addition, all comments submitted during the public review period have received satisfactory responses and have been appended to the FEIS. The acceptance of the statement is an affirmation of the adequacy of the statement under applicable laws and does not constitute an endorsement of the proposed action.

Therefore, as the accepting authority specified in Chapter 343-5, (b), (2), HRS, and in compliance with City and County Directive 89-2, dated May 25, 1989, we respectfully request your acceptance of the FEIS for the Kailua 272' Reservoir.

If you have any questions, please contact me at 527-6180.

Enclosure

ACCEPTANCE/NON-ACCEPTANCE:

Jeremy Harris

JEREMY HARRIS, MAYOR

7-2-96

Date

RECEIVED
BD OF WATER

--PLANNING DEPARTMENT

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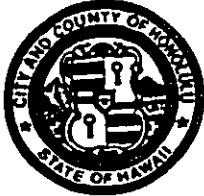
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 8TH FLOOR • HONOLULU, HAWAII 96813-3017
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PE

APR 3 11 40 AM '96

JEREMY HARRIS
MAYOR



CHERYL D. SOON
CHIEF PLANNING OFFICER

CAROLL TAKAHASHI
DEPUTY CHIEF PLANNING OFFICER

MH 3/96-0732

April 1, 1996

MEMORANDUM

TO: RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM: CHERYL D. SOON, CHIEF PLANNING OFFICER
PLANNING DEPARTMENT

SUBJECT: PRE-FINAL ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR
THE BOARD OF WATER SUPPLY'S KAILUA 272' RESERVOIR,
TMK: 4-2-03: 16, PORTION 9 AND 17, KAILUA ROAD

In response to your agency's request of March 21, 1996, we have reviewed the subject Pre-Final EIS and have no additional comments or objections. Should you have any questions, please contact Matthew Higashida of our staff at 527-6056.


CHERYL D. SOON
Chief Planning Officer

CDS:ft



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**CHAPTER 1
INTRODUCTION AND SUMMARY**

PURPOSE OF THIS DOCUMENT

The City and County of Honolulu Board of Water Supply (BWS) proposes to construct a 4.0 million gallon (MG) reinforced concrete reservoir on Puu O Ehu ridge, just south of the abandoned Kailua 275' Reservoir site. Kailua has no water sources and is served by sources as far away as Punaluu. The proposed reservoir will eliminate the current water storage deficit problem in the Kailua service area. Specifically, the proposed reservoir will provide additional storage capacity for the Kailua 272 system which is part of the BWS's Windward Low Service Water System. The BWS has determined that an environmental impact statement (EIS) is required for the proposed Kailua 272 Reservoir project, pursuant to Chapter 343, Hawaii Revised Statutes. The determination has been based primarily on the project's potential impact on the physical environment.

SUMMARY OF DEVELOPMENT

Applicant:	Board of Water Supply City and County of Honolulu 630 South Beretania Street Honolulu, Hawaii 96843
Property Owner:	The Trustees of the Kapaa Trust and Michael and Patricia Gorelangton
Accepting Authority:	Office of the Mayor City and County of Honolulu 530 South King Street, Room 300 Honolulu, Hawaii 96813
Preparer of Final EIS:	Engineering Concepts, Inc. 250 Ward Avenue, Suite 206 Honolulu, Hawaii 96814
Proposed Action:	Installation of a 4.0 million gallon reinforced concrete reservoir, transmission main, and associated appurtenances
Project Name:	Kailua 272 Reservoir
Project Location:	Kailua, Oahu, Hawaii
TMK:	4-2-03:16, portion of 9 & 17
Area of Application:	Approximately 1.4 acres

Existing Uses: Undeveloped and unimproved land; pasture land;
Site of abandoned 275 reservoir

State Land Use District: Conservation and Urban

Development Plan Designation:

Land Use Map: Preservation and Agriculture

Public Facilities Map: Ordinance 92-14 establishes a water
reservoir modification symbol, site
determined, within six years

Zoning: P-1 Restricted Preservation and Country
Special Management Area

PROJECT OBJECTIVES

The objectives of the BWS are to manage and operate Oahu's municipal water system in a reliable and sound manner. To this end, the objectives of this project are to--

1. Increase storage capacity of the Kailua low service area (part of the Windward Low Service System) as a step in achieving the standards of BWS;
2. Provide reliable water service to consumers; and
3. Supply water during peak demand periods and for fire fighting purposes.

The total reservoir capacity needed for the Kailua low service area is 9.6 million gallons (MG), based on the BWS municipal system standard for reservoir storage volume. This standard requires a reservoir storage volume which can sustain the maximum day demand of the service area. The existing effective reservoir system capacity is 6.3 MG, or 3.3 MG less than required by BWS standard (data from Board of Water Supply).

Adequate storage provides operational flexibility and reliability. The existing reservoirs cannot accommodate peak hour demands without being supplemented by increasing pumpage from other sources. Adequate storage allows water sources to be pumped at a steady state which provides consistent water quality. Increased fluctuating pumpage from the relatively thin windward aquifers could cause up-coning of brackish water which degrades the water source.

Adequate storage capacity will also ensure that fire protection services will be available to Kailua residents during maximum day demands. With substandard storage, pumps would have to provide supplemental water during fires. Main breaks may disrupt water service and reduce the level of fire protection since the water sources serving Kailua are as distant as Punaluu.

PROJECT AND SITE DESCRIPTION

The proposed Kailua 272 Reservoir will be constructed on the northwestern portion of Puu O Ehu ridge near the entrance of Kailua Town, south of the intersection of Hamakua Drive and Kailua Road (Figure 1-1). The designation "272" refers to the maximum water level measured in feet above mean sea level (MSL) or spillway elevation to be incorporated in the reservoir design. The configuration of the proposed reservoir is a circular tank of 4.0 MG capacity, approximately 185 feet in diameter and 22 feet in height, with a base pad elevation of 252 feet MSL. In addition to the reservoir tank, the proposed project will also include construction of a concrete access road, transmission main, instrument house, landscaping, irrigation system, retaining wall, and fencing and demolition of the abandoned Kailua 275 Reservoir. Approximately 1,500 linear feet of 24-inch transmission main will be required to connect the proposed reservoir to an existing BWS transmission main in Kailua Road.

The proposed reservoir site is characterized by near surface brown and reddish brown clayey gravelly silt with an underlying layer of weathered basalt in the form of brown silty gravel and boulders and a layer of fractured rock basalt. Vegetation consists of koa-haole shrubland on the slope and open grassy scrub on the top of the ridge.

The proposed reservoir site presently straddles the Urban and Conservation District boundaries established by the State Land Use Commission and Preservation (P-1, Restricted) and Agriculture designations of the City and County Land Use Development Plan.

SUMMARY OF POTENTIAL IMPACTS

Physical Environment

Construction of the proposed reservoir will result in changes to portions of the existing topography of Puu O Ehu ridge. Excavation of the ridge up to 50 feet in depth will be required. However, cut slopes will be stabilized due to the anticipated rock subsurface. Soil erosion potential is expected to increase during the construction period due to displacement of vegetation and exposed excavated ground.

A soils investigation for the proposed reservoir site indicated the structure foundation is expected to rest on stable basaltic bedrock overlying clayey gravelly silt and silty gravel. Approximately 35,000 to 50,000 cubic yards of basalt will be removed. Cut slope in rock should not exceed a ratio of 0.5 horizontal (H) to 1 vertical (V); in weathered rock material, 1H to 1V; and in soils, 2H to 1V.

Flora/Fauna

A field survey to inventory vascular flora and identify threatened or endangered plants at the proposed reservoir site concluded that the proposed project would not pose a significant impact on botanical resources. Introduced or alien species are the dominant components of the project site vegetation.

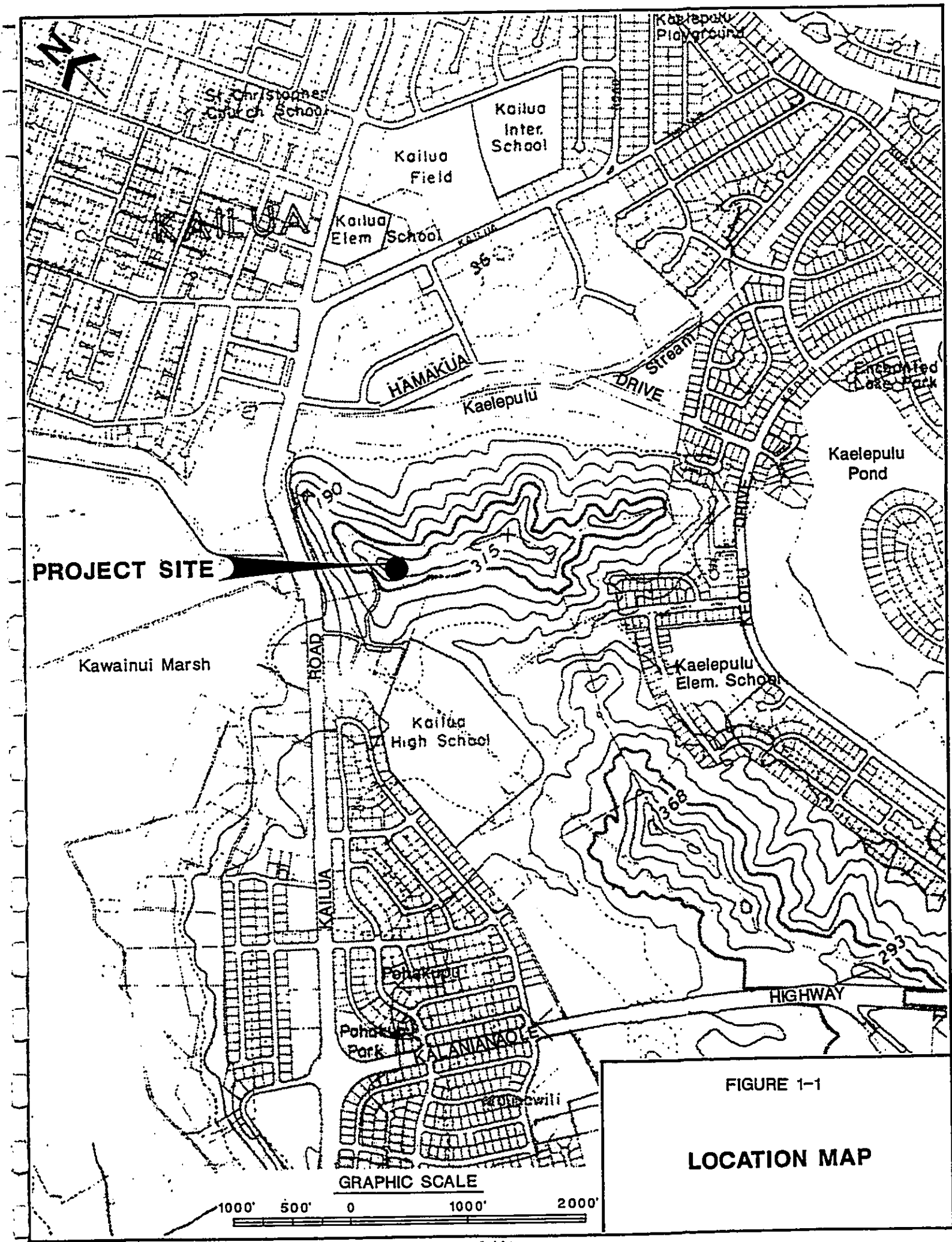


FIGURE 1-1

LOCATION MAP

Avifauna and feral mammals were observed at the site. The adjacent land is used periodically for the raising of horses. The survey concluded the project is not expected to have any significant impact.

Archaeology

An archaeological inventory survey of the proposed reservoir site identified no archaeological sites in the project area. No significant impacts are anticipated due to construction of the proposed reservoir.

Traffic

Traffic will be affected in two ways for the short-term. The number of construction vehicles using the private access road will increase. Installation of the new water main along the private access road will also temporarily reduce the roadway width. Once the reservoir is constructed, no long-term impacts are anticipated.

Noise and Air Quality

Approximately 50,000 cubic yards of earthwork will be excavated using excavation equipment and/or blasting. Temporary noise and dust impacts will accompany this activity. Noise and dust will also be generated by construction vehicles and equipment. Adjacent residences and Kailua High School would be affected during the construction period.

Visual Impact

The reservoir will be visible from several locations in Kailua; however, landforms and vegetation will partially obstruct the view. One important view cited in the City and County of Honolulu's Development Plan Special Provisions for Koolaupoko is the view of Puu O Ehu ridge from the Kaelepulu Pond area. This view will not be significantly affected by the project since only portions of the reservoir will be seen from the Kaelepulu Pond area. The reservoir will be situated in the northwest portion of Puu O Ehu ridge. In addition, Puu O Ehu ridge cannot be seen from the entire Kaelepulu Pond area because land forms between the two areas partially obstruct the view (see visual impact analysis).

Puu O Ehu ridge is prominent from view angles along the Pali Highway and in Kailua Town. The visual impact of the proposed reservoir from these view angles will be minimized as much as possible.

The aesthetic impact of the reservoir on Puu O Ehu ridge is discussed in Chapter 3. Mitigation measures to screen the reservoir from affected views are also discussed. Several affected views of the reservoir are depicted in the photographic representations.

UNAVOIDABLE ADVERSE IMPACTS

The following unavoidable adverse impacts have been identified:

1. Short-term impacts during construction, including noise, air quality, and traffic.

2. Alteration of the appearance of the ridge due to the size of the reservoir and cuts in the hillside and hilltop.

SUMMARY OF PROPOSED MITIGATION MEASURES

Erosion and Sediment Control

1. Seed the disturbed area after grading.
2. Minimize erosion by diverting storm runoff away from graded areas and preventing water from flowing across slope faces.
3. Install temporary erosion control berm, silt fence, filter berm, sediment traps, and filter inlets where needed.
4. Require the contractor to remove all loose rocks and boulders after grading is completed and restore disturbed areas to original condition to reduce the hazard of rock slides.

Drainage

1. Alleviate drainage impacts by site grading and installing drainage structures to divert surface water away from the reservoir foundation and the edges of the cut slopes.
2. Provide drainage swales and/or other catchment and conveyance structures along the access road.
3. Construct drain line to convey runoff off site.

Traffic

1. Minimize the impact on traffic flow during the construction period by the use of proper signs, barricades, police/flag men, etc. to ensure ease and safety of motorists and pedestrians.
2. Limit construction activity liable to affect traffic to non-peak hours, generally between 8:30 am and 3:30 pm, Monday to Friday (excluding holidays).

Noise and Air Quality

1. Shorten the duration of excavation activities by blasting.
2. Implement dust control measures such as sprinkling, mulching, or installing temporary vegetative cover. Water the disturbed areas periodically.

3. Minimize noise impacts by limiting construction operations to daylight hours, generally between 7:00 am and 3:30 pm, Monday to Friday (excluding holidays). Restrict blasting operations which exceed 95 dBL at residences and schools to the hours between 9:00 am and 5:30 pm.
4. Use noise abatement equipment as stipulated in the noise permit issued by the Department of Health.
5. Minimize noise impacts to Kailua High School by scheduling major excavation activities during the summer months where possible.
6. Impose strict controls on blasting activities by reducing maximum air blast levels to less than 110 dBL at the nearest noise-sensitive school or residence.
7. Schedule blasting during warm periods of the day to minimize the possibility of thermal ducting.

Visual

1. Construct an earth berm against a 10-ft high retaining wall partially encircling the reservoir tank to screen the tank from affected views.
2. Minimize the visual impact with landscaping, including plantings around the reservoir tank and cut slopes.
3. Paint the walls of the reservoir structures to blend with the background.
4. Keep the facilities and grounds well maintained and paint the reservoir regularly.

COMPATIBILITY WITH LAND USE PLANS AND POLICIES

The project will be compatible with State and City and County of Honolulu land use plans and policies.

ALTERNATIVES CONSIDERED

The following alternatives were considered:

1. No action
2. Alternate reservoir configurations
 - a. Construction of smaller reservoirs

- b. Construction of taller reservoirs
 - c. Construction of underground reservoirs
 - d. Construction of elevated tanks
3. Alternate reservoir locations
 - a. Site of old abandoned Kailua 272 and 275 tanks
 - b. Pohakupu site
 - c. Other sites
 4. Replace 1.0 MG Pohakupu Reservoir with a 5.0 MG structure
 5. Refurbish existing abandoned storage tanks
 6. Install emergency power generators at well sites(s)

RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The proposed reservoir will enhance long-term productivity by enabling the BWS to increase total storage capacity in the Windward District to operating standards for reliability. There will be no long-term losses in terms of land use since the land has been designated for use for public facilities. No long-term risks to health or safety are anticipated.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible and irretreivable resources committed to the project include funds, labor, energy, and raw materials required to construct and operate the facility. Permanent changes to the existing ridge would result from the excavation for the reservoir.

UNRESOLVED ISSUES

The following issues remain unresolved:

1. Method of excavation to be employed for removal of approximately 50,000 cubic yards of earth will be determined by the contractor.
2. A visual impact analysis has been prepared; however, community concerns still exist.
3. Noise disturbance, particularly to livestock, is a concern of neighboring landowners due to the possible installation of a civil defense siren warning device at the site.

4. Location of the new storm drain discharge point at Kailua Road will be coordinated with the Department of Transportation.

NECESSARY PERMITS AND APPROVALS

<u>Approval Required</u>	<u>Authority</u>
Building Permit	City Building Department
Grubbing, Grading & Stockpiling Permit	City Department of Public Works
Variance from Pollution Controls	State Department of Health
NPDES Hydrotesting Permit	State Department of Health
Noise Permit	State Department of Health
Conservation District Use Application	State Department of Land & Natural Resources
Special Management Area Use Permit	City Department of Land Utilization
Permit for Work Within State Right-of-Way	State Department of Transportation
Permit for Connection to the State Highway Drainage System	State Department of Transportation
Permit for Discharge into the State Highway Drainage System (for Hydrotesting)	State Department of Transportation

**CHAPTER 2
DESCRIPTION OF THE PROPOSED PROJECT**

NEED FOR THE PROJECT

Background

As water purveyor for the City and County of Honolulu, the Board of Water Supply (BWS) is responsible for the management, control, and operation of Oahu's municipal water system. The BWS is charged with furnishing communities a reliable water supply that, in quality, is safe for human consumption and sustenance and that, in quantity, is ample both for everyday domestic uses and for emergency protection of life and property in the event of fire.

To accomplish these objectives, the BWS develops and operates wells and tunnels that yield high quality water, which in turn feed large transmission pipelines that deliver potable water to a network of water mains and storage reservoirs. Situated at strategic elevations near the serviced community, reservoirs basically serve a dual purpose. First, as storage tanks, reservoirs must maintain an adequate amount of water for consumption and fire fighting use, especially during times of power outages which cripple and prevent well pumps from sustaining the water supply system. Second, as elevated distribution tanks, reservoirs operate solely by gravity to reliably produce acceptable pressure levels in the mains for delivering water to users' taps and street hydrants. In having elevated reservoirs of adequate capacity, communities are ensured that water demand for all purposes will be met, especially during extended time periods of power loss and disruption to the transmission network.

Current Reservoir Capacity of the Kailua Low Service Area

Presently, wells and high level tunnels supply water to a number of reservoirs in the BWS's Windward Oahu service district, which extends from Punaluu in the north to Waimanalo in the south. The Kailua low service area is part of the Windward Oahu service district and is comprised of the communities of Coconut Grove, Kailua Town, Lanikai, Enchanted Lake, Olomana, Kukanono, and Pohakupu.

The locations of reservoirs in the Kailua low service area are shown on Figure 2-1, while a schematic profile of water sources and reservoirs in the Kailua and Kaneohe service areas is shown on Figure 2-2.

Reservoir capacities in the Kailua low service area are listed below.

<u>Low Service Area:</u>	<u>Reservoir Capacity</u>	<u>Effective Capacity</u>
Kailua Heights 272 (Kailua)	0.3 MG	0.3 MG
Pohakupu No. 1 272 (Kailua)	1.0 MG	1.0 MG
Pohakupu No. 2 272 (Kailua)	6.0 MG	3.0 MG
Kapaa 272 (Kaneohe)	<u>2.0 MG</u>	<u>2.0 MG</u>
LOW SERVICE TOTAL	9.3 MG	6.3 MG

The Pohakupu No. 2 272 Reservoir has a volume capacity of 6.0 MG. However, 3.0 MG of storage capacity is already committed to regional operational requirements to provide water

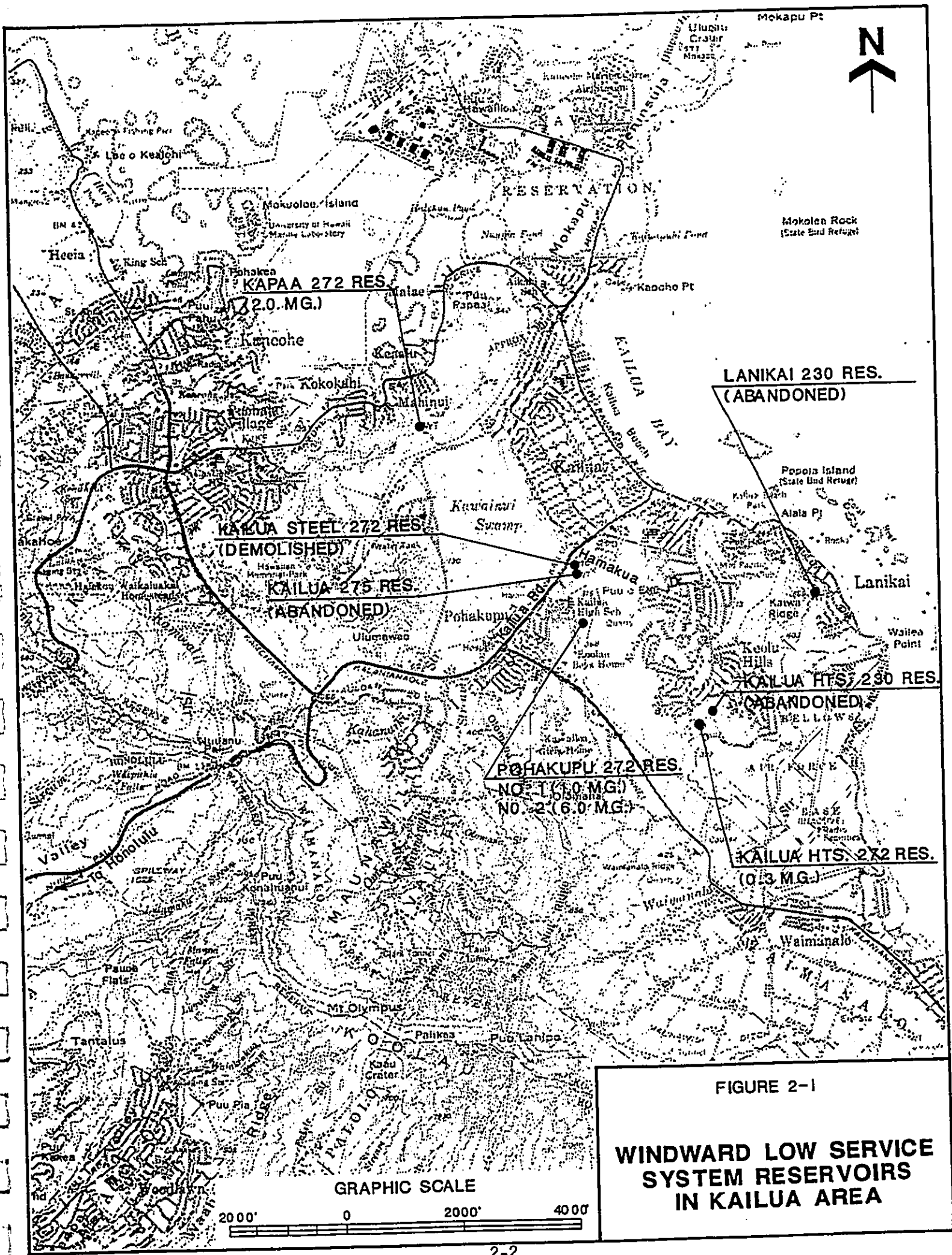


FIGURE 2-1
**WINDWARD LOW SERVICE
 SYSTEM RESERVOIRS
 IN KAILUA AREA**

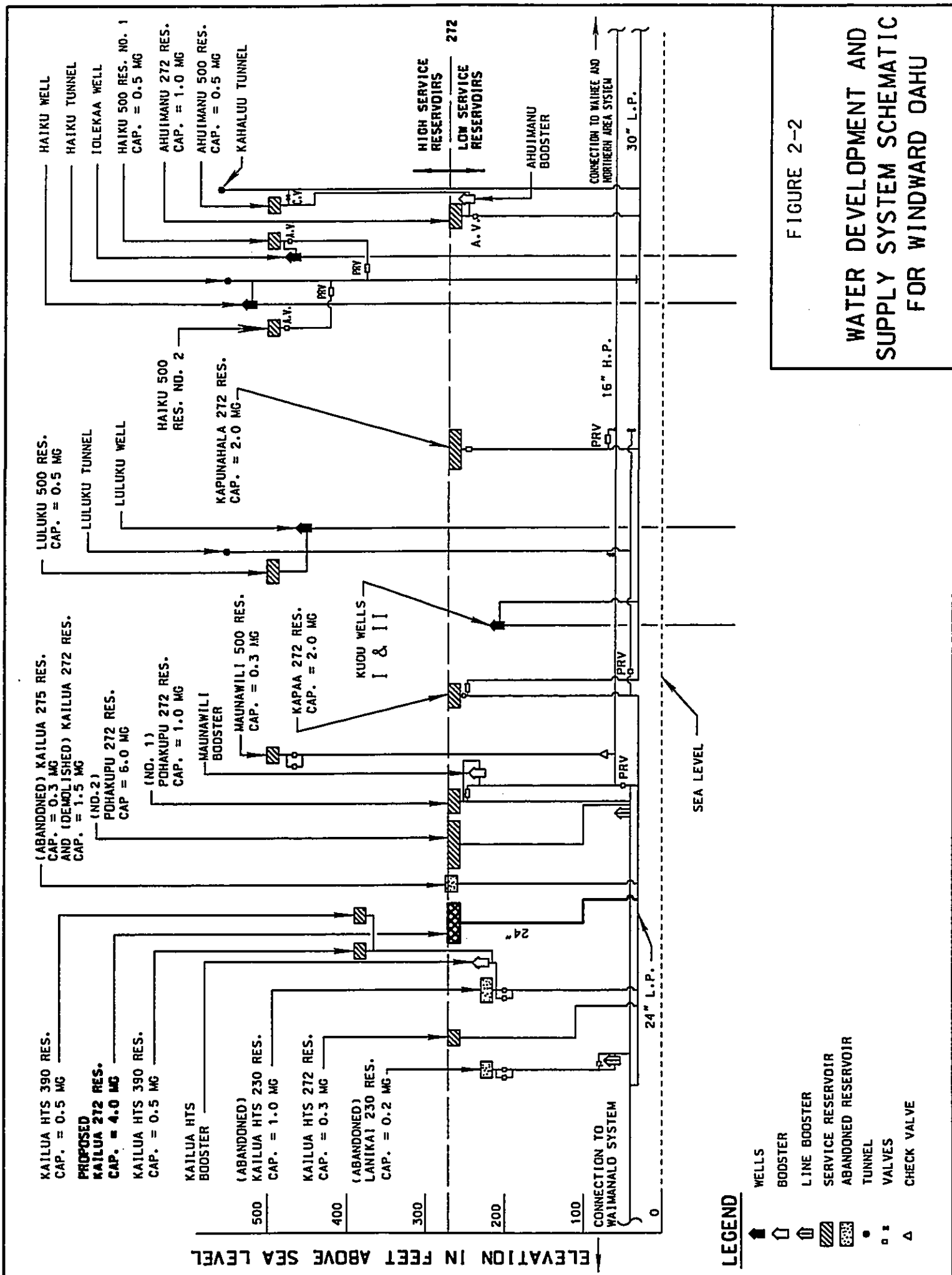


FIGURE 2-2
**WATER DEVELOPMENT AND
 SUPPLY SYSTEM SCHEMATIC
 FOR WINDWARD OAHU**

to Waimanalo, with any excess water conveyed toward Hawaii Kai. This 3.0 MG is not available for Kailua's storage needs. Hence, the effective reservoir capacity allocated to Kailua is 3.0 MG for Pohakupu Reservoir No. 2.

The list of reservoirs shown above is limited to reservoirs servicing areas located in Kailua below the 172-foot elevation. This list does not include the Kailua Heights No. 1, Kailua Heights No. 2, and the Maunawili 500 reservoirs, which service areas above the 172-foot elevation (commonly referred to as the Kailua High Service System). The high and low service zones are operated as separate and distinct systems; otherwise, high level tanks will exert extraordinarily high pressures on the low level system water mains, which would likely rupture water lines and home plumbing fixtures.

Kailua Low Service System Improvements

In 1991, the average water demand imposed on the Kailua low service system was 6.4 million gallons per day (mgd). At this consumption rate, the effective storage capacity of the existing reservoir system is equivalent to slightly less than one day's water supply. An aggregate effective storage capacity of 9.6 million gallons is actually needed to meet the BWS's storage requirement standard of one and one-half day's supply to meet the maximum day demand.

To alleviate the present shortage in reservoir storage capacity, the BWS is proposing to construct a 4.0 MG reinforced concrete reservoir as part of the low service system. This Kailua 272 Reservoir will improve the reliability of water supply and enhance fire protection capability afforded to Kailua and other Windward Oahu residents. The "272" designation refers to the maximum water level (or spillway elevation in feet above sea level) of those reservoirs dedicated to serving the low lying areas. This proposed reservoir will also replace the capacity void of two Kailua low service reservoirs (1.5 MG Kailua 272 and 0.3 MG Kailua 275) that were removed from service in 1986 because of deterioration and age, and abandoned reservoirs at Lanikai (0.2 MG) and Kailua Heights (1.0 MG). This abandonment of the four reservoirs resulted in a 3.0 MG decrease in reservoir storage capacity in the Kailua area.

This proposed 4.0 MG reservoir primarily aims to alleviate an operating shortfall of 3.3 MG in storage capacity. Secondly, it will also serve with the Pohakupu No. 2 (6.0 MG) reservoir as a second main regional tank for the Kailua area that will henceforth safely allow BWS maintenance personnel relief to temporarily remove a vital, large tank from service for routine inspection, cleaning, and repair, without risk of loss of fire protection capability or interruption of service to customers at peak water demand episodes.

Puu O Ehu ridge, the site of the old abandoned 1.5 MG and 0.3 MG reservoirs, is proposed as the site for this 4.0 MG concrete tank. The project site is on that portion of the ridge above the community of Old Kukanono.

PROJECT SITE

The project site is located near the entrance of Kailua Town, just south of the intersection of

Hamakua Drive and Kailua Road, in proximity to the sites of the demolished Kailua 272 (1.5 MG) steel reservoir and the abandoned Kailua 275 (0.3 MG) concrete reservoir, as shown on Figure 1-1. The proposed site overlooks Kawai Nui Marsh to the west and the community of Pohakupu to the south. The communities of Enchanted Lakes and Keolu Hills lie to the east and Kailua Town toward the north.

The 1.4-acre site straddles the northwestern portion of Puu O Ehu ridge and is situated on a knoll with moderate to steep slopes. Maximum slopes are up to 50 percent. The highest elevation within the project site is approximately 300 feet mean sea level (MSL). Residences are located to the south and southwest of the project site. Lands adjacent to the site from the northwest to easterly direction are currently open or undeveloped.

Portions of the proposed reservoir site are presently used for grazing cattle and horses, while the remainder is open lands. Vegetation consists of koa-haole shrubland on the slopes and open, grassy scrub on the top of the ridge.

Land Ownership

The Trustees of the Kapaa Trust and Michael and Patricia Gorelangton own portions of the proposed reservoir site.

Land Use Designation and Controls

The proposed reservoir and access road are situated within the State "Urban" and "Conservation" land use districts. Principal uses in these designations include public utilities; and the proposed reservoir is consistent with existing land use. See Figure 2-3 for state land use designations.

The reservoir and access road are on land zoned Preservation (P-1) (Restricted), and Country by the City and County of Honolulu. See Figure 2-4 for county zoning designations.

DESCRIPTION OF THE PROPOSED FACILITIES

The project consists of the following elements:

- A 4.0 million gallon capacity concrete reservoir
- A 12-foot wide concrete access road between an existing private access road and the reservoir
- A 3-foot wide service walkway surrounding the reservoir
- A 10-foot high retaining wall surrounding a portion of the reservoir with a landscaped earthen berm on the exterior face
- A 24-inch diameter water main connecting the reservoir to the existing water system at Kailua Road
- Landscaping and a landscape irrigation system
- Storm drain system; drainage swales; inlet/outlet structures; perimeter fencing and security gate; instrument house for water level sensor, indicator, and controls

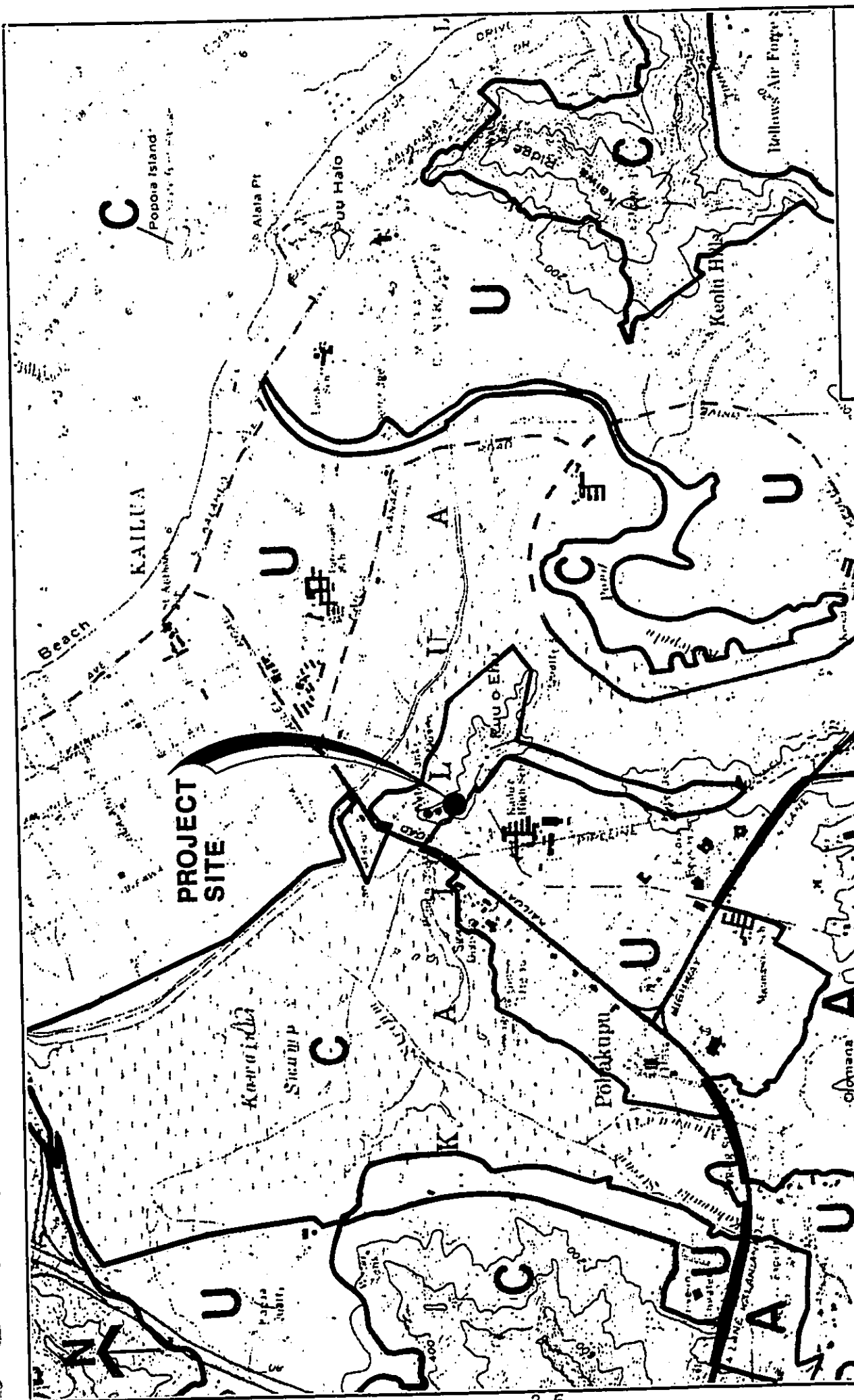


FIGURE 2-3

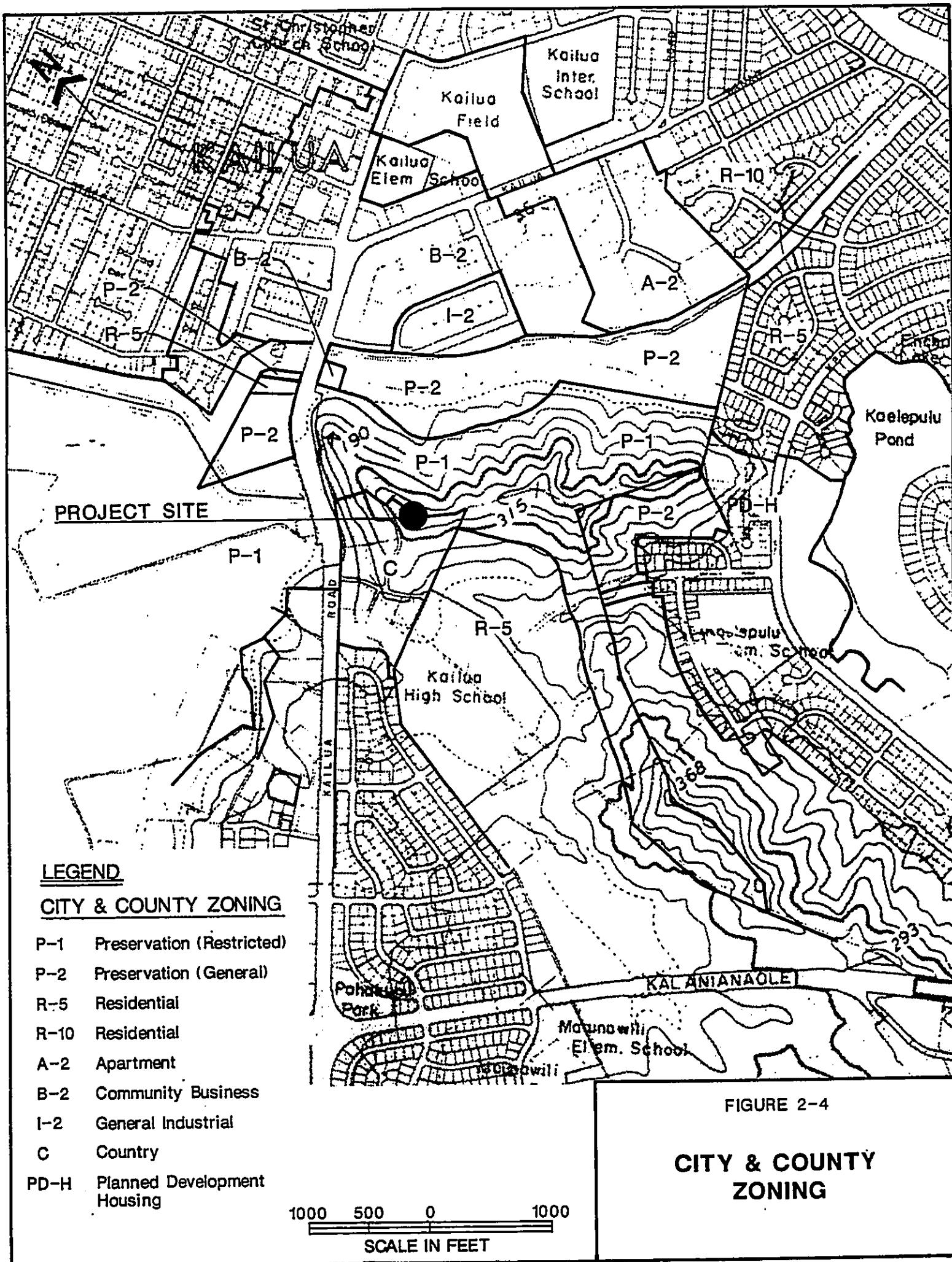
STATE LAND USE BOUNDARIES

REFERENCE: LAND USE DISTRICT BOUNDARY, STATE OF HAWAII LAND USE COMMISSION

GRAPHIC SCALE



- LEGEND
- A AGRICULTURE
 - C CONSERVATION
 - U URBAN



LEGEND

CITY & COUNTY ZONING

- P-1 Preservation (Restricted)
- P-2 Preservation (General)
- R-5 Residential
- R-10 Residential
- A-2 Apartment
- B-2 Community Business
- I-2 General Industrial
- C Country
- PD-H Planned Development Housing



FIGURE 2-4

CITY & COUNTY ZONING

- Facilities for monitoring residual chlorine levels in the reservoir (final rule anticipated to be issued by the federal government in mid-1997)

In addition, the abandoned 0.3 MG Kailua 275 reservoir will be demolished and removed.

Reservoir

The proposed Kailua 272 reservoir will be a circular concrete tank 185 feet in diameter and 22 feet in overall height. The reservoir will be covered to protect the water against contamination and deterioration by algal growths stimulated by sunlight. Elevation of the tank floor will be 252 feet above mean sea level (MSL). Spillway elevation in the reservoir will be 272 feet MSL. A perimeter walkway and drainage swale will encircle the reservoir to allow operations personnel to inspect, maintain, and repair the structure and ancillary equipment. A retaining wall, approximately 10-ft high, will encircle portions of the reservoir and walkway to minimize the visual impact of the tank from surrounding areas. The site occupied by the reservoir and encompassed by the perimeter fence is approximately 1.4 acres. Because the reservoir foundation must be constructed on firm ground, its centerline nearly coincides with the ridge line, and large cuts are required in the hillside. A reservoir site plan is illustrated on Figure 2-5 and typical sections are depicted on Figure 2-6.

The reservoir, roads, drainage structures, landscape, and perimeter fence will be constructed according to Board of Water Supply standards. In addition, the reservoir will be structurally designed for Category 3 earthquake loads, which is one level of stringency above the standard for buildings on Oahu.

Access Road

A 12-foot wide, all weather access road will be constructed from an existing private road to the reservoir site (Figure 2-7). This concrete access road will permit maintenance vehicles to routinely access the reservoir grounds and thereby allow personnel to regularly perform operation and maintenance tasks at the site.

The site is accessible from Kailua Road via a paved private road and an existing reservoir access dirt road. The rural nature of the private road will be retained after construction. Grades of the private road vary from 11 to 17 percent. The road has no curb, sidewalk, or gutter. Portions of the existing access road that will be reused will require reconstruction for road widening and removal of overgrown vegetation. A road of reinforced concrete pavement will be constructed for ease of vehicle access. Profile and sections of the road are illustrated on Figures 2-8 and 2-9.

Transmission Main

A single-feed 24-inch water main will be constructed to connect the proposed reservoir to the existing water main along Kailua Road. Alignment of the water line will follow the route of the existing private road to elevation 120 feet, and continue upwards toward the ridge. The route is approximately 1,500 feet long, but construction difficulties are expected to be minimal.

Installation of this transmission main will afford opportunities for the Old Kukanono Community residents in this area to connect to the main and permit abandonment of an old,

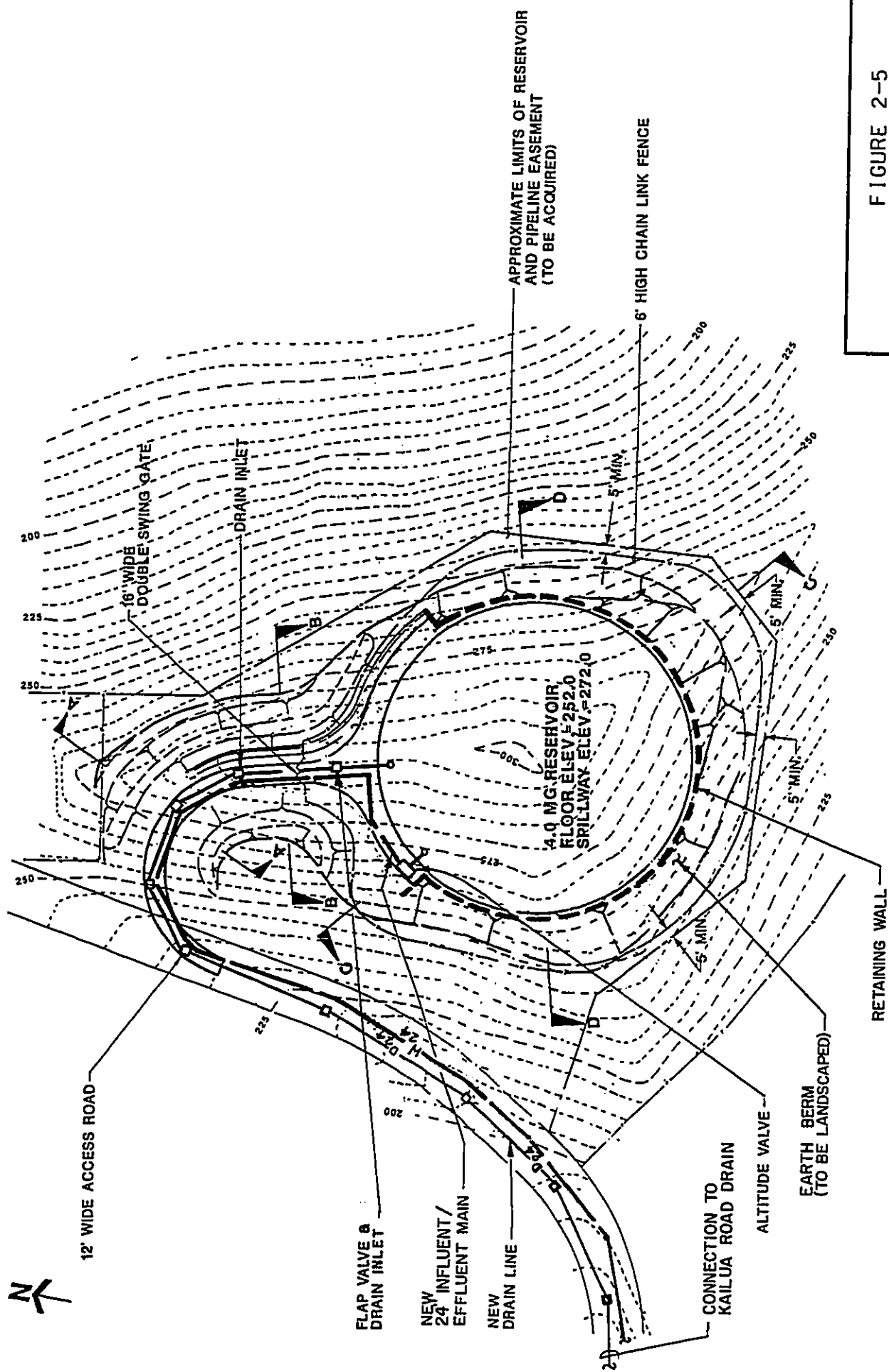
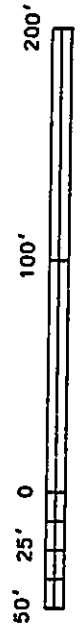
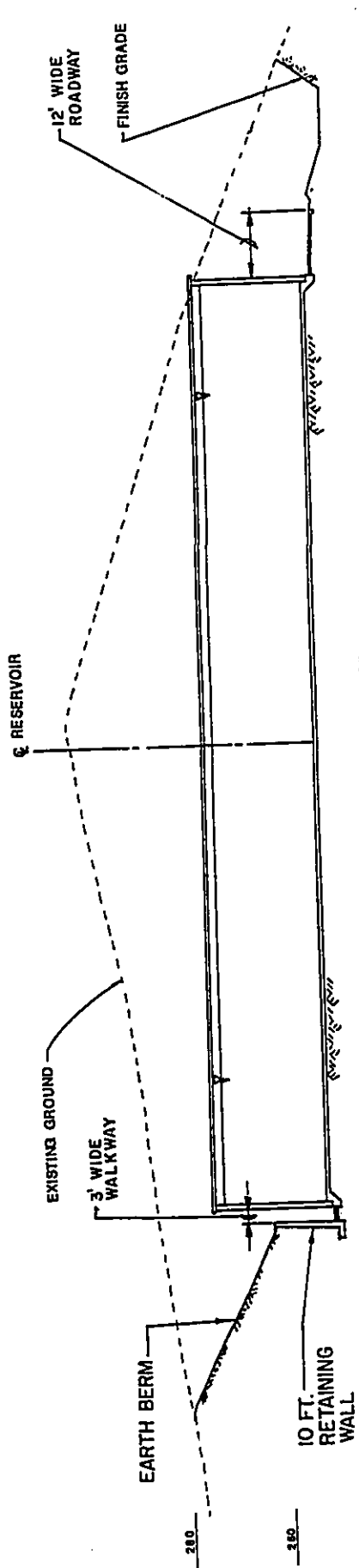


FIGURE 2-5

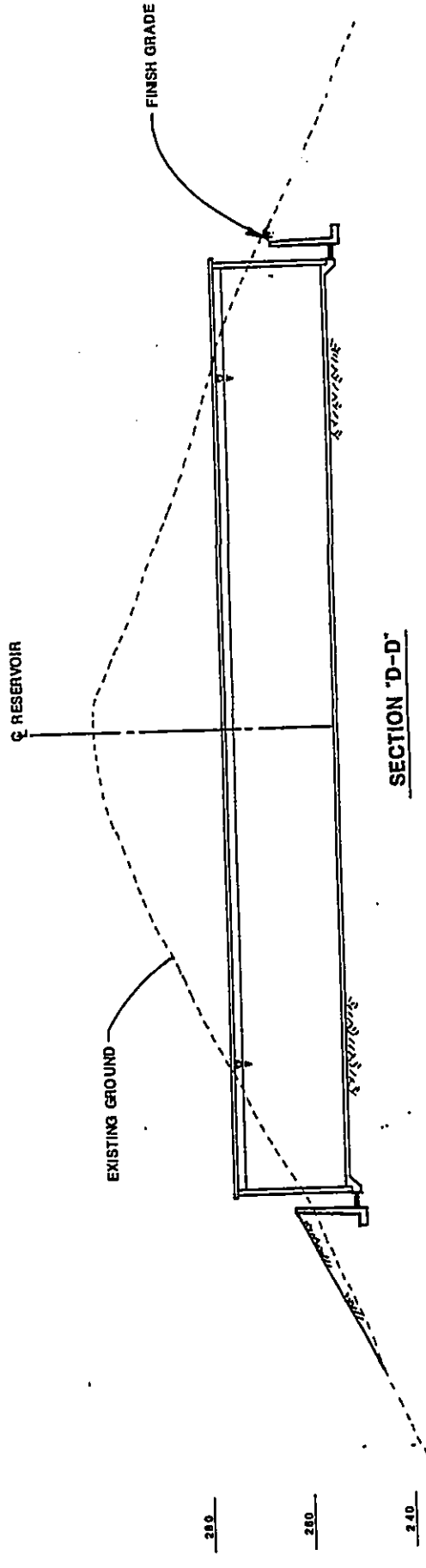
RESERVOIR SITE
GRADING PLAN

GRAPHIC SCALE





SECTION 'C-C'



SECTION 'D-D'

GRAPHIC SCALE

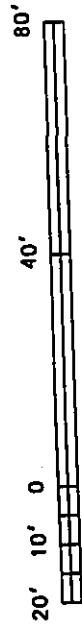


FIGURE 2-6

4.0 MG RESERVOIR SECTIONS

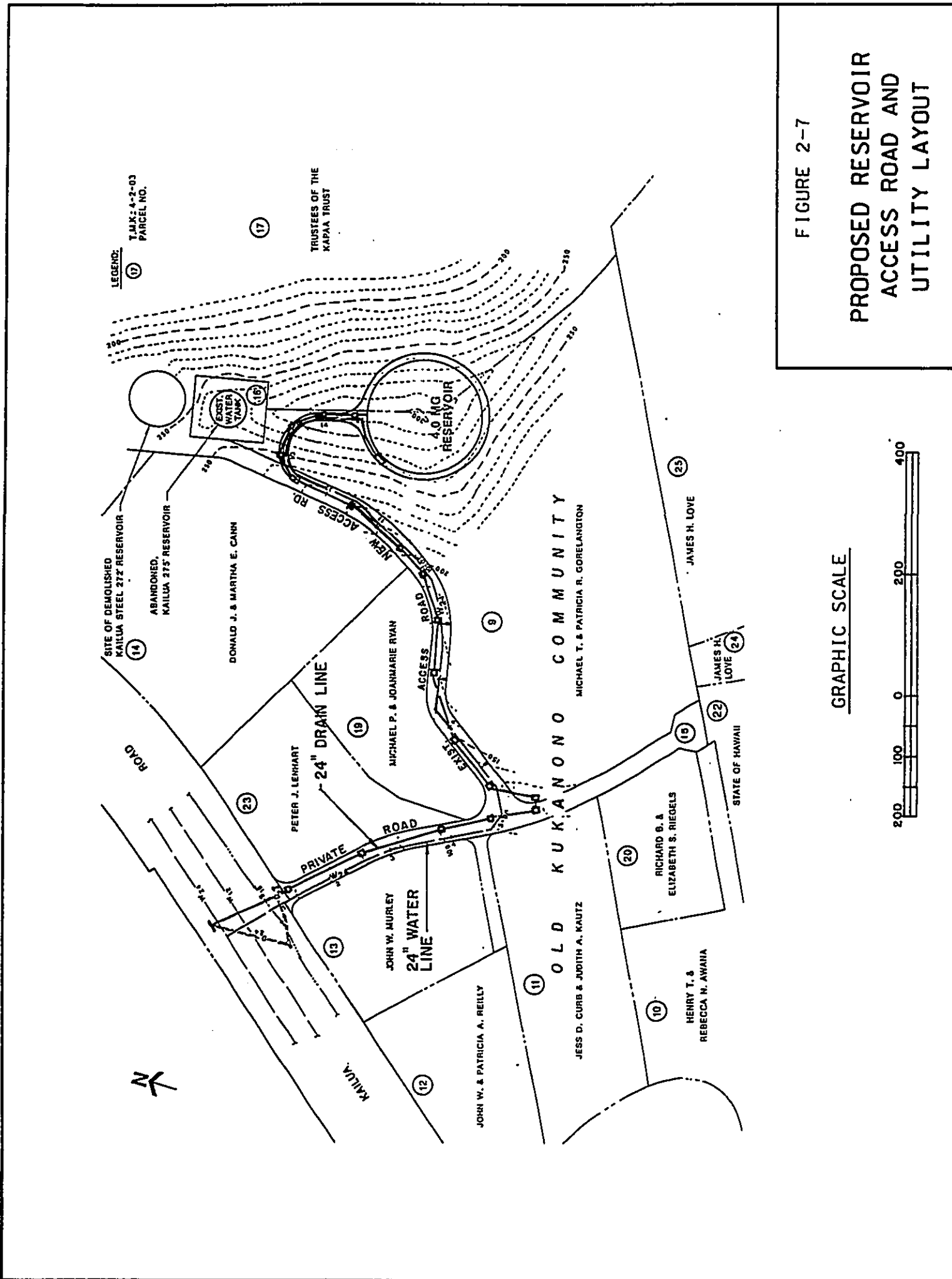


FIGURE 2-7
**PROPOSED RESERVOIR
 ACCESS ROAD AND
 UTILITY LAYOUT**

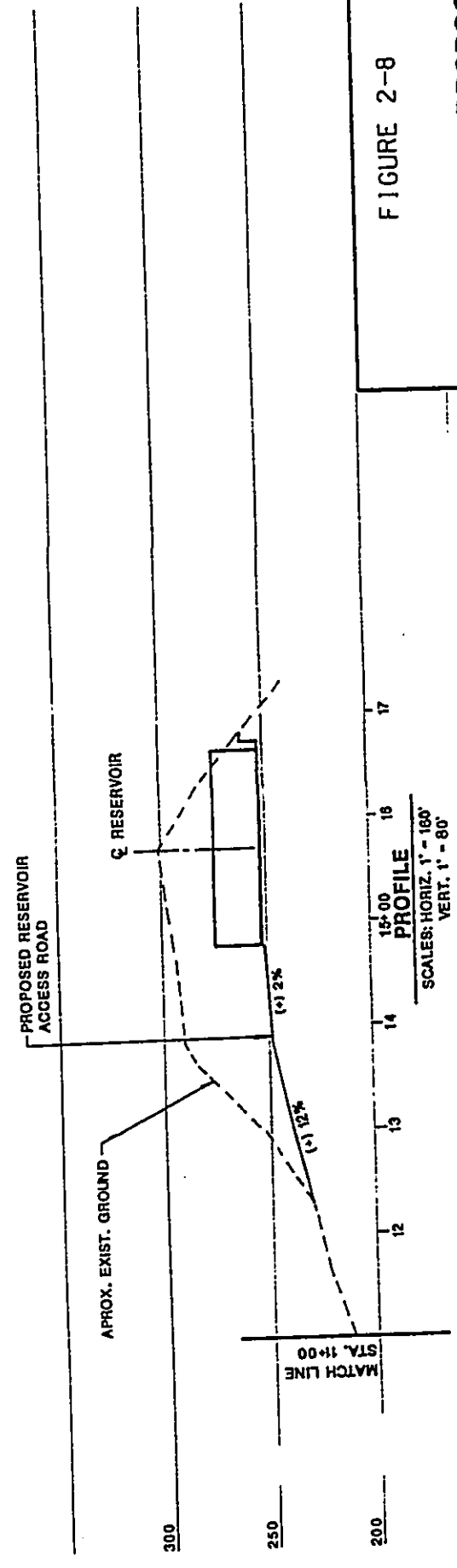
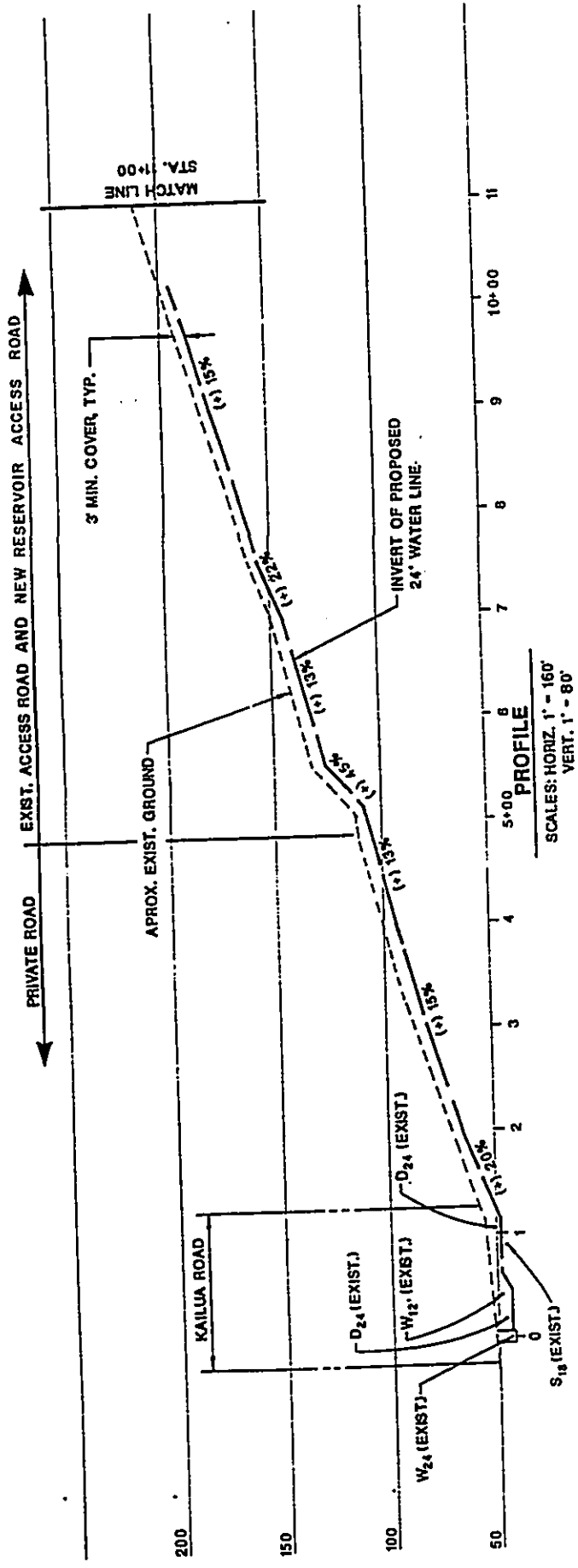
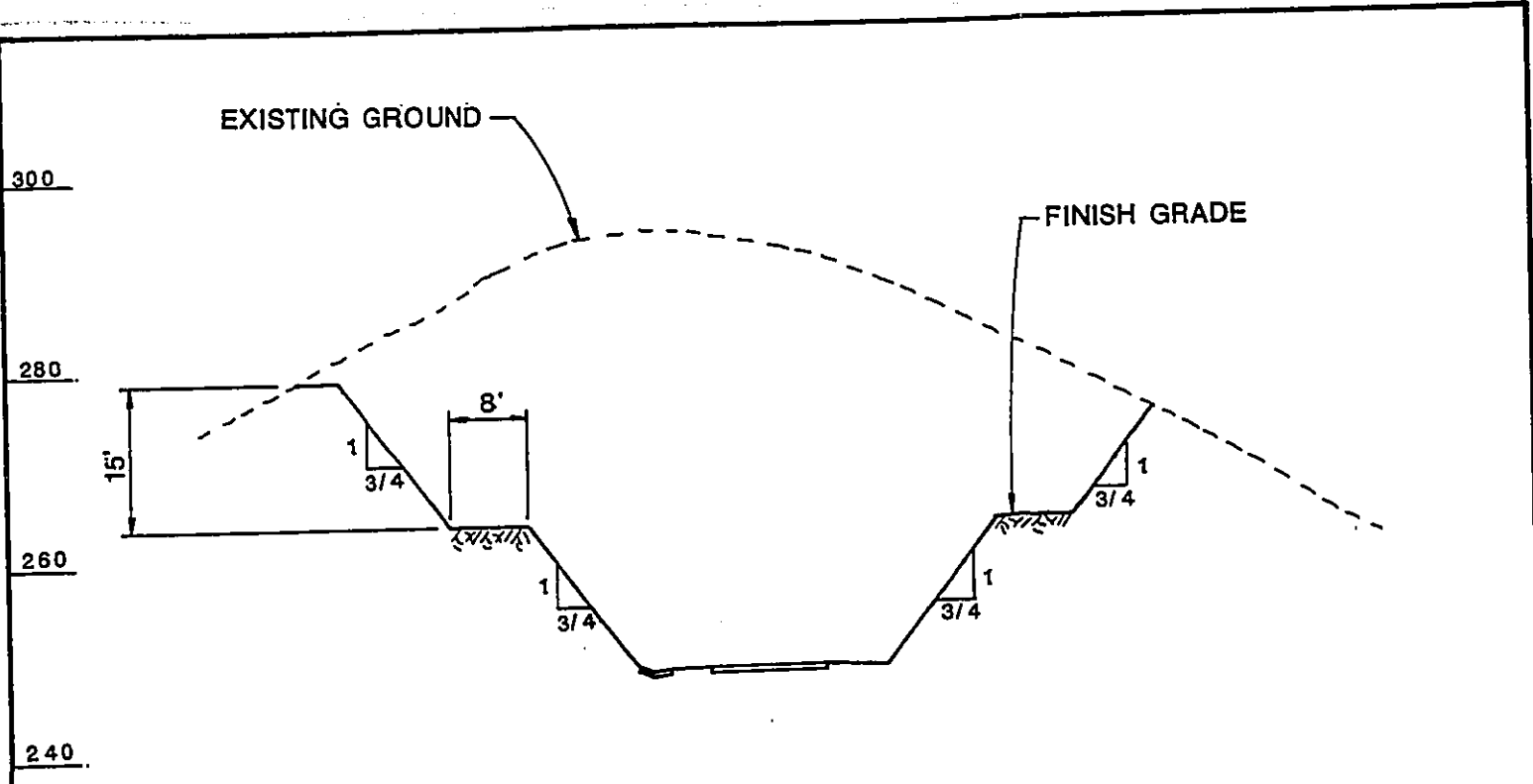
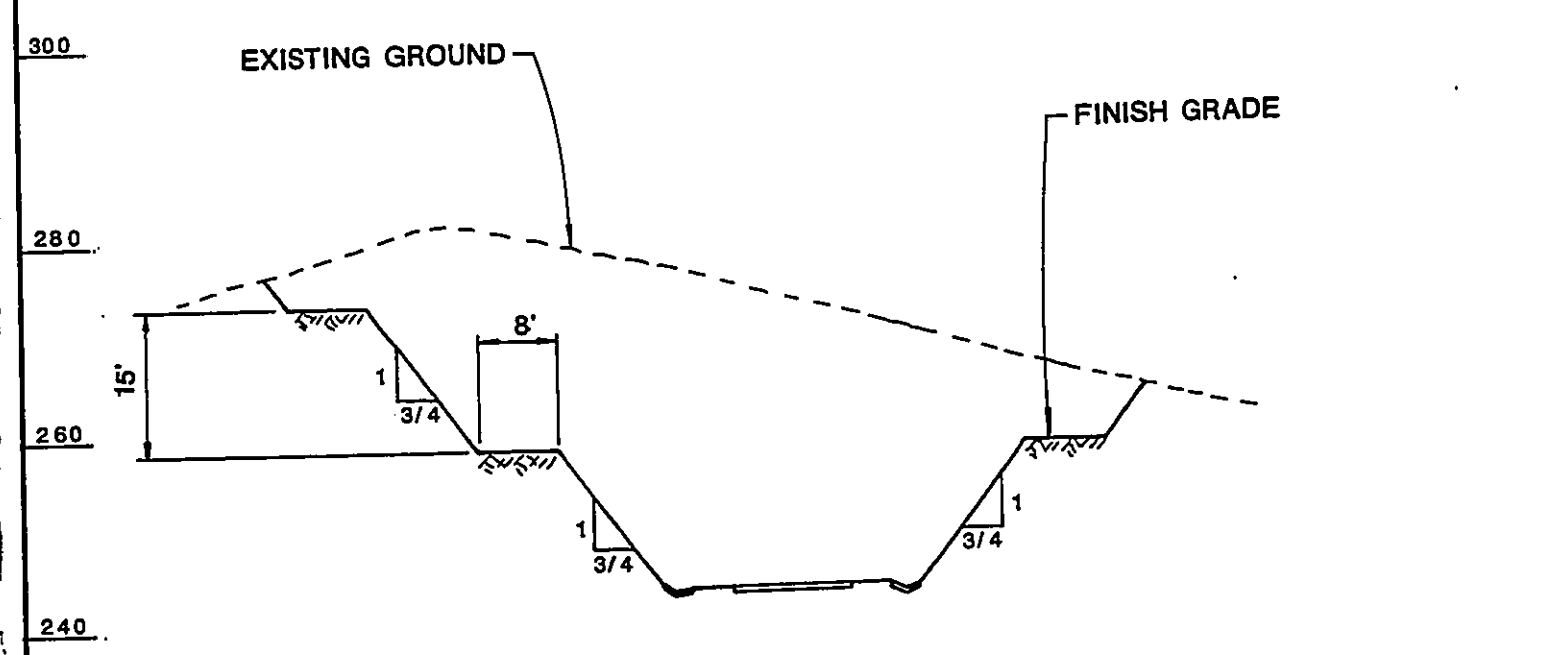


FIGURE 2-8
 PROFILE - PROPOSED
 RESERVOIR ACCESS ROAD
 AND TRANSMISSION MAIN



SECTION "B-B"
SCALE: 1" = 20'



SECTION "A-A"
SCALE: 1" = 20'

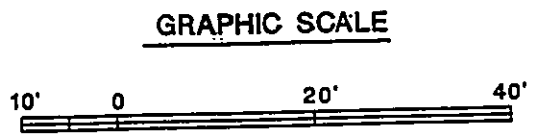


FIGURE 2-9
ACCESS ROAD SECTIONS

corroded 3-inch private waterline. Additionally, fire hydrants will be installed along the private road to upgrade this area's fire protection capabilities.

Drainage

Storm runoff will be collected in swales and catch basins at the shoulder of the access and reservoir perimeter roads and conveyed through underground drain pipes to a 24-inch storm drain system paralleling the access and private roads. Storm runoff will be released along with other area wide runoff into Kawai Nui Marsh at a point across Kailua Road (Figure 2-7). The storm drain system within Kailua Road is under State DOT jurisdiction. Reservoir overflow and washout will also be discharged through this same drainage system and release point.

Presently, the private road leading to the proposed reservoir site does not have an underground drainage system, resulting in overland storm runoff. The drainage system improvements will reduce the amount of overland runoff experienced by the Old Kukanono Community residences.

Landscaping

Landscaping will consist of plantings on the slopes around the reservoir. In recent years, with an emphasis on facility aesthetics, the Board of Water Supply has given increased attention to the landscape of its facilities. Plants for ground cover and trees for visual screening are selected according to the aesthetic needs for each project. Landscaping features plant species that are tolerant to dry conditions for year round growth and species that will adequately ameliorate the visual effects of the reservoir and surrounding slopes. For this project, the tank periphery landscaping will incorporate existing vegetation to blend with the surroundings.

Other Facilities

It is anticipated that the federal government will require chlorination of the water supply. Once enacted, (perhaps in mid-1997), the Board of Water Supply will implement the rule, including monitoring of residual chlorine levels in the reservoir. Sampling ports will be provided for this purpose.

Associated with the reservoir will be electrical and telephone services required to operate telemetry equipment that regularly monitor tank water level and transmit readings to the BWS Beretania Street central station.

Fencing topped with barbed wire will also be installed completely around the reservoir and associated slopes, and a locked gate at the access road will control unauthorized entry to the reservoir grounds.

Civil Defense Siren

The State Civil Defense has been granted permission to install a civil defense siren warning device at the reservoir site. Maintenance of the siren will be the state's responsibility. Should the state decide to install the siren, concerns of neighboring residents must be addressed.

CONSTRUCTION ACTIVITIES

Demolition

As part of this project, the abandoned 0.3 MG concrete reservoir will also be demolished and the site cleared of remnants of the old reservoir system. Structures that will be dismantled or demolished and disposed offsite are valve box manholes, exposed 8-inch and 12-inch pipelines and valves, and miscellaneous concrete structures and metalworks. Demolition methods may involve use of small crane and wrecking ball, bulldozer, heavy equipment, hoe-ram pneumatic jackhammers, and concrete cutting hydraulic scissors.

Following demolition and cleanup work, the old reservoir site might temporarily serve as the contractor's staging area for ready-mix cement trucks and concrete pump trucks needed for concrete pours for the new reservoir. The grounds will finally be graded and planted with ground cover plants and restored to closely resemble its surroundings.

Final disposition has not yet been determined for these BWS owned lands.

Grading

Excavation and grading will be required to prepare a suitable foundation for the proposed reservoir. A preliminary grading plan for the site showing the approximate limits of grading activity is illustrated on Figure 2-5.

Prior to earthmoving activities, the area within the grading limits will be cleared and grubbed of all vegetation and debris and a temporary earth berm or other appropriate perimeter erosion control measure will be constructed to minimize offsite sediment transport. Rough grading of the access road will begin first, followed by installation of the water main beneath the roadway and laying of the access road base course. The steep grade of certain sections of the access road may necessitate that it be paved before construction vehicles use the road.

Side slopes for the access road will be constructed at 1/2H:1V to 3/4H:1V (horizontal to vertical) slopes according to the findings of a soils investigation performed at the site. This will provide a stable slope in exposed layers of basalt formation. Cut slopes exposing the surface soils, estimated to be about four feet deep, will be contoured at a gradient of 2H:1V for stability.

At these side slopes, the approximate earthwork quantity for excavation of the roadway and reservoir is approximately 50,000 cubic yards. Excavation depth averages from 30 to 40 feet, with maximum excavations up to 50 feet.

Facilities Construction

Following grading, work on the reservoir structure will proceed with the laying of interior piping and reinforcing steel and concrete forms for the reservoir floor. Ready-mix concrete will then be trucked to the reservoir site and placed in the forms in several pours. After curing of the foundation, the concrete walls and columns will be erected, followed by the concrete roof. Construction of the retaining wall, drainage system, landscape irrigation system, paved access road, landscaping, and security fencing, and cleanup and testing will be the final steps to this project.

Some flexibility is possible in construction methods and sequence whereby some work may be done in sections in combination with other site work.

PROJECT SCHEDULE, CONSTRUCTION COST, AND FINANCING

Start of construction will largely depend on the availability of capital improvement project (CIP) funds; but it is expected that the project will begin in 1997 and be completed in 1998. Estimated construction time is 365 calendar days. The construction cost is projected to be approximately \$12.5 million, with funds provided by the Board of Water Supply's water system facilities charges account and other revenues. An increase in water rate due to this project is not anticipated.

A tentative construction schedule is as follows:

	<u>Duration</u>
1. Demolish abandoned concrete tank and appurtenances	10 days
2. Clear and grub site	12 days
3. Construct temporary earthen berm for erosion control	9 days
4. Mass grade reservoir site and grass all dirt slopes and exposed dirt areas, construct 24-inch water main	135 days
5. Construct 18-inch and 24-inch drain lines and reservoir access road subbase	30 days
6. Construct reservoir, retaining wall, perimeter fencing, and landscape irrigation system	120 days
7. Test reservoir, water main, and grounds irrigation system	15 days
8. Construct base course and pave access road, install landscape plantings	24 days
9. Remove temporary earthen berm and restore area to its natural condition	<u>10 days</u>
Approximate construction time (some work will occur concurrently)	365 days

CHAPTER 3
ASSESSMENT OF EXISTING CONDITIONS AND
PROBABLE IMPACTS AND MITIGATION MEASURES

PHYSICAL ENVIRONMENT

Existing Conditions

Geology and Topography

The island of Oahu was formed by the Waianae and Koolau volcanoes. In the ancient Hawaiian system of land division (ahupua'a), the Kailua District, which is located in the center of the extinct Koolau Volcano, extended from the top of the Koolau Range to the shore along two high ridges. The ahupua'a of Kailua included Waimanalo in the southeast to northwest of Kaneohe and from the eastern base of the Koolau Range on the southwest to inshore of Mokulua Islands to the east. Kailua formerly contained two ocean embayments, and the remains of these two are *Kawainui Marsh and Enchanted Lakes (formerly Kaelepulu Pond)*.

Two series of lava flows comprise the greater part of the Koolau Range. The Kailua volcanic series, a dense volcanic plug, covers most of Kailua Town and Kawai Nui Marsh, while the Koolau volcanic series comprises the greater part of the Koolau Range.

The process of erosion has created a topography characterized by relatively steep slopes and irregular ridges. Elevations range from sea level at Kailua Bay to over 2,000 feet at the crest of the Koolau Range.

The proposed site is located on an eroding ridge near Kailua Town on the northwestern end of Puu O Ehu ridge. The ridge is approximately 5 to 15 feet wide and drops sharply to steep terrain. The site has slopes extending downward toward the northeast and southwest on the order of 20 to 40 percent. Elevations at the site (Figure 3-1) range from 250 to 300 feet above mean sea level (MSL).

Soils

The Soil Survey prepared by the U.S. Department of Agriculture, Soil Conservation Service, identifies the near surface soil in the area of the proposed project as Papaa clay (PyE), on 20 to 35 percent slopes. The clay is formed in colluvium and residuum derived from basalt. Papaa clay is usually very dark brown in color and has a sticky and plastic consistency. This soil is characterized as being suitable for pasture usage because of the difficulty in working on the slopes and its moderate to severe erosional hazard. The Soil Survey gives Papaa clay a Unified Soil Classification of CH, which may indicate a high expansion potential.

The Soil Survey also indicates that a thin layer of reddish brown and gray silty clay loam underlies the surface clay. The loam generally exhibits moderate shrink-swell potentials. Below the silty clay loam, the soils transition to weathered rock and rock.

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400 410 420 430 440 450 460 470 480 490 500 510 520 530 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 700 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000

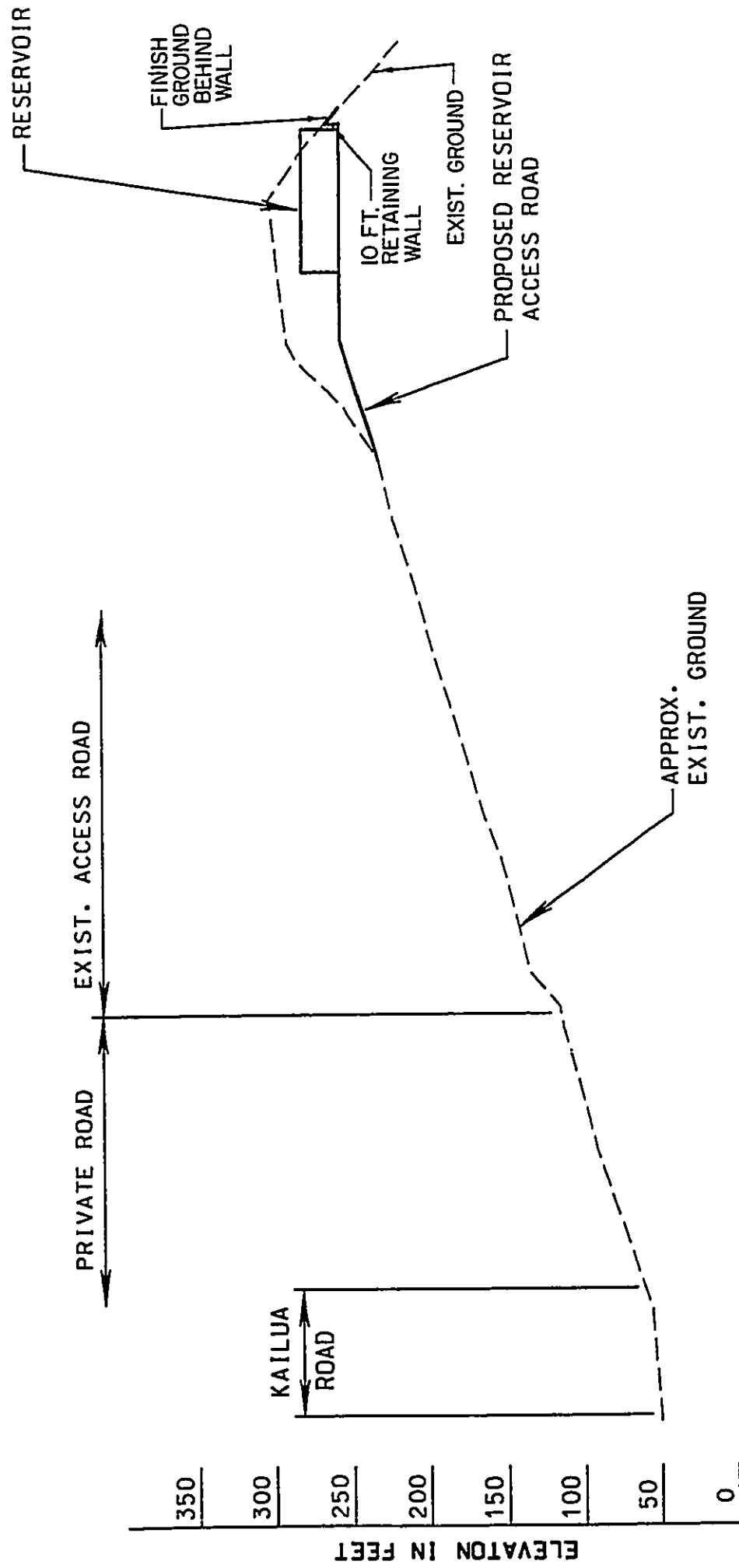


FIGURE 3-1

PROFILE OF SITE

GRAPHIC SCALES



The soil exposed along the slopes generally confirm data in the Soil Survey. The surface soil was visually classified as brown and reddish brown clayey silt. Isolated areas also exposed mottled orange brown clayey silt.

Rock outcrops were observed in numerous areas, particularly along the western slopes. A relatively consistent basalt stratum or ledge was observed along the western slope face, about 75 feet below the ridge line. The basalt was fractured but only slightly weathered.

Runoff is medium to rapid, and workability is difficult.

See Appendix B for soils feasibility report prepared by Ernest K. Hirata & Associates, Inc. in April 1992.

Climate

The climate in the Kailua area is affected by its windward and coastal location. Tradewinds from the east or northeast are not obstructed by land forms and provide good ventilation. When the tradewinds are absent or weak, land or sea breezes or mountain-induced circulation may develop. Extreme temperatures may range from the mid-50s to the low-90s, while the average range is 68 to 79 degrees F. There are only two seasons: summer (between May and October) and winter (between October and April).

Spatial and temporal distributions of rainfall are pronounced in the Kailua area. The orographic effect of the Koolau Range produces most intense rainfall in areas nearest the summits of ridge lines. Average annual rainfall ranges from 45 to 75 inches. The wet season is usually from October to April, with the highest rainfall in March and the lowest rainfall in June. Winter storms from October to April bring the heaviest rains to the island.

Kailua is subject to moisture-laden northeast tradewinds about 75 percent of the year. Wind speeds range between 10 and 25 miles per hour, with prolonged periods of calm and low velocity wind patterns.

Drainage

The drainage pattern in the project area is shown on Figure 3-2. Storm water runoff from the urbanized lands of Old Kukanono Community and the hillside lands above it travels overland to Kailua Road into State Department of Transportation storm sewers that discharge into Kawai Nui Marsh. The private road of this residential community to which the new reservoir access road will connect has no drainage system.

According to the Federal Emergency Management Agency's Flood Insurance Rate Map (FIRM), the project site is located outside the 500-year flood plain (FIRM, Panel no. 150001-0090-C, September 28, 1990).

Probable Impacts

Geology and Topography

Large-scale grading will result in major changes to the existing ridge. Excavation will require cuts as deep as 50 feet.

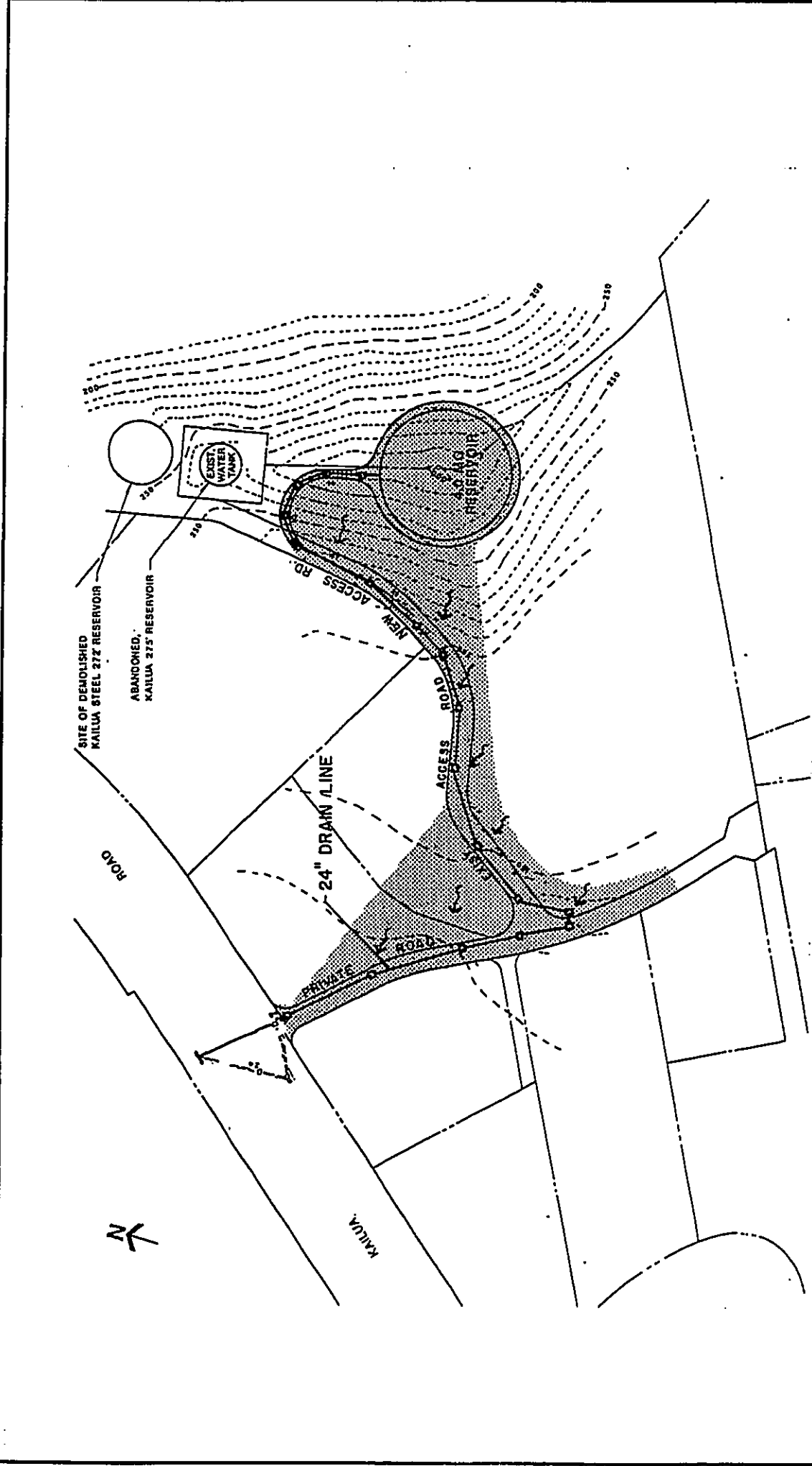
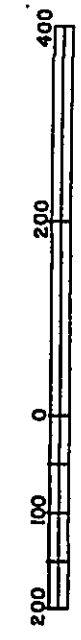


FIGURE 3-2
**DRAINAGE PATTERN
 FOLLOWING CONSTRUCTION
 OF RESERVOIR**

GRAPHIC SCALE



LEGEND

TRIBUTARY AREA TO
 PROPOSED DRAIN LINE



SURFACE FLOW DIRECTION



Erosion

During construction, soil erosion may occur due to excavation and grading. A soil erosion assessment based on the City and County of Honolulu's Soil Erosion Standards and Guidelines was performed. A project's Severity Rating Number (H) indicates the degree of hazard from potential damage due to erosion and sediment. The maximum allowable value of H for Oahu is 50,000. For the Kailua 272 Reservoir project, the value of H is less than 48.

Drainage

The amount of runoff generated within the boundary of the 1.4-acre reservoir site and paved access road is estimated to be 6 cubic feet per second (cfs) for a storm intensity that has a 10 percent probability of occurring in any given year. Storm water runoff from the proposed project site in its present vegetated condition is about 3.5 cfs. In altering the ground cover features, the project will increase runoff by about 2.5 cfs. Compared to the 36 cfs of total runoff estimated to occur presently from these hillsides and residences, this additional runoff comprises only about seven percent of the total amount.

During non-storm conditions, the drainage system may receive reservoir tank overflow and tank wash water. However, such occasions seldom occur in routine operations. The reservoir will be drained only during instances where interior cleaning work is required, such as to rid the reservoir of accumulated sediment or to perform interior structural inspections.

Proposed Mitigation Measures

Erosion Control

The surface clay, which may be highly expansive, will require removal prior to placement of structural fill. In addition, cut slope gradients of 2H:1V (horizontal to vertical) may be used for slopes exposing the surface soils. Cut slopes in rock should not exceed a ratio of 0.5H:1V and, in weathered rock material, 1H:1V.

Clearing and grubbing will be done in accordance with Chapter 23, "Grading, Soil Erosion and Sediment Control," of the Revised Ordinances of Honolulu, 1978, as amended (Ordinance No. 81-13). In addition, grubbing will be done in accordance with Chapter 54, "Water Quality Standards," and Chapter 55, "Water Pollution Control," of Title 11, Administrative Rules of the State Department of Health. The graded area will be planted or sodded after grading is completed. Landscaping will be maintained by BWS upon completion of construction.

An erosion control plan will be prepared and submitted for approval to the City and County of Honolulu. The erosion control plan will identify specific best management practices (BMPs) which will be employed to minimize erosion and offsite sediment transport from the site. These BMPs may include installation of an earth berm, silt fence or other appropriate control measure along the downsloping perimeter of the site to contain sediment on site; placement of erosion control matting or hydromulching with seeds to stabilize bare cut surfaces; and construction of a graveled ingress/egress for use by trucks at the entrance of the construction site to minimize tracking debris onto paved streets.

Due to location of the project within the Conservation district, construction activities will also be subject to conditions of the CDUA. Applicable standard conditions pertaining to erosion control include:

13-5-42(a)(17) During construction, appropriate mitigation measures shall be implemented to minimize impacts to offsite roadways, utilities, and public facilities;

13-5-42(a)(18) Cleared areas shall be revegetated within thirty days unless otherwise provided for in a plan on file with and approved by the department;

13-5-42(a)(19) Use of the area shall conform with the program of appropriate soil and water conservation district or plan approved by and on file with the department, where applicable.

Drainage

The impact of overland storm water runoff at the project site will be mitigated by constructing inlets and swales to collect and convey the water into new 18- and 24-inch storm sewers that will cross Kailua Road and discharge toward Kawainui Marsh near an existing DOT drainage system headwall.

The reservoir's perimeter walkway will be graded to channelize storm water into swales and drain pipe inlets. A drainage system constructed alongside the existing private road (Figure 2-5) will also have similar drain inlets at regular intervals to intercept storm runoff directed at the residential areas below the project site. These improvements will not only mitigate the storm water impacts of the constructed reservoir but will also reduce the amount of surface runoff that occurs within the residential areas.

FLORA

Existing Conditions

A botanical survey of the proposed site was conducted by Char & Associates in March 1992 to describe the vegetation, inventory the flora, and identify any threatened or endangered plants. See Appendix C for the complete report.

Twelve to eighteen-foot tall koa-haole shrubs (Leucaena leucocephala) are found on the slopes. Green panicgrass (Panicum maximum var. trichoglume) forms a short, dense mat under the koa-haole shrubs and occasional blue potato vines (Solanum seaforthianum) grow over the koa-haole shrubs. Along the top of the ridge, where the vegetation is open and grassy, the predominant flora include uhaloa (Waltheria indica), Klu (acacia farnesiana), Cuba jate (sida rhombifolia), and indigo (Indigofera suffruticosa).

There were 56 species inventoried during the field study. Of this amount, 53 species were introduced, 1 may be of early Polynesian introduction, and 2 are probably indigenous. There were no endemic, threatened, or endangered plants.

Probable Impacts

The botanical survey revealed that there is little of botanical interest at the proposed site, and the project is not expected to have any significant adverse impact on the botanical resources at the site.

FAUNA

Existing Conditions

A survey of the avifauna and feral mammals was conducted by Phillip L. Bruner in December 1991 for the proposed Kailua Gateway project, which abuts the proposed reservoir site to the north below Puu O Ehu ridge.

No endemic land birds were recorded. Four endemic and endangered water birds were observed throughout the wetlands associated with the proposed Kailua Gateway site. Several migratory indigenous birds were observed. No nesting sea birds were observed. Fourteen species of exotic (introduced) birds were recorded.

Mongoose and feral cats were observed. Cattle and horses were seen on the upper slopes and in the wetlands.

Probable Impacts

Cattle and horses grazing on the slopes of the ridge may be displaced insofar as the area around the reservoir will be fenced. In addition, blasting may affect the horses that are stabled adjacent to the reservoir site. Otherwise, the project is not expected to have any significant adverse impact on the fauna at the site.

HISTORICAL AND ARCHAEOLOGICAL RESOURCES

Existing Conditions

An archaeological survey and historical research were conducted by Cultural Surveys Hawaii in February 1992 to determine the presence or absence of any archaeological sites in the proposed area. See Appendix E for the complete report.

No archaeologically-significant sites were found. There are numerous cattle trails along the hillside, but no cultural material was noted along the trail or on top of the ridge. Portions of the ridge top were previously graded for the construction of two reservoirs that are now abandoned or demolished. It is not known if there were any archaeological sites in these two areas prior to their construction.

Probable Impacts

No adverse impacts to archaeological resources are foreseen due to construction of the project. The nearest significant feature is the high point of Puu O Ehu ridge, about 1,500 feet southeast of the proposed reservoir site, which overlooks Kaelepulu Pond and Kawai Nui Marsh.

Since no historic sites were found, the State Historic Preservation Division has determined the project will have no effect on historic sites.

TRAFFIC

Existing Conditions

Traffic data of the State of Hawaii Department of Transportation's Highways Division for Kailua Road are depicted on Figure 3-3. Traffic counts taken in January 1991 indicate--

- The highest volumes on Kailua Road, fronting the project site, occur between 6:00 am and 8:00 am in the morning and between 4:00 pm and 6:00 pm in the afternoon. Peak morning traffic exceeds 1,300 vehicles per hour in the Honolulu-bound direction; peak afternoon traffic in the reverse Kailua-bound direction is also at about 1,300 vehicles per hour. This reflects the daily commuter traffic from Kailua Town into the business districts of metropolitan Honolulu.
- Honolulu-bound traffic in the morning exceeds Kailua-bound traffic in a ratio of 2.7:1. In the evening period, Kailua-bound traffic exceeds Honolulu-bound traffic by a 1.6:1 ratio.
- During the hours of 9:00 am to 3:00 pm, i.e., the middle part of the day, the directional split is nearly even at about 900 vehicles per hour in either direction.

Existing traffic on the private access road which serves as entry to the reservoir site consists of diurnal vehicle trips generated by eleven or so residences within that neighborhood.

Probable Impacts

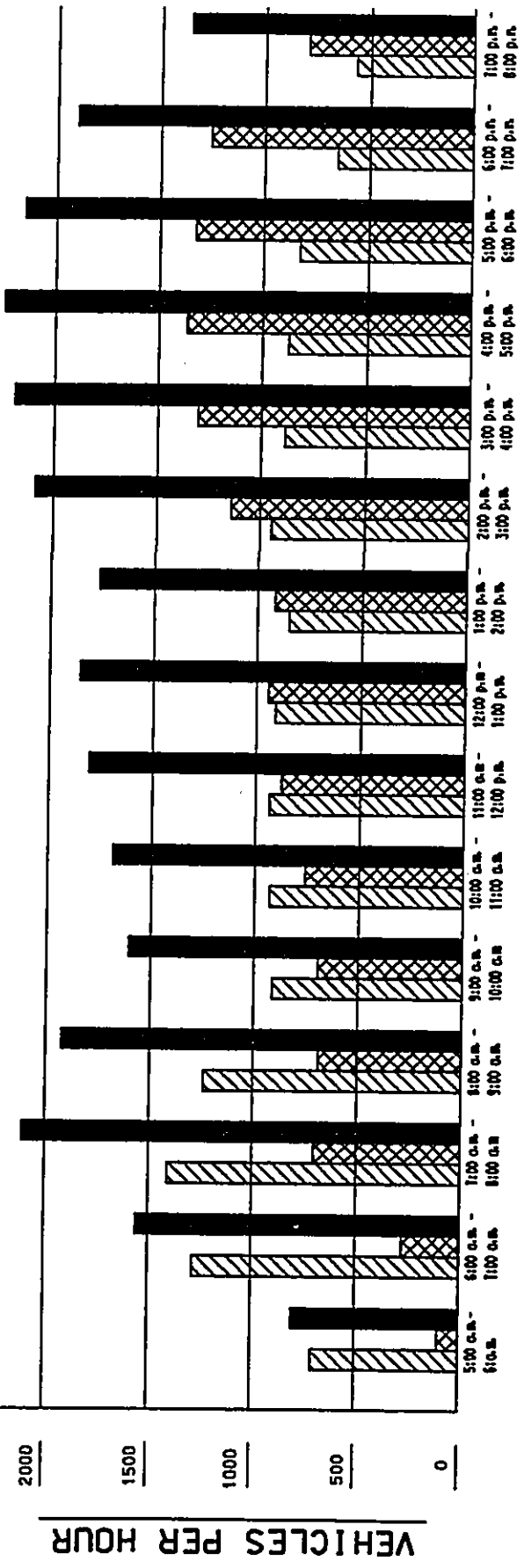
The project will affect traffic in two principal ways. First, construction trucks will temporarily increase the number of vehicles using the private access road leading to the reservoir site. Second, installation of the new water main along the private access road and connection to Kailua Road will temporarily reduce the available roadway width for traffic. All construction-related impacts will be temporary and will last only for the duration of constructing this public facility and infrastructure.

It should be noted that, once constructed, the reservoir will generate virtually no traffic aside from occasional operation and maintenance trips by BWS personnel vehicles.

The following will be covered in this section:




- Number, timing, and anticipated routing of construction vehicle trips
- Ability of the existing roadways to accommodate the forecast increase in traffic volume

The project will generate construction vehicle traffic for the duration of the various phases of work, starting with site preparation (includes excavation, grading, and roadway paving) and erection of the concrete reservoir and construction of the water pipeline.



TIME OF DAY

LEGEND

-  HONOLULU BOUND
-  KAILUA BOUND
-  TOTAL

SOURCE: DEPARTMENT OF TRANSPORTATION
JANUARY 14-15, 1991

FIGURE 3-3

TRAFFIC ON KAILUA ROAD
FRONTING THE PROJECT SITE

To estimate the number of large truck trips that will be generated during the site preparation phase, the following assumptions are made:

- Excavation volume = 55,000 cubic yards
- Average truck capacity = 18 - 20 cubic yards
- Number of truck loads per hour = 8 to 10 loads/hr

Based on these assumptions and with hauling operations between the hours of 8:30 am and 3:30 pm, approximately 56 to 70 truck trips per day will occur to dispose of excess excavated material. The volume hauled will be approximately 1,000 to 1,400 cubic yards per day, and hauling operations will last about four months. However, depending on the site specific plan a contractor develops for staging of excavated materials and a staging area for haul truck traffic, the overall time for sitework preparation could vary from the projected time period.

After sitework, the reservoir erection and pipeline construction phases will follow, wherein the number of construction trucks coming to and leaving the reservoir site is expected to be reduced substantially, except for the few days when concrete is being poured for the floors, walls, and roof of the reservoir. Light and heavy trucks will frequent the jobsite, hauling various construction materials for the duration of the project.

Concrete pours will probably take place by increments over several weeks and consist of a series of partial pours for the concrete floor, followed by the reservoir walls, and, finally, the tank roof. Capacities of concrete trucks commuting to the site vary from 8 to 10 cubic yards. The concrete plant at Kapaa Quarry will probably supply the materials.

Pipeline construction will involve trucks transporting pipe, concrete, reinforcing steel bars, select fill, and other materials to the site, with trips occurring mostly at off-peak traffic hours. To lessen local traffic impacts, pipe will be stored off to one shoulder of the road while work progresses on installing the water main on the other shoulder or in the roadway.

Portions of the intersection of Kailua Road and the private road may need to be coned off and police hired to direct traffic during the various stages of construction within the intersection. Also, it may be necessary for the contractor to stage haul trucks along the right lane of Kailua Road inbound to Kailua Town as they await turning right on to the private road.

On vehicular safety, the contractor will be required to take all necessary precautions to operate his vehicles in a safe manner and to comply at all times with the safety standards of the State Division of Safety and Health.

Long-term traffic impact will be negligible since there should only be one vehicle per day for operation and maintenance of the reservoir.

Mitigation Measures

To avoid inconvenience to motorists, residents, and the high school, the normal construction hours of 7:00 AM to 3:30 PM can be adjusted when the permit allowing work within the

road right-of-way is issued by the state Department of Transportation. A traffic control plan will also be prepared to minimize hazards from construction traffic.

The access road to the project site will be widened to accommodate construction equipment. It may be necessary to cone off or barricade the right lane of Kailua Road near the entry to the private road. Police and/or flagmen may also be assigned to direct motorists and pedestrians across Kailua Road.

To minimize impacts to Old Kukanono Community residents, construction-related traffic will be coordinated between the contractor and the residents of the private road. The construction contractor will be required to maintain continued roadway access throughout the construction period.

Construction of the reservoir is anticipated to take place in 1997-1998. If the proposed reservoir construction occurs concurrently with the Kawai Nui Marsh Flood Control project or other construction activity in the area, the traffic control plans and proposed mitigation will be coordinated with the State Department of Transportation, BWS, the Corps of Engineers and the other affected parties.

NOISE AND VIBRATION

Jobsite activities to excavate soil and rock to finish grade will generate different levels and pitches of noise. Vehicle noise will emanate from engines of heavy equipment such as backhoes, dozers, and trucks used for earthwork and demolition. Besides vehicle-related noise, detonation of small explosives to fragment rock will also induce noise and vibration effects at the job site and immediate surrounding environs.

The reservoir site has 2 to 5 feet of soil overlying about 7 to 10 feet of weathered rock and a strata of basalt (blue rock). Due to the amount and type of excavation involved in this project, it is desirable for economic and time element reasons to use the faster method of small explosives blasting to fracture hard basalt. The most expeditious manner of construction will mitigate the duration of noise exposure and construction-related impacts.

The impacts of construction methods will be discussed with regard to vibration and noise. Y. Ebisu and Associates assisted in the assessment of blasting and vibration impacts.

Blasting

Probable Impacts

Blast - induced ground and air vibrations have the potential to startle or disturb surrounding residents and horses and also to cause damage to structures. The air blasts associated with blasting are concussion type, low frequency vibrations that are of short duration (or impulsive) and are generally characterized in terms of peak overpressure in pounds per square inch (psi) or in decibels (dBL). The dominant sources of the air blast are the Air Pressure Pulse, which is caused by the large displacement of the ground surface near the

explosive charge, and the Stemming Release Pulse, which is caused by gas pressure ejecting the stemming material placed in the bore hole to set the explosive charge.

When exposed to high peak overpressure levels exceeding 141 dBL, large plate glass windows may break. At peak overpressure levels over 171 dBL, most windows can be expected to break. For these reasons, blasting activities are generally conducted in a manner to limit air blast levels to below the 141 dBL level, thus controlling and minimizing risks of damage to structures.

The low frequency characteristic of air blast noise tends to induce vibrations in structures, sometimes causing complaint reactions. In contrast, high frequency sounds of equal amplitude to blast noise generally do not induce vibrations and/or cause physical damage to structures. Low frequency air blast sounds are inaudible to humans, but structures that vibrate from shock waves can produce secondary audible effects such as rattling sounds of fixtures, doors, etc. Sound levels at which these secondary effects occur vary with the weight and the stiffness of the structure. In general, the inception point of sound-induced vibration is difficult to establish, but it may occur at levels as low as 80 dBL. These levels are significantly below the peak air blast levels of 120 to 136 dBL, which have been associated with low risk of damage to structures. Thus, sound-induced secondary audible effects that may be felt are not necessarily associated with effects of damage to structures.

Ground vibrations, or seismic waves, are also generated during blasting operations and are generally described in terms of peak particle velocity in inches per second. Most of the seismic energy remains confined in the ground, but some energy is released as an overpressure pulse into the air (or Rock Pressure Pulse). Typically, the ground vibrations as well as the airborne Rock Pressure Pulse are expected to be less intrusive than the Air Pressure and Stemming Release Pulses.

As an example, the recent tunneling work along Dole Street for a Honolulu sewer project generated some initial air blast complaints from nearby residents during blasting of the surface entrance to the tunnel. However, complaints ceased once the entrance to the tunnel was formed and blasting was confined to tunneling underground. Maximum ground vibration levels of two inches per second occurred during that tunneling work, and blasting was conducted during all hours of the day and night, with about five blasts per day. A total of six delays were typically used, with fixed delays of approximately 200 milliseconds and with a maximum charge weight per delay of approximately 8.6 pounds.

Predictions of peak overpressure or ground vibration levels versus distance from the blast are not precise, with initial uncertainties for a given location in the order of 20 to 30 dBL. For this reason, it is standard practice to employ site-specific seismograph monitoring of air and ground vibrations during actual blasting operations with a 3-axis geophone instrument to monitor ground vibrations and a microphone to monitor air vibrations.

In conducting blasting operations, the construction industry generally requires seismograph monitoring at the structures closest to the bore holes. Based on the monitoring data, explosive charge sizes (or weights) are adjusted in order to limit peak overpressures of the airblasts to levels below the threshold of possible damage to structures.

A similar reservoir excavation project using blasting was recently completed at the Board of Water Supply's Waahila 180 reservoir on Dole Street near the Manoa Stream Bridge. The closest structure to the blast holes was the University of Hawaii faculty housing building, which was situated approximately 120 to 460 feet from the blast holes. These distances are similar to the separation distances for this Kailua 272 reservoir job site and the nearest surrounding existing structures. On the Waahila 180 project, maximum vibration levels induced by blasting were controlled so as not to exceed 0.5 inches per second at the faculty housing building, with airblast levels limited to 119 dBL. No damage was caused by blasting work on the Waahila 180 reservoir project, and no extraordinary or unusual mitigation measures were required to control airblast noise or ground vibration levels. Blasting should not impact any activities at Kailua High School, which is located over 600 feet away.

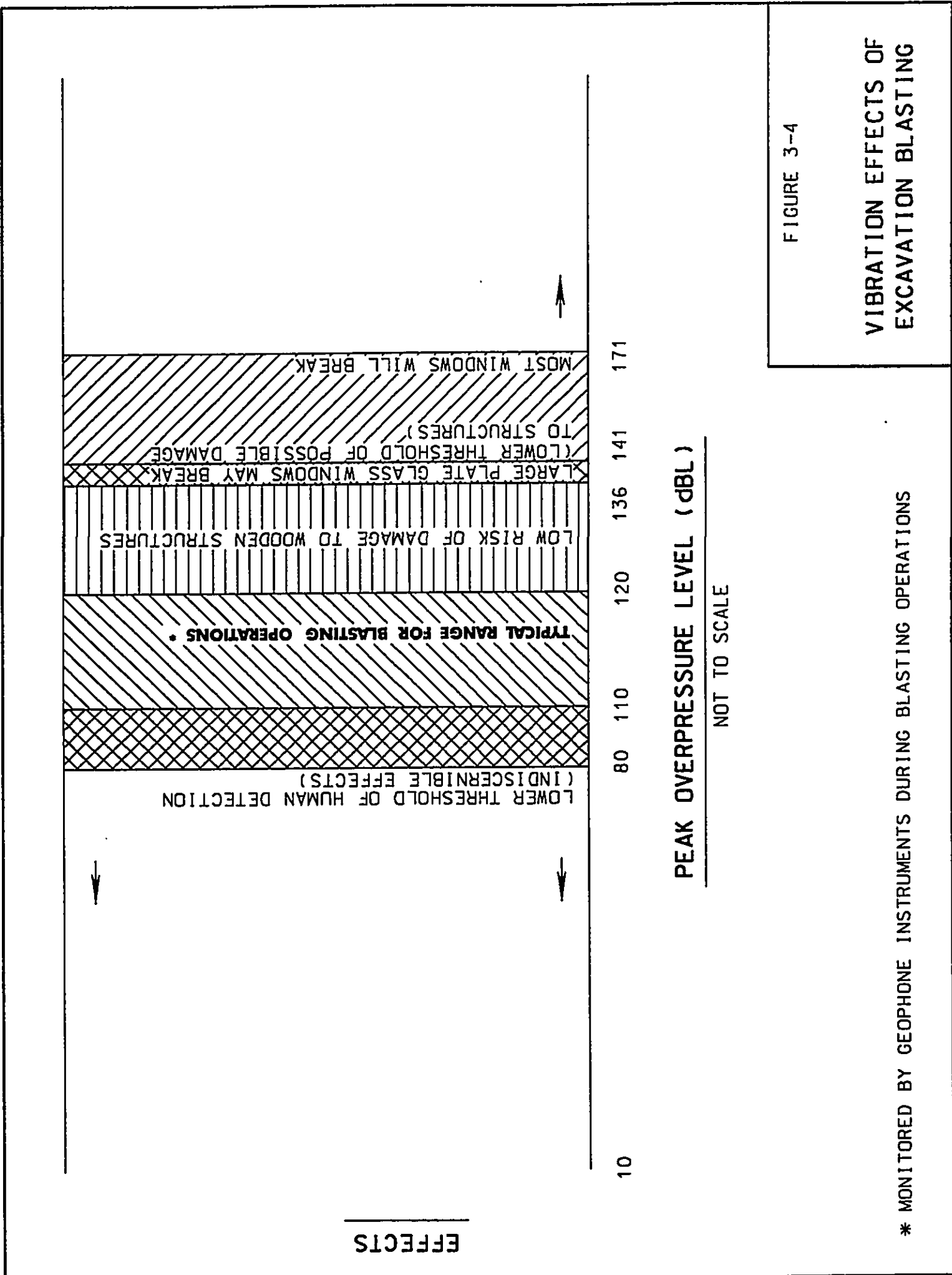
A summary of the vibration effects associated with ground blasting is shown on Figure 3-4. Figure 3-5 shows the existing structures in closest proximity to the project site.

Mitigation Measures

Since complaints resulting from airblast noise levels could occur at levels considerably below those necessary to cause damage to structures (120 to 136 dBL), additional mitigation measures will probably be required to minimize risks of annoying nearby residents. These recommended mitigation measures are described as follows:

- Initiate the excavation work on the Kailua Town side of the ridge to minimize airblast and noise exposure from general construction equipment to residences on the Pohakupu side of the ridge. The closest structure on the Pohakupu side of the ridge is anticipated to be approximately 380 feet distance, while the closest structure on the Kailua side of the ridge is anticipated to be approximately 1,250 feet away. This approach would result in the mountain ridge acting as a temporary sound attenuation barrier that can reduce air blast noise levels on the existing residences and horse stables on the Pohakupu side of the ridge. A minimum of 11 dBL of sound attenuation should initially be possible by taking advantage of this ridge barrier. When the existing ridge and Pohakupu side face are finally excavated, the additional sound attenuation due to shielding will gradually reduce to zero. It should be noted that the Waahila 180 reservoir excavation work, performed entirely on the mountain-side facing the University of Hawaii faculty housing buildings, did not have the added benefit of attenuation from a natural sound barrier. Yet, air blast levels still could be controlled well below 120 dBL, the sound pressure level associated with low risk damage to structures.
- Develop a monitoring program to identify a safe level of air blast and ground vibration simultaneously on both sides of the ridge at homes and business establishments which are closest to the source of blast.
- For initial blasts, prior to the establishment of a data base of airblast levels versus scaled distance, use a maximum charge weight (in equivalent pounds of TNT) per delay of less than $(D/102)^2$ pounds, or distance divided by 102 and the quantity squared, where D is the distance in feet between the charge and

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200



EFFECTS

10

80

110

120

136

141

171

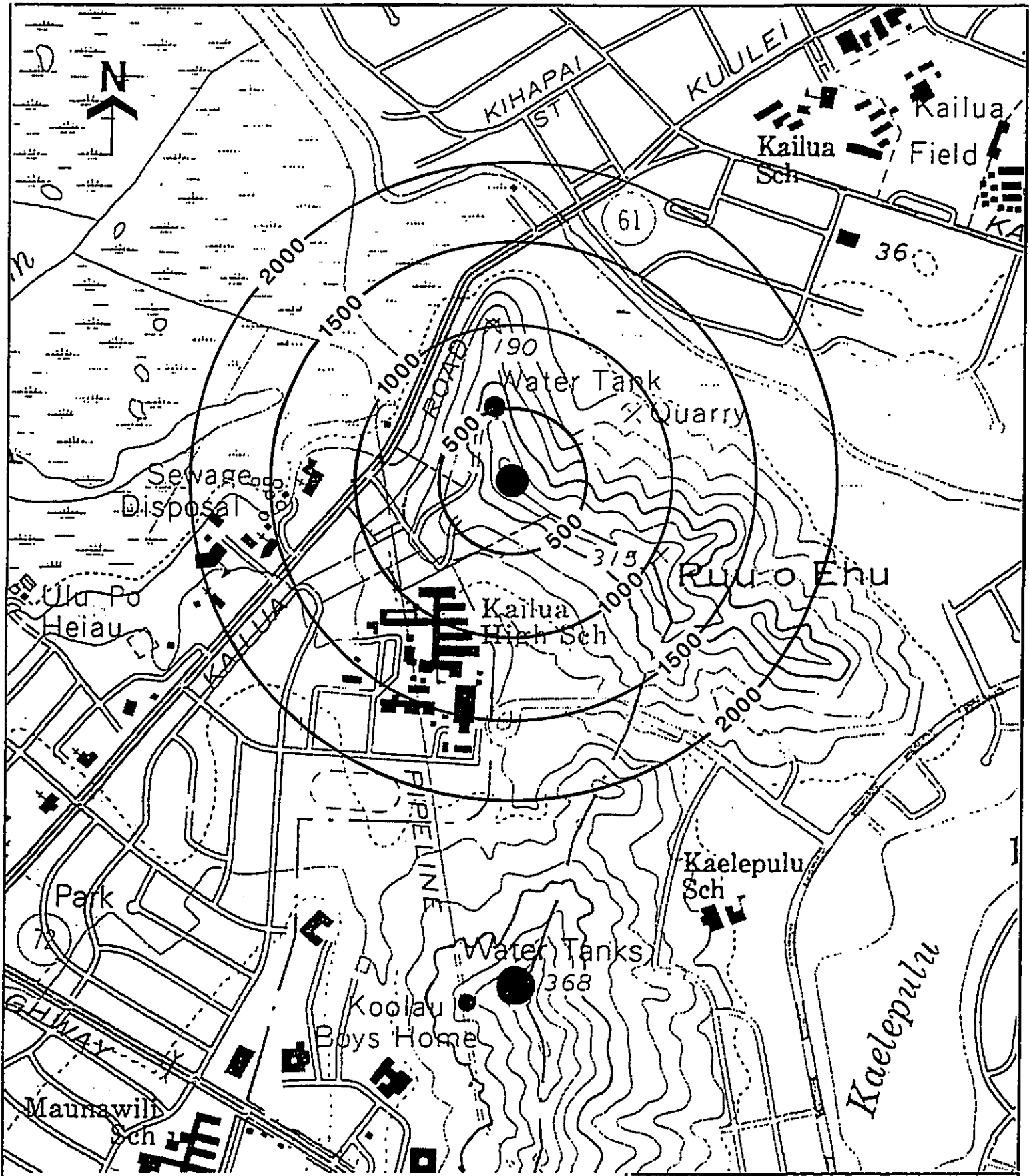
PEAK OVERPRESSURE LEVEL (dB)

NOT TO SCALE

FIGURE 3-4

VIBRATION EFFECTS OF EXCAVATION BLASTING

* MONITORED BY GEOPHONE INSTRUMENTS DURING BLASTING OPERATIONS



GRAPHIC SCALE

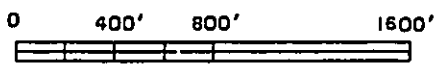


FIGURE 3-5

LOCATION OF EXISTING
STRUCTURES IN PROXIMITY
TO PROPOSED RESERVOIR SITE

the nearest noise sensitive residence or structure. This should probably not exceed 5 pounds of charge.

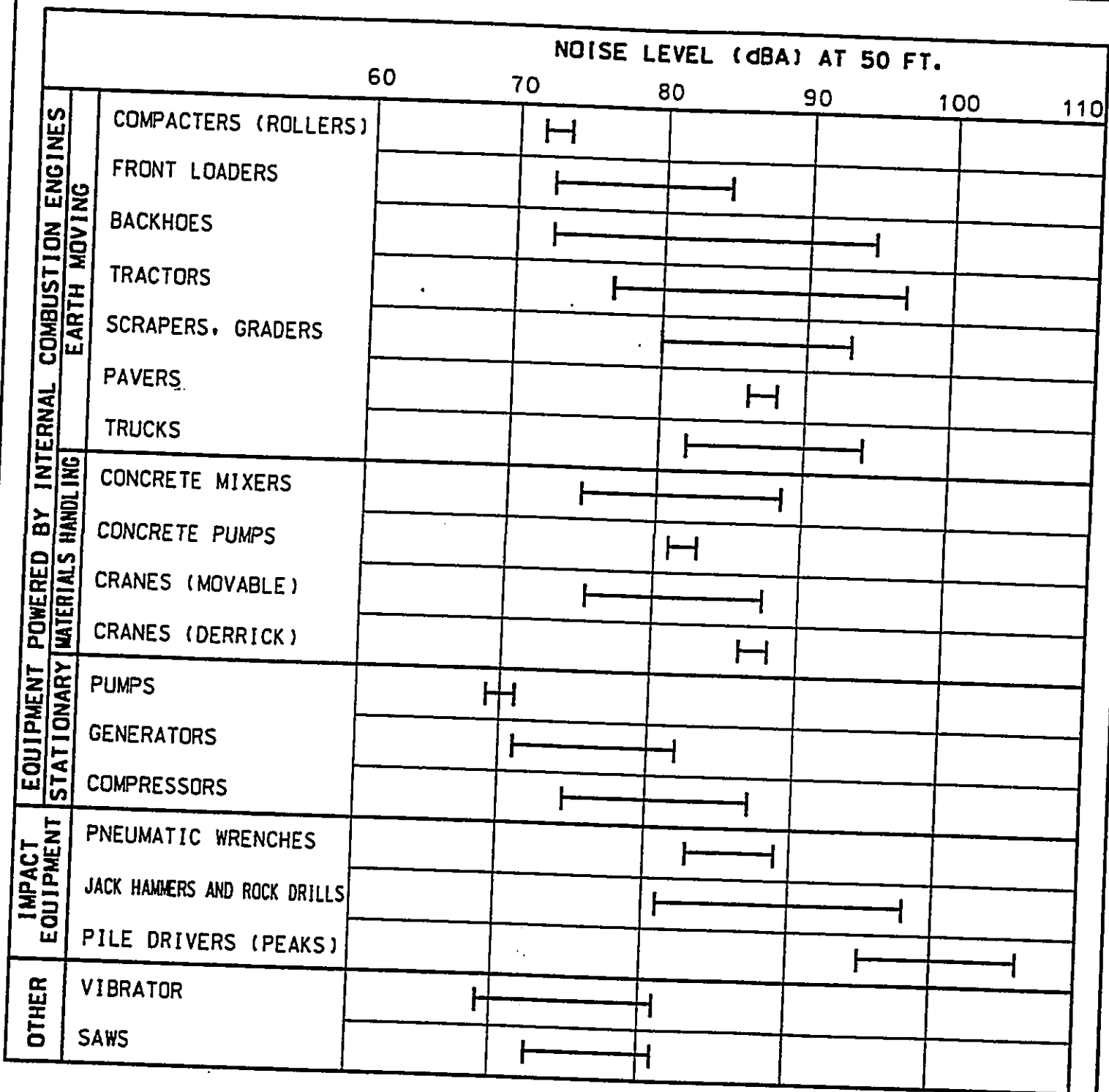
- If practicable, reduce maximum airblast levels to less than 110 dBL at the nearest noise sensitive residences in response to airblast complaints. Possible methods of accomplishing this are to (1) reduce the charge size, (2) increase the delay intervals, (3) increase hole depths, (4) orient bore holes to direct the Stemming Release Pulse away from noise sensitive properties, (5) truck in high quality material to minimize stemming blowouts, and (6) filling (sandbagging) over the area to be blasted and the detonating chord.
- Schedule actual blasting during the warm periods of the day to minimize the possibility of thermal ducting and focusing of airblast noise at large distances from the blast. If possible, schedule blasting during fixed time periods which are publicized and made known to area residents.
- Restrict blasting operations which exceed 95 dBL at residences or apartments to the hours of 9:00 am to 5:30 pm of the same day, and to weekdays only (excluding holidays). For other noise sources associated with excavation operations, follow State Department of Health permit procedures and requirements for construction activities.
- The contractor shall be responsible for conducting a pre-blast survey of the area and shall remove potential falling boulders.
- Use the erosion control earthen berm and construct other temporary perimeter barriers to contain any loose material that may be dislodged during blasting.
- During blasting operations, the horses may need to be moved.

Construction Equipment

Noise will also be generated by construction equipment vehicles involved in demolishing the abandoned reservoir, grubbing and grading the new reservoir site, and constructing the new reservoir structure. These construction phases may generate significant amounts of equipment noise; the actual levels are dependent upon the methods employed during each stage of construction by the contractor.

The noise levels of some typical construction equipment are shown on Figure 3-6. Vehicles such as engine-driven, tread-tracked bulldozers and trailer trucks will emit noise at 85 to 95 dBL during earthmoving operations or when traversing an inclined roadway. Pneumatic jackhammers used for rock breaking may also generate noise up to 98 dBL.

As in most development projects, construction noise will likely exceed the allowable limits in the regulations of Chapter 43, "Community Noise Control for Oahu," since the noise standards are set and measured at the job site property line. Consequently, a noise permit will be obtained from the Hawaii State Department of Health (DOH) that will specify the allowable conditions under which noise-producing operations can occur (i.e., restricted time periods of the day, restricted days, etc.). The contractor's construction equipment that emit exhaust gas or air and roadway transit vehicles must be equipped with mufflers to meet the noise level limits of Chapter 42, "Vehicular Noise Control for Oahu."



NOTE: BASED ON LIMITED AVAILABLE DATA SAMPLES

FIGURE 3-6
CONSTRUCTION EQUIPMENT
NOISE RANGES

Probable Impacts

Noise generated by construction activities would be a short-term environmental impact. One noise-sensitive site, Kailua High School, is located one-fourth mile from the project site. Construction noise will be audible there, although at reduced levels.

As for long-term impacts following construction, reservoir operations will generate virtually no noise. There will be no loud electrical or mechanical equipment associated with daily operations.

Sound Propagation Outdoors. The transmission of sound from the job site to surrounding areas is influenced by three broad types of natural effects: distance, atmospheric, and terrain and vegetation. In addition, structures such as barriers and buildings influence the transmission of sound to neighboring areas. The natural effects in outdoor sound propagation are described below.

1. **Distance Effects.** Sound from a localized source (job site equipment) spreads out as it travels away from the source, and the sound pressure levels drop off with the distance according to the "inverse square law." In traveling twice the distance from the source, the sound energy per unit area decreases by a factor of four. Stated differently, doubling the distance from the source reduces the sound energy to one-fourth; tripling the distance reduces the sound level to one-ninth, etc. The sound pressure level roughly decreases at the rate of 6 dBL for each doubling of distance from the source. In addition, the air absorbs a certain amount of sound energy by molecular absorption.
2. **Atmospheric Effects.** Wind and temperature variations can cause bending of sound waves and influence changes in sound levels at large distances. A steady, smooth flow of wind at all altitudes would have no noticeable effect on sound transmission. In reality, however, wind speeds are slightly higher above the ground than at the ground. The resulting wind speed gradients tend to "bend" sound waves over large distances. Sound traveling with the wind is bent down toward the earth, while sound traveling into the wind is bent upward above the ground. When there is no wind, the principal sound arrives at the receiver in a direct path, although the ground, vegetation, and trees can absorb some of the sound. Downwind currents can reduce some of the attenuating effects of terrain and vegetation, or of solid barriers that otherwise intercept sound paths. In contrast, a strong, persistent upwind condition can cast a "shadow zone" that can account for up to about 25 dBL sound level reduction for sound travel distances greater than about 1,000 feet at wind speeds about 10 to 15 miles per hour or more. Constant temperature with altitude produces no effect on sound transmission, but temperature gradients can produce bending in much the same way as wind gradients do. Air temperature above the ground is normally cooler than at the ground, and the denser air above tends to bend sound waves upward. With temperature inversions, the warm air above the surface bends the sound waves down to earth. At short distances, these effects are negligible, but they may amount to

several decibels at distances over one-half mile. The various atmospheric effects discussed above are illustrated on Figure 3-7.

3. **Terrain and Vegetation Effects.** The ground-reflected sound may arrive at the receiver either in-phase or out-of-phase with the direct sound path and can increase or decrease the received sound level. A hard ground surface reflects sound; a soft ground surface absorbs sound. When a direct path is virtually eliminated, there remains sound levels that are about 20 to 25 decibels below the levels of the direct or reflective ground path. A medium-dense wooded area through which sound must pass directly can reduce sound by 3 to 5 decibels.

Mitigation Measures

Construction noise can be controlled by using noise control devices (exhaust mufflers, intake silencers, etc.) and barriers (partition shields) and by scheduling construction activities during off-peak hours to avoid inconvenience to motorists, residents, and the high school.

As previously mentioned in mitigation measures for blasting noise, excavation work could begin on the Kailua Town side of the ridge to minimize noise exposure from construction equipment to residents on the Pohakupu side of the ridge. The contractor could also schedule the final phases of excavation activities producing high sound levels during the summer months when regular classroom activities are not in session. Remaining construction activities would mainly involve grading and reservoir construction. Specific construction operations that exceed the DOH standards may also be performed after 2:30 pm.

The nearby Old Kukanono Community residential lots situated to the south, Kailua High School and Pohakupu residences located further south, and the Kailua commercial shopping center set to the north-northeast directions are in the vicinity of the proposed reservoir site. Based only on the earlier described distance effect principle of outdoor sound propagation and sound transmission attenuation and analyzing the situation where the noise source is in direct line of sight to a sound receiver, it is estimated that construction sound levels will be reduced between 18 and 25 decibels at such sites as follows:

	Transmitted Noise Level*			
	@ Jobsite (Noise Source)	@ Old Kukanono (400 ft away)	@ Kailua High School (900 ft away)	@ Kailua Shopping Center (1300 ft away)
95 dBL (tractor/trucks)	77 dBL	70 dBL	67 dBL	
75 dBL (front loaders, back- hoes, and concrete pumps)	57 dBL	50 dBL	47 dBL	

* Estimated noise level reduction due to distance effect alone. Excludes effects of atmosphere and terrain/vegetation.

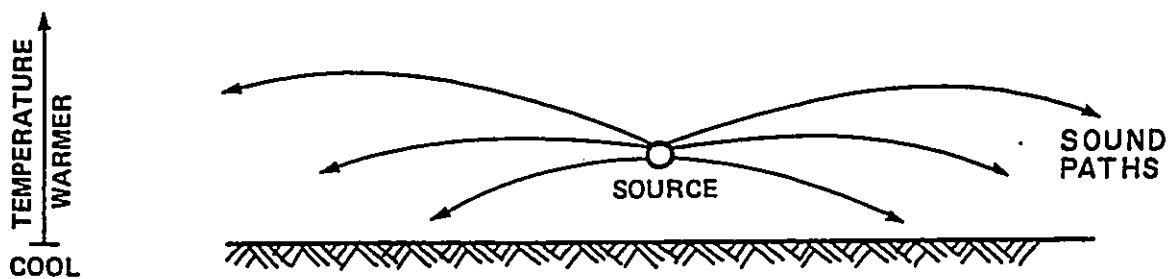
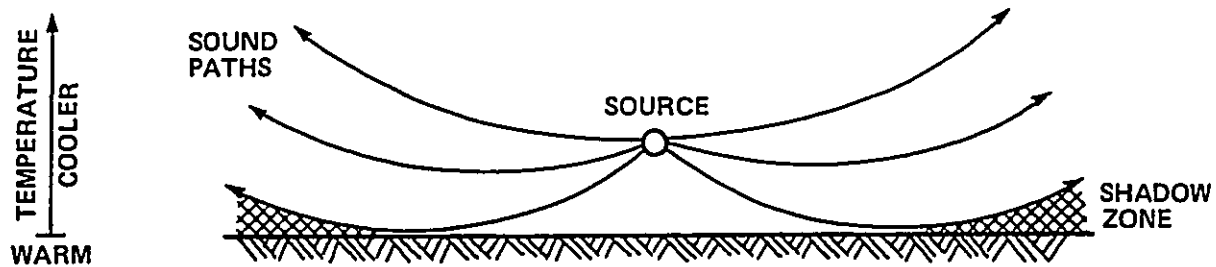
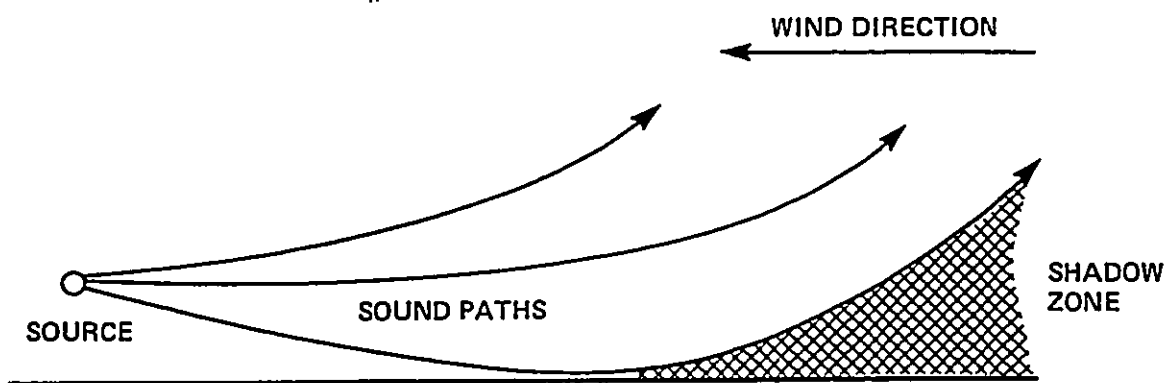


FIGURE 3-7

SOURCE: NOISE AND VIBRATION CONTROL
FOR MECHANICAL EQUIPMENT
 U.S. GOVERNMENT, DECEMBER 1983

CLIMATIC INFLUENCES
 ON SOUND

For comparison, typical noise levels of sounds encountered almost daily are shown in Table 3-1 and long-term land use compatibility and sound levels are shown in Table 3-2. Noise levels from the job site as measured at 1,000-foot distance will be near the office and normal conversation level. The allowable noise level of Chapter 43 regulations on Community Noise Control for residential and preservation districts is 55 dBL during the daytime hours between 7:00 AM and 10:00 PM. Consequently, there may be times during which noise from tractors and trucks will exceed these noise levels. A variance from the Department of Health may be required by the contractor. Noise barriers, such as fences, may be constructed along side the site to deflect sound upward.

AIR QUALITY

Existing Conditions

Air quality in the Kailua area is predominantly affected by vehicle emissions. Data from the State Department of Health indicate that air quality standards are currently being met; however, carbon monoxide concentrations may occasionally exceed the standards near traffic congested areas.

Probable Impacts

No long-term air quality impacts are expected from operation of the reservoir. During construction, short-term impacts may be expected from fugitive dust and exhaust emissions from construction equipment and vehicles.

Dust will be heaviest during excavation, which is expected to take about four months, depending on the method of excavation. Trucks and other construction vehicles will also generate dust. The dust problem will decrease once excavation is completed and while the reservoir and other facilities are being constructed.

Adjacent residences and Kailua High School will be affected the most by dust emissions during the construction period.

Mitigation Measures

State air pollution control regulations require no visible fugitive dust emissions at the property line. To ensure compliance with these regulations, an effective dust control plan must be implemented. Dust control measures may include watering the work area, using wind screens, keeping adjacent roads clean, and covering open-bodied trucks. Other dust control measures may include limiting the area that can be disturbed at any given time and/or mulching or stabilizing inactive areas. Paving and landscaping early in the construction schedule will also reduce fugitive dust. Exhaust emissions may be mitigated by inspecting construction vehicles and moving construction equipment and workers during off-peak traffic hours.

The contractor will be required to comply with the provisions of Chapter 60, "Air Pollution Control," of Title 11, Administrative Rules of the State Department of Health. In addition, the contractor will be required to implement measures to minimize air quality degradation.

TABLE 3-1


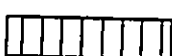

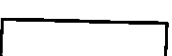
TYPICAL SOUND LEVELS ENCOUNTERED IN COMMON ACTIVITIES

Jet Takeoff (200 feet)	120 dBL	Intolerable
Shout (5 feet)	100 dBL	Very noisy
Urban Street	80 dBL	
Automobile Interior	70 dBL	Noisy
Normal Conversation (3 feet)	60 dBL	
Office, Classroom	50 dBL	Moderate
Living Room	40 dBL	
Bedroom at Night	30 dBL	Quiet
Rustling Leaves	10 dBL	Barely audible

Source: The Science of Sound, Thomas D. Rossing, 1990.

LAND USE	YEARLY DAY-NIGHT AVERAGE SOUND LEVEL IN DICIBELS				
	50	60	70	80	90
RESIDENTIAL - SINGLE FAMILY, EXTENSIVE OUTDOOR USE	Compatible	Compatible	Compatible	Incompatible	Incompatible
RESIDENTIAL - MULTIPLE FAMILY, MODERATE OUTDOOR USE	Compatible	Compatible	Compatible	Incompatible	Incompatible
RESIDENTIAL - MULTI STORY LIMITED OUTDOOR USE	Compatible	Compatible	With Insulation	Incompatible	Incompatible
TRANSIENT LODGING	Compatible	Compatible	With Insulation	Incompatible	Incompatible
SCHOOL CLASSROOMS, LIBRARIES, RELIGIOUS FACILITIES	Compatible	Compatible	With Insulation	Incompatible	Incompatible
HOSPITALS, CLINICS, NURSING HOMES, HEALTH RELATED FACILITIES	Compatible	Compatible	With Insulation	Incompatible	Incompatible
AUDITORIUMS, CONCERT HALLS	Compatible	Compatible	With Insulation	Incompatible	Incompatible
MUSIC SHELLS	Compatible	Compatible	With Insulation	Incompatible	Incompatible
SPORTS ARENAS, OUTDOOR SPECTATORS SPORTS	Compatible	Compatible	With Insulation	Incompatible	Incompatible
NEIGHBORHOOD PARKS	Compatible	Compatible	With Insulation	Incompatible	Incompatible
PLAYGROUNDS, GOLF COURSES, RIDING STABLES, WATER REC., CEMETERIES	Compatible	Compatible	With Insulation	Incompatible	Incompatible
OFFICE BUILDINGS, PERSONAL SERVICES BUSINESS AND PROFESSIONAL	Compatible	Compatible	With Insulation	Incompatible	Incompatible
COMMERCIAL - RETAIL, MOVIE THEATERS, RESTAURANTS	Compatible	Compatible	With Insulation	Incompatible	Incompatible
COMMERCIAL - WHOLESALE, SOME RETAIL, IND., Mfg., UTILITIES	Compatible	Compatible	With Insulation	Incompatible	Incompatible
LIVESTOCK FARMING, ANIMAL BREEDING	Compatible	Compatible	With Insulation	Incompatible	Incompatible
AGRICULTURE (EXCEPT LIVESTOCK)	Compatible	Compatible	With Insulation	Incompatible	Incompatible
EXTENSIVE NATURAL WILDLIFE AND RECREATION AREAS	Compatible	Compatible	With Insulation	Incompatible	Incompatible

LEGEND

-  COMPATIBLE
-  WITH INSULATION
-  MARGINALLY COMPATIBLE
-  INCOMPATIBLE

SOURCE: ACOUSTICAL SOCIETY OF AMERICA, 1980.

TABLE 3-2
SOUND LEVELS LAND USE
COMPATIBILITY
RELATIONSHIP

If dust levels exceed the Department of Health's air quality standards and affect classroom activities, the Department of Education requests installing air conditioning units in those affected classrooms.

VISUAL IMPACTS

Existing Conditions

The project site is located on an eroding ridgeline at elevation 250 feet above mean sea level (MSL). The highest elevation at the project site is approximately 300 feet MSL. Tall shrubs, 12 to 18 feet high, are found on the slopes and on portions of the reservoir site, becoming lower near the summit of the ridge. Ground cover is short and dense. The site overlooks Kailua Town to the north, Kawai Nui Marsh to the west, and residential areas to the southeast (see Photos 1 to 5).

The reservoir will be situated on a prominent ridge in the central part of the Kailua area and will be visible from surrounding areas where other land forms, structures, or vegetation do not obstruct the view.

Probable Impacts

The reservoir will be approximately 185 feet in diameter and 22 feet high, with cuts averaging 30 to 40 feet high along the center line of the ridge from the base of the reservoir and approximately 250 feet at its widest point. Based on observations from numerous locations in Kailua, the proposed site will be visible from several locations. In general, the significant view planes impacted by the reservoir are located in the immediate vicinity of the project site. Distant views will be less affected.

Representations of the reservoir, associated grading and landscaping were superimposed by computer on photos to aid in the assessment of the visual impact of the project. A "before" and "after" view of the reservoir site has been included from locations with significant view planes. The approximate reservoir dimensions were sited on the ridge by using surveyed control points and extending yellow tape (visible in the "before" photos). The yellow tape was used to validate the computer enhanced "after" views. The approximate location of the photos is indicated on Figure 3-8.

Existing and expected views from Kailua Road at Pohakupu Park. The focus of this view is activity within the park. Homes surrounding the park are the immediate backdrop with Puu O Ehu ridge visible in the distance above the homes. The abandoned reservoir is obscured from view by trees (Photo 6). The ridge profile will be altered by construction of the reservoir. Proposed mitigation includes surrounding the reservoir face with a 10-ft high earth berm. Growth of existing vegetation on the earth berm will further shield the reservoir from view. In addition, overhead utility lines within the Pohakupu subdivision create a visual distraction from the reservoir on the ridge (Photo 7).



PHOTO 1. PUU O EHU RIDGE: LOOKING TOWARD ENCHANTED LAKES AND KEOLU HILLS



PHOTO 2. PUU O EHU RIDGE: LOOKING TOWARD HAMAKUA DRIVE

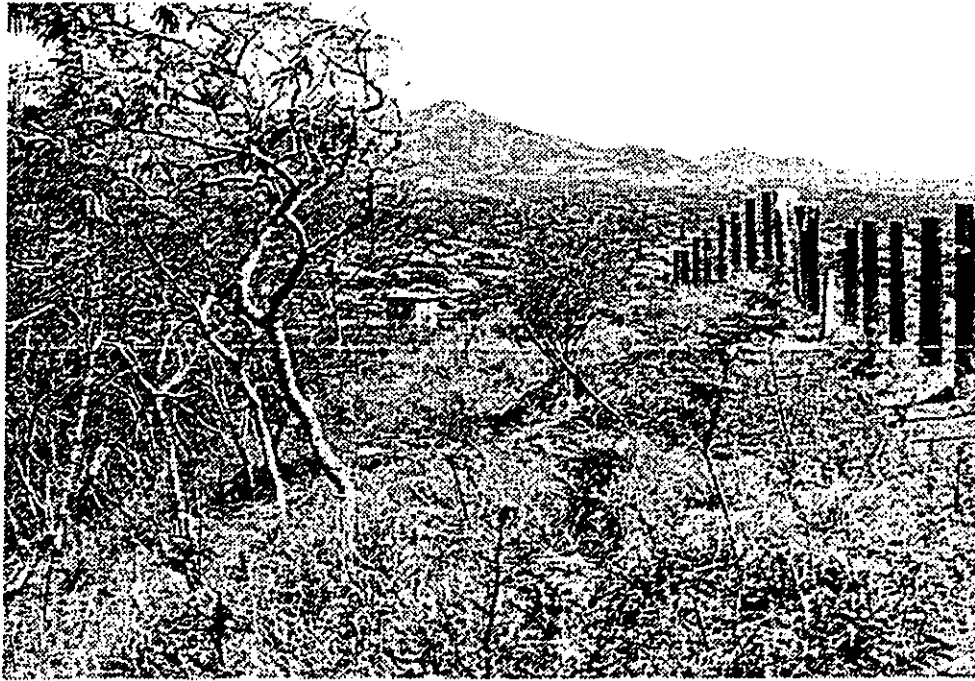


PHOTO 3. PUU O EHU RIDGE: LOOKING TOWARD ABANDONED RESERVOIR



**PHOTO 4. PUU O EHU RIDGE: LOOKING TOWARD
KAELEPULU ELEMENTARY SCHOOL**

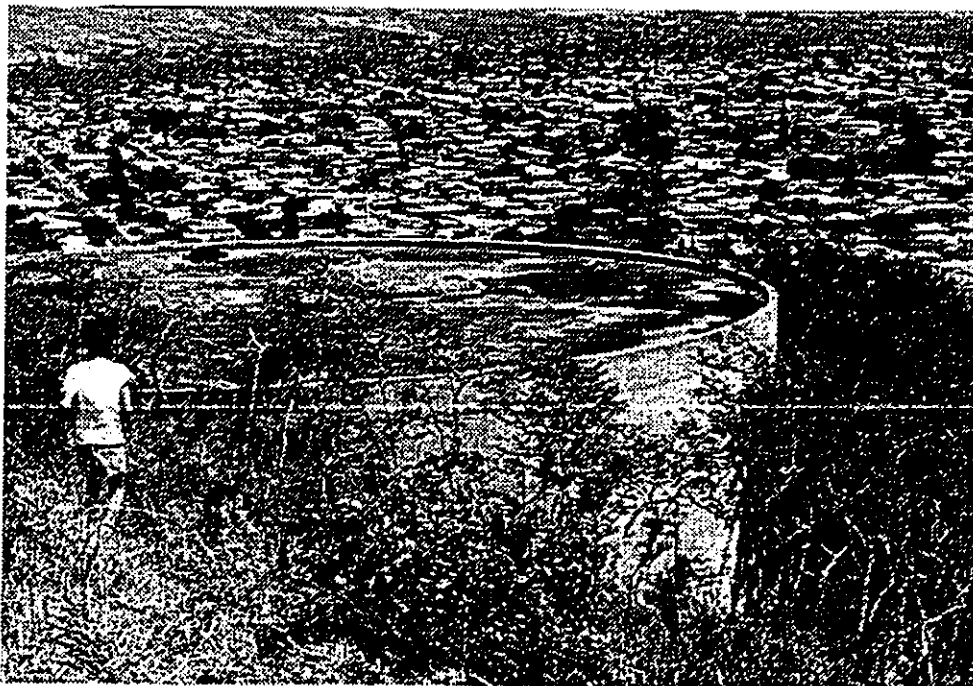
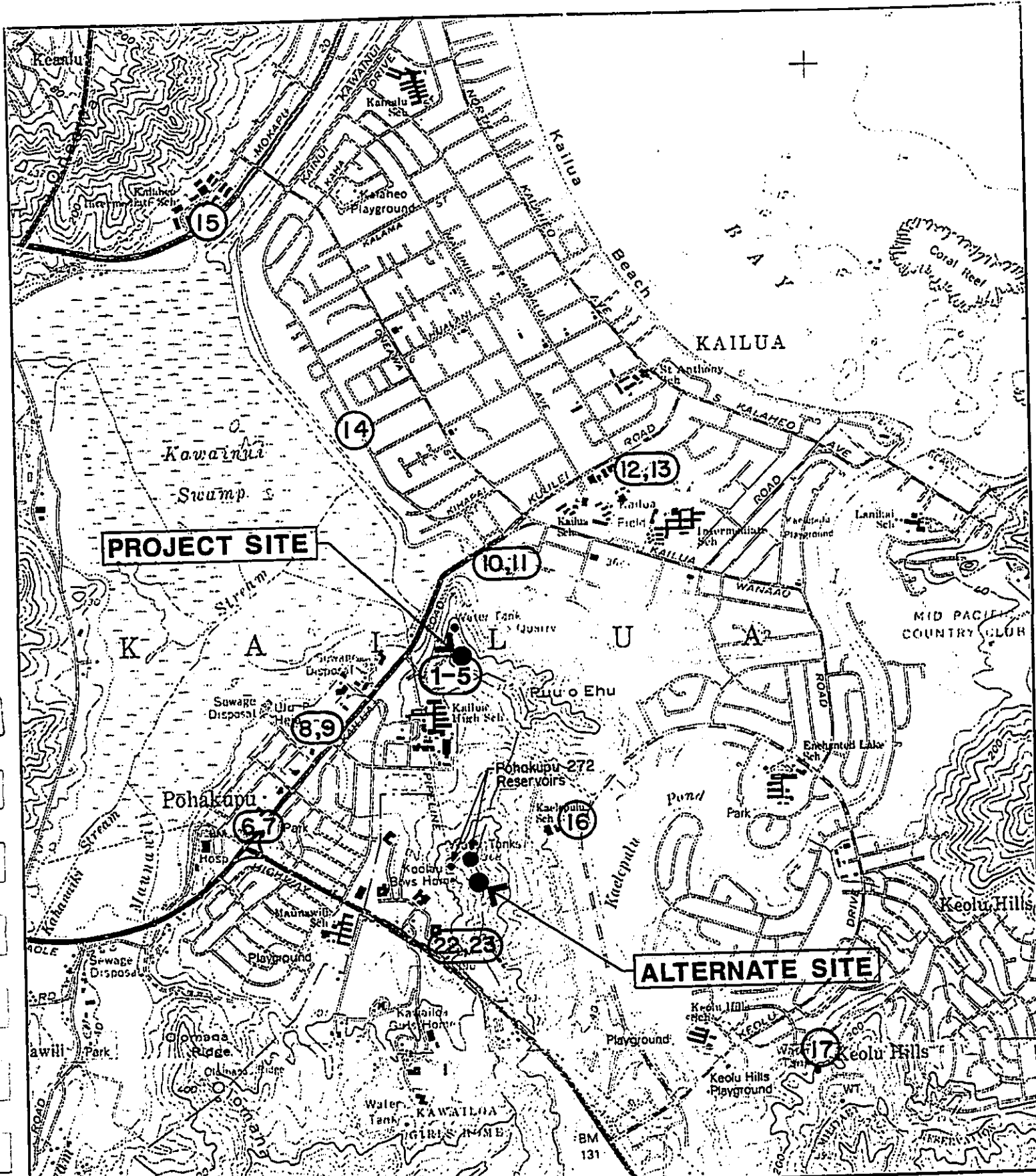


PHOTO 5. PUU O EHU RIDGE: VIEW OF ABANDONED RESERVOIR



LEGEND:

① PHOTO NUMBER

GRAPHIC SCALE



FIGURE 3-8

PHOTO LOCATION MAP

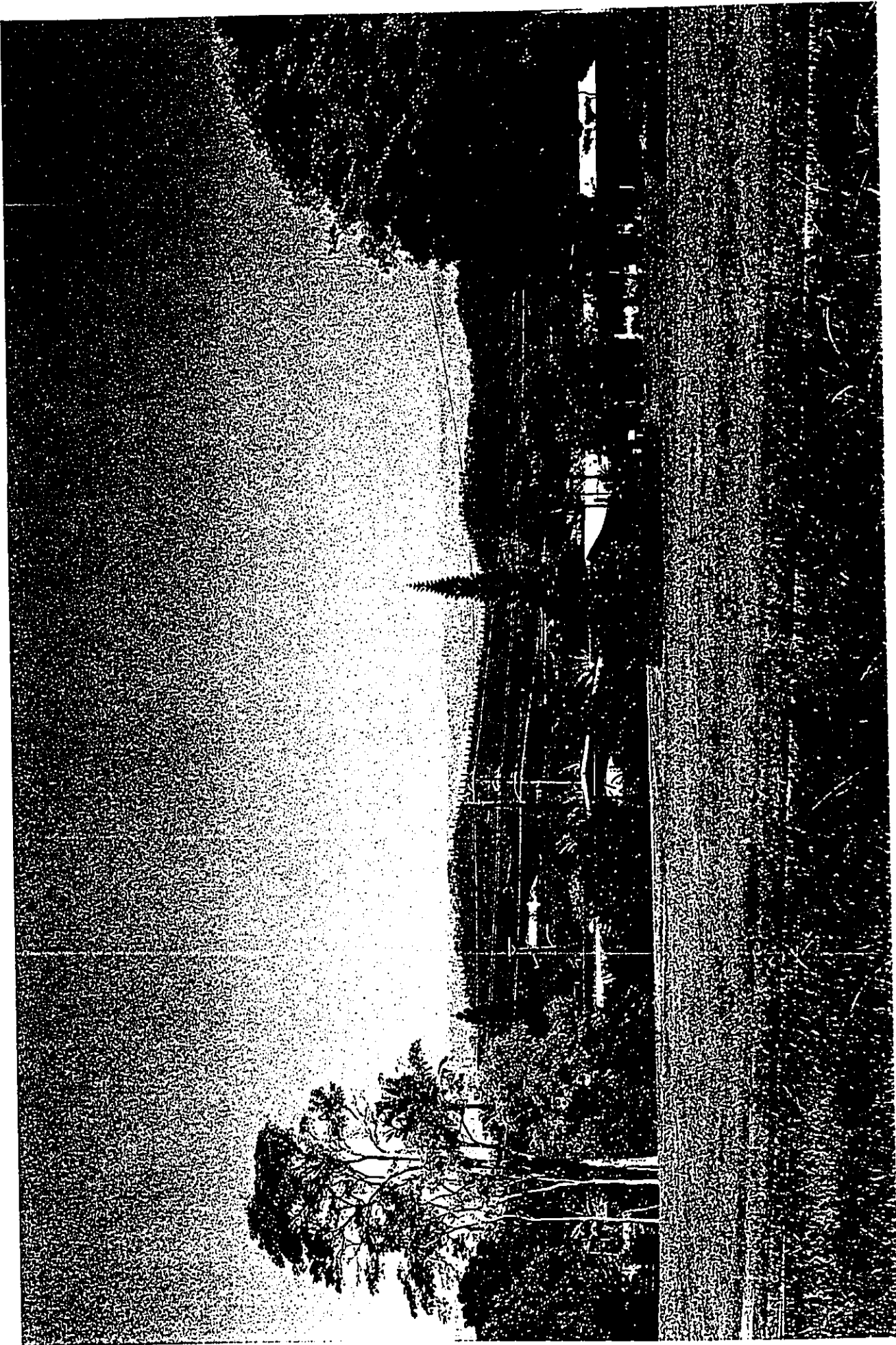


PHOTO 6 - KAILUA ROAD AT POHAKUPU PARK (EXISTING VIEW)

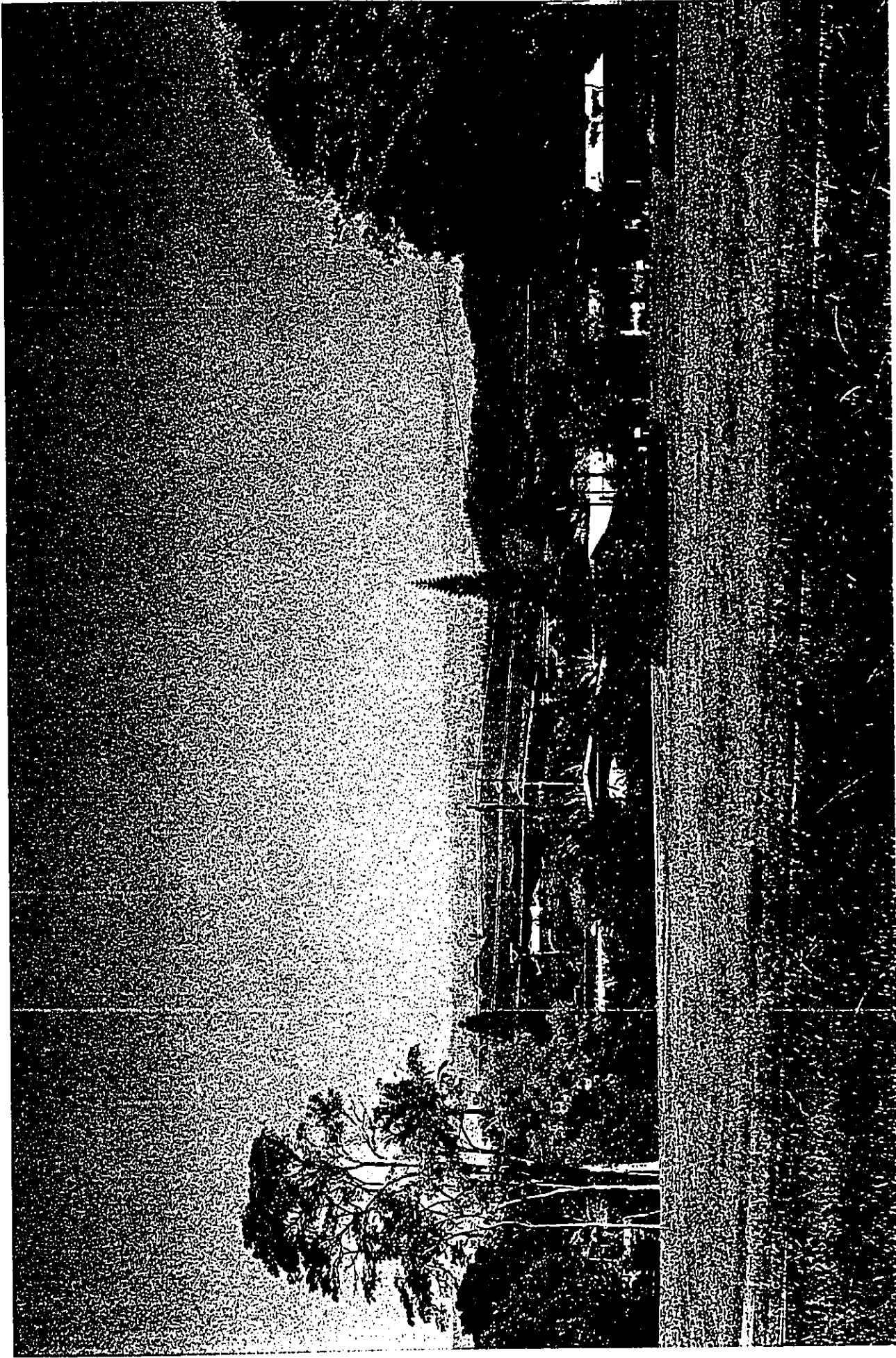


PHOTO 7 - KAILUA ROAD AT POHAKUPU PARK (EXPECTED VIEW)

Existing and expected view from Kailua Road near Kailua Baptist Church. The top of the abandoned reservoir is visible from Kailua Road (Photo 8). However, trees at street level and atop the ridge partially obstruct the view. In the expected view after development, the abandoned reservoir will be demolished and the new reservoir will be visible from Kailua Road (Photo 9). Growth of existing vegetation on the 10-ft high earth berm surrounding the tank will help to obstruct views. In addition, heavy vegetation and structures at street level create visual distractions to views of the site, which is above street level.

Existing and expected view from Hamakua Drive near Kailua Road. The abandoned reservoir is visible from Hamakua Drive near Kailua Road, which is directly below the project site (Photo 10). Structures and vegetation at street level distract attention from the site. This existing view will be altered due to the proximity of Hamakua Drive to the reservoir. The new reservoir will be visible, but partially obscured by the surrounding earth berm. Growth of existing vegetation on the earth berm will further shield the reservoir from view (Photo 11).

Existing and expected view from Kailua Field. Proceeding to Kailua Town and the residential areas northeast of the project site, motorists and residents have an unobstructed view of the ridge, as depicted in Photo 12 taken at Kailua Field near Kailua Intermediate School. The addition of the reservoir is evident in Photo 13, but mitigation measures clearly minimize the visual impact.

Other views of the reservoir are not expected to create a significant visual impact. The ridge is visible from residential streets located north of the site (Photo 14 taken on Kihapai Street), although structures and vegetation tend to obstruct the view. The impact on this area is expected to be minimal due to numerous visual distractions and obstructions and the distance (approximately 5,000 feet) from the site.

The ridge is also visible across Kawai Nui Marsh on Mokapu Boulevard near Kalaheo High School (Photo 15), although the features are not distinct since the ridge is about 2.5 miles away. From this distance, the visual impact of the proposed reservoir is expected to be minimal.

As seen on Photo 16, the ridge is visible from Kaelepulu Elementary School. The visual impact of the proposed reservoir should be minimal, however, since the structure will be constructed on the hind side of the ridge.

From the residential areas of Enchanted Lakes and Keolu Hills, which are across Kaelepulu Pond, Puu O Ehu ridge is barely discernible because of the numerous other ridges in the area (Photo 17). Structures and vegetation also block the view at street level and unobstructed views are intermittent. The visual impact of the proposed reservoir is expected to be minimal since this area is about two miles from the project site.

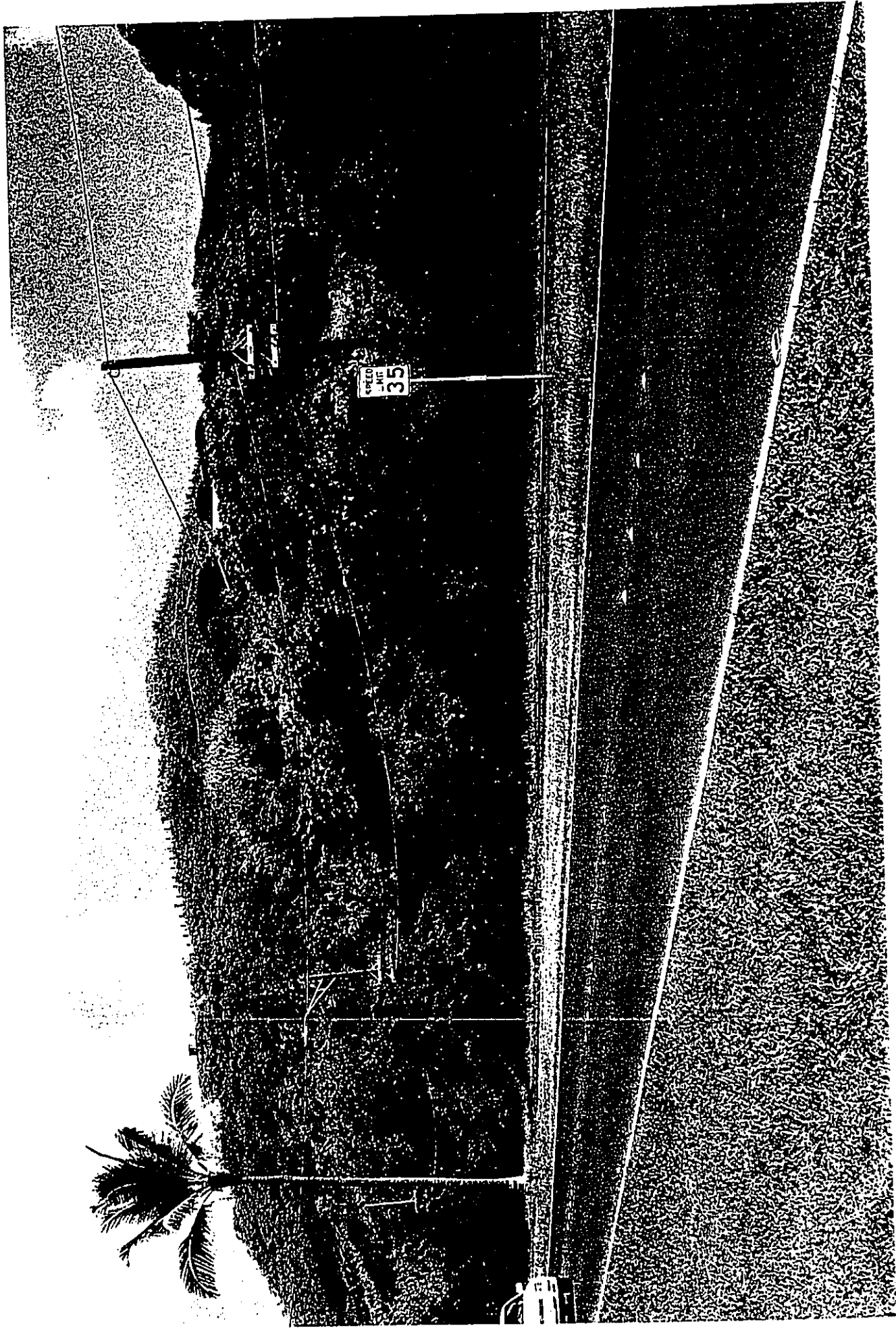


PHOTO 8 - KAILUA ROAD NEAR KAILUA BAPTIST CHURCH (EXISTING VIEW)



PHOTO 9 - KAILUA ROAD NEAR KAILUA BAPTIST CHURCH (EXPECTED VIEW)



PHOTO 10 - HAMAKUA DRIVE NEAR KAILUA ROAD (EXISTING VIEW)



PHOTO 11 - HAMAKUA DRIVE NEAR KAILUA ROAD (EXPECTED VIEW)

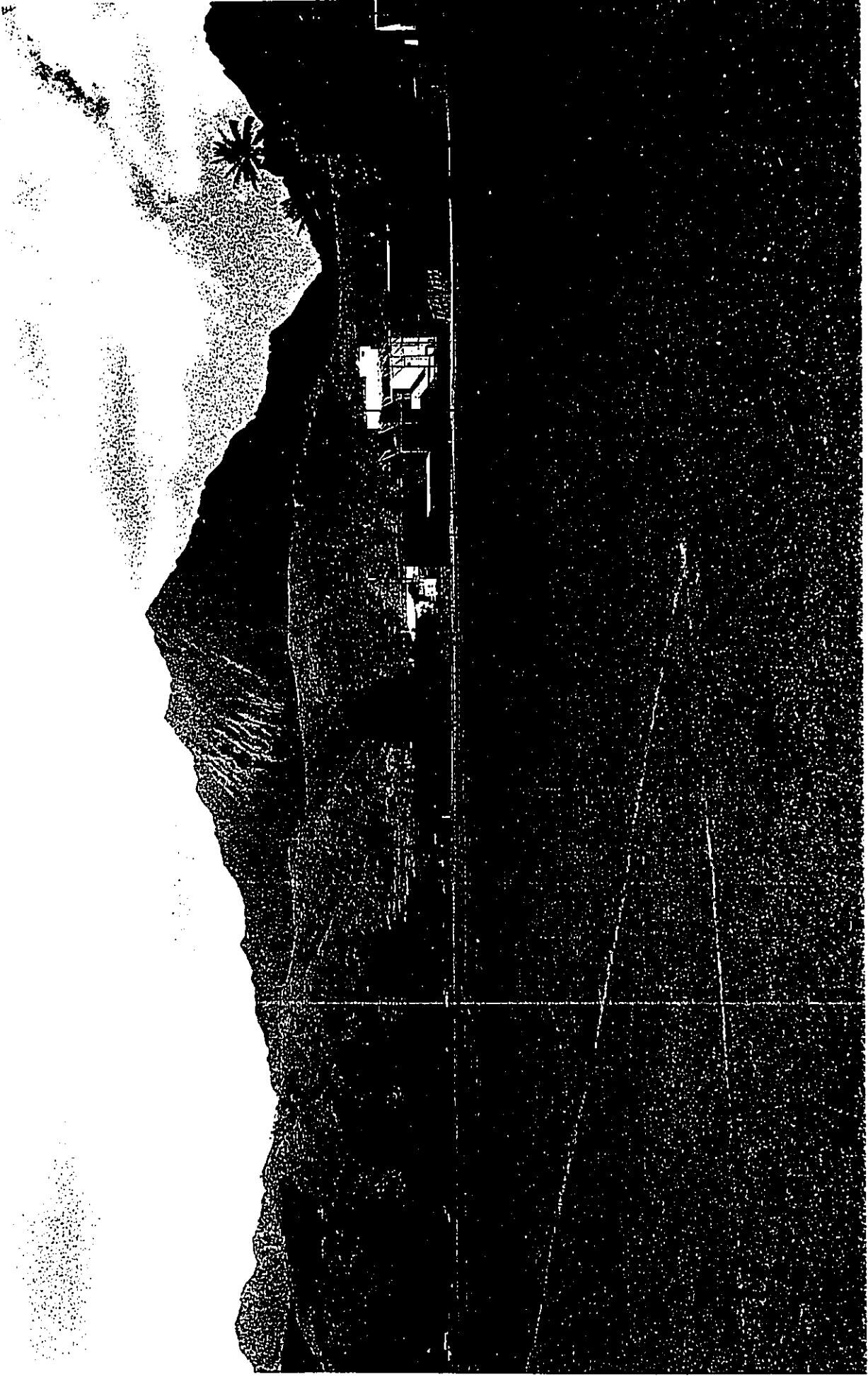


PHOTO 12 - KAILUA FIELD (EXISTING VIEW)



PHOTO 13 - KAILUA FIELD (EXPECTED VIEW)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

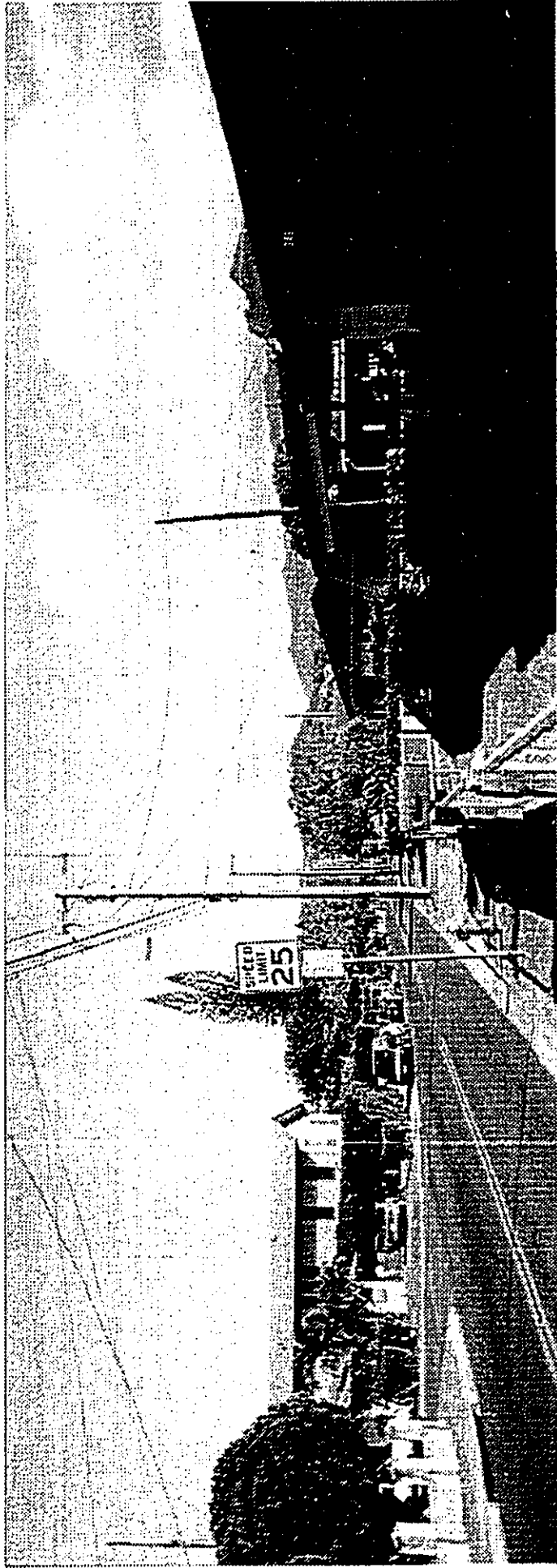


PHOTO 14. KIHAPAI STREET

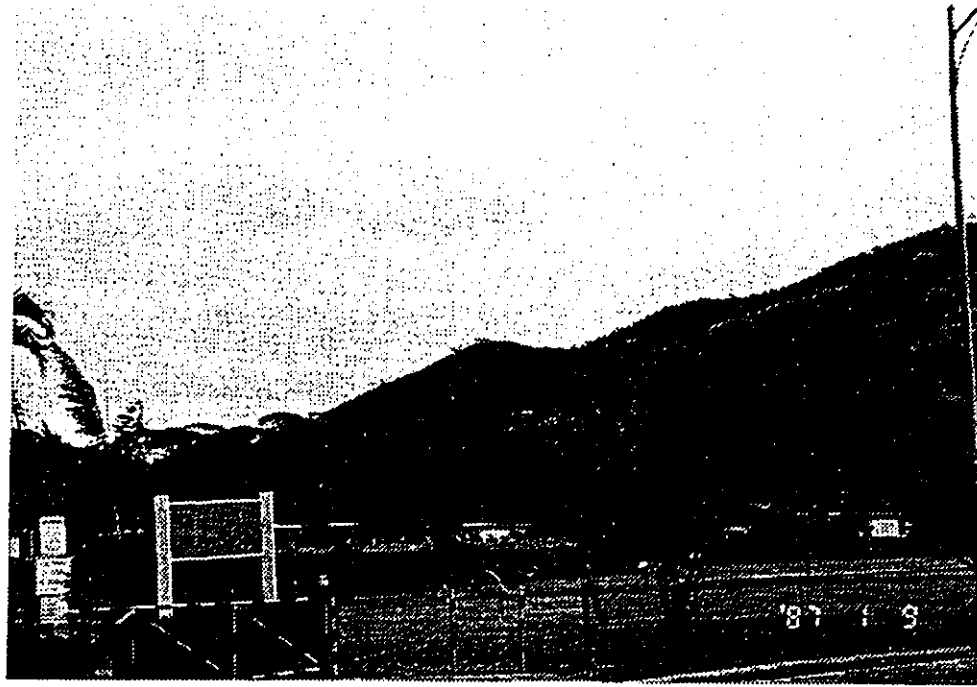


PHOTO 16. KAELEPULU ELEMENTARY SCHOOL

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

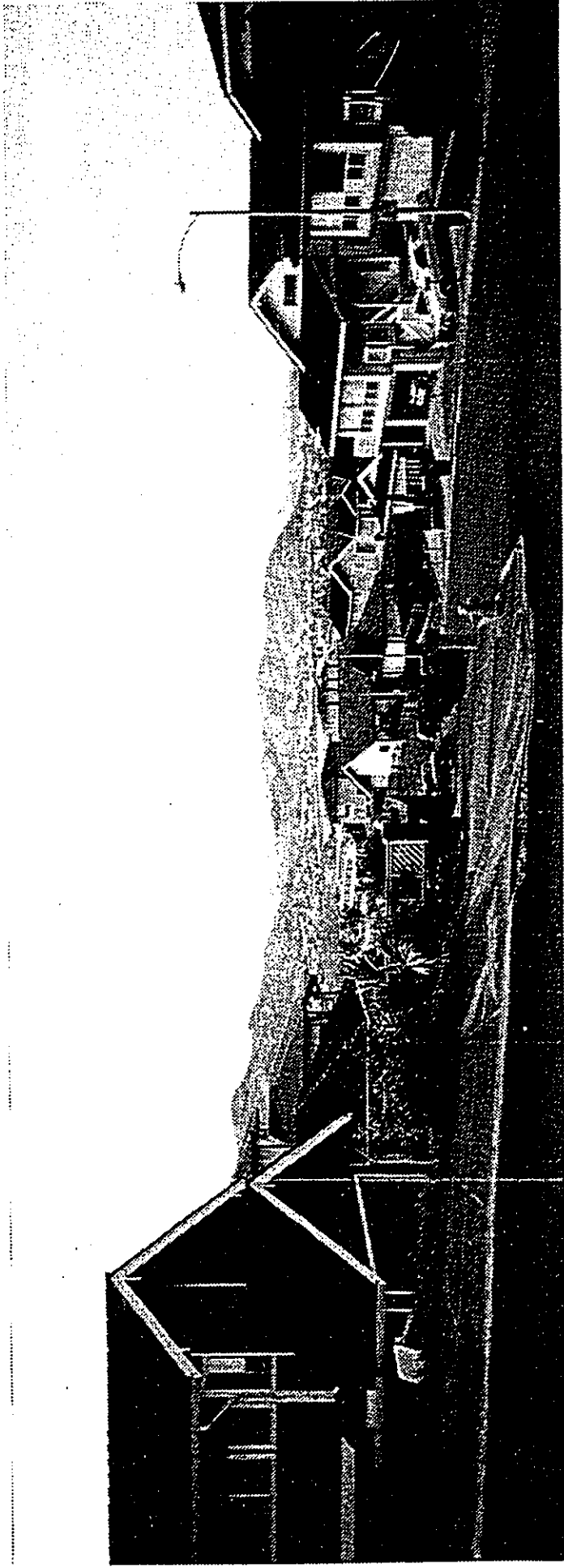


PHOTO 17. PAUKIKI AND KANAPUU STREETS

View Analysis

The Coastal View Study prepared for the City and County of Honolulu Department of Land Utilization examines views from public viewpoints and coastal roadways in the Special Management Area (SMA). As stated in this study, a view analysis performed for a proposed project should take into consideration the following visual qualities of an area:

- **Vividness** - Memorability of a landscape derived from contrasting landscape components combining to create distinctive visual patterns
- **Unity** - Degree to which visual resources of a landscape scene join together to form a coherent, harmonious visual pattern
- **Intactness** - Extent to which landscape is free from visually encroaching features

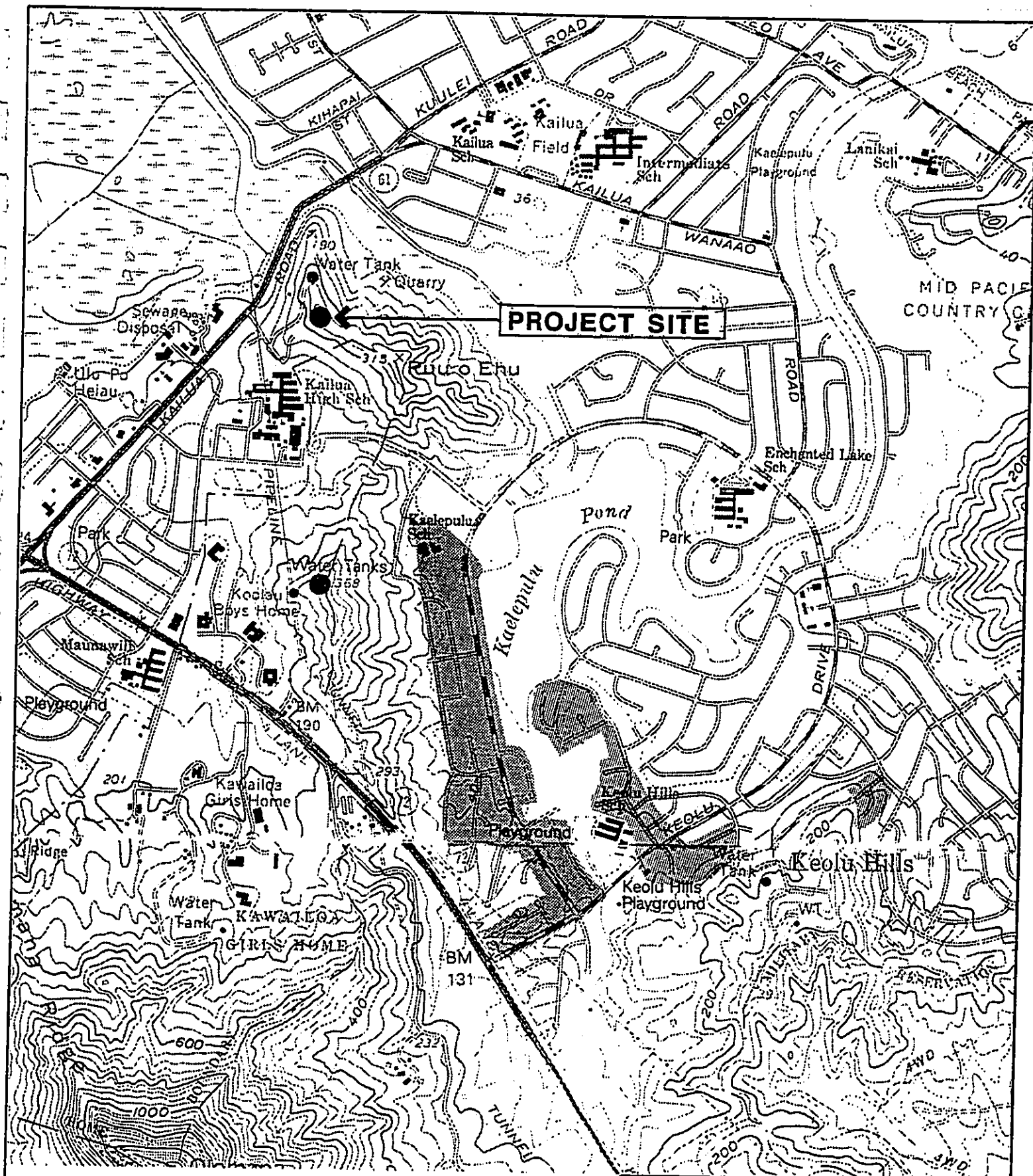
Relevant visual characteristics in the case of the Kailua 272 Reservoir appear to be vividness and unity. The mountains and ridges provide a high degree of contrast in this suburban setting. For example, photos of the project site show many views (Photos 1, 12, and 15) creating distinct visual patterns. There are only a limited number of high-rise structures in the community to block the view. Rather, visibility is limited by elevation and other land forms, structures, and/or vegetation.

The Coastal View Study also identifies view concerns and opportunities, taking into consideration the following situations:

- Where views of exceptional visual quality should remain unaltered
- Where significant views may be lost or diminished due to future development
- Where limited or no views are presently available but enhancement opportunities may be possible

The view of the proposed site does not appear applicable in this situation. Puu O Ehu ridge is only one of many land forms in the area, the dominant one being the Koolau Mountain Range. This view would not be significantly altered, as evidenced in Photos 12, 13, 14, 15, and 17. Enhancement opportunities may exist but would probably be limited.

The Special Provisions of the Development Plan (City and County of Honolulu Department of Land Utilization) identifies significant open spaces and public views. Section 24-6.2, Urban Design Principles and Controls for Koolaupoko, lists important public views that should be protected whenever possible. The panoramic view of the Pali and views of Puu O Ehu ridge and Olomana from the Kaelepulu Pond area are listed. As previously mentioned, the visual impacts attributable to the proposed reservoir from Kaelepulu Pond are minimal since the reservoir will be situated on the far side of the ridge. The reservoir can only be seen from a portion of the Kaelepulu Pond area due to the topographic features of Puu O Ehu ridge and the surrounding land forms. Specifically, the reservoir can only be seen from the western section of the pond (see Figure 3-9).

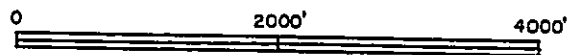


PROJECT SITE

FIGURE 3-9

**AFFECTED VIEWS FROM
KAELEPULU POND**

GRAPHIC SCALE:



Visual Character of Existing BWS Reservoirs

In recent years, the BWS reinstated its attention to aesthetics in the design of reservoirs. Emphasis is placed on appearance and beautification of facilities and the surrounding environs, with attention given to landscaping. From fiscal year 1985-86, the BWS implemented a reservoir and building painting and repair program. Landscaping improvements have been made at various reservoirs.

Examples of existing reservoirs in the Kailua area are shown on Photos 18 and 19. The Pohakupu 272 Reservoirs (Photo 18) and the Kailua Heights Reservoir (Photo 19) are examples where landscaping has effectively been incorporated to minimize the visual impacts. Although it is located in a residential area, the reservoir is barely noticeable. Trees effectively provide a visual screen. Likewise, the Waialae Nui Reservoir (Photo 20) and the Niu Valley Reservoir (Photo 21), although visible from adjacent residential streets, have been effectively landscaped and painted to integrate the structures into their surroundings.

Mitigation Measures

To maintain the unity and vividness of the view, the following measures will be implemented:

1. Construction of a 10-ft high retaining wall surrounding the reservoir to screen the tank from surrounding views. Soil will be backfilled around the wall's exterior to create an earthen berm which will be planted with existing vegetation to further obstruct view of the tank.
2. Landscaping the exterior face of the site with existing vegetation to blend with the surroundings and enhance the screening effect.
3. Landscaping all exposed excavation cuts to control erosion and mitigate the visual impact of cut slopes.
4. Painting the concrete reservoir with earth tone colors to blend with the surrounding environment.
5. Conducting maintenance and repainting on a regular basis.

With the proposed reservoir being constructed on the northern end of Puu O Ehu ridge, it can be observed from limited areas of Kaelepulu Pond. Specifically, these areas would be limited to the western sector of the pond (see Figure 3-9), with the exception of selected higher elevations in Keolu Hills (southern sector). However, since the project site would be over two miles from this area in the southern sector, it would be hardly discernible.

SOCIOECONOMIC ENVIRONMENT

Population and Demographics

In 1990, the population in the Koolaupoko District was 117,694 (State of Hawaii Data Book, 1991). In the Kailua Census Designated Place (CDP) the population was 36,818.

The proposed project will solve the existing substandard storage problem in Kailua and therefore, will not contribute to any increase in the residential population.



PHOTO 18. POHAKUPU 1.0 MG AND 6.0 MG RESERVOIRS

The domed structure is the 1.0 MG reservoir. The 6.0 MG reservoir is located at the same elevation, within 200 ft. to the left of the 1.0 MG tank.

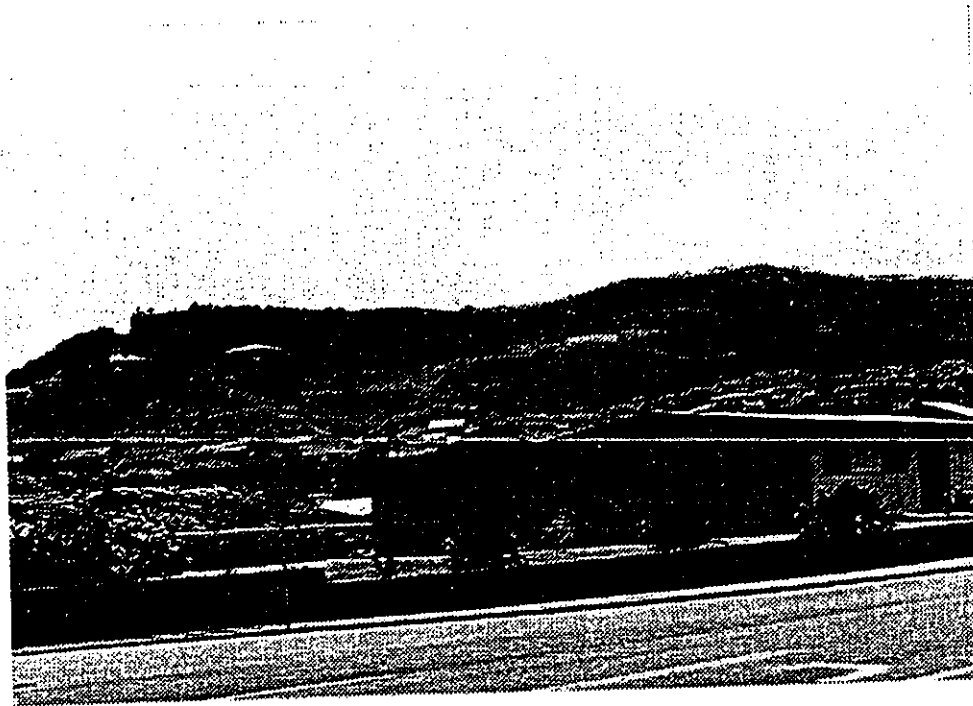


PHOTO 19. KAILUA HEIGHTS RESERVOIR



PHOTO 20. WAIALAE NUI RESERVOIR

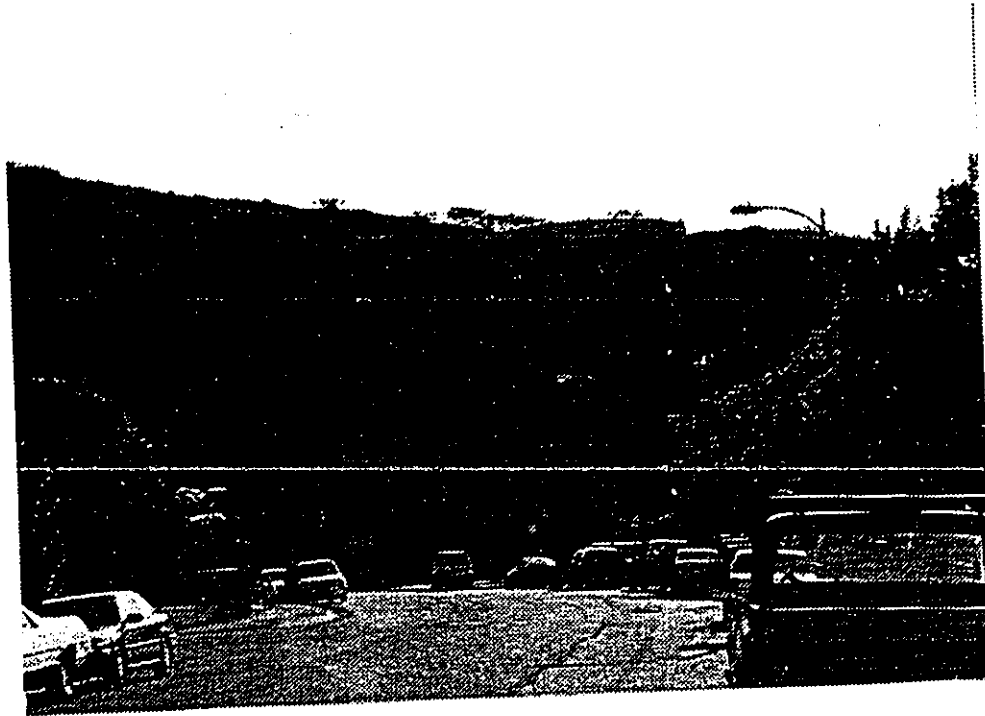


PHOTO 21. NIU VALLEY RESERVOIR

Character of Neighborhood

Kailua is a suburban residential community with supporting retail services that provide employment to local residents. Population and housing have grown slowly due to a lack of developable land and the City's General Plan directing growth to Leeward Oahu.

The residents in the Kailua area are generally characterized as long-time Hawaii residents, generally higher education, more professional occupations, higher median income, high percentage of residents as homeowners.

The proposed project will not affect the character of the Kailua community.

PUBLIC SERVICES AND FACILITIES

Water Service

Water service to this part of Kailua is primarily being provided by the Pohakupu 272 Reservoirs. Prior to 1986, water service to this area was provided by the Kailua 272 Steel Reservoir, which has been taken out of service.

Fire Protection

Kailua Fire Station, at the corner of Kuulei Road and Kainalu Drive, is approximately 1.5 miles from the project site. Other nearby fire stations are Olomana Fire Station on Kalaniana'ole Highway and Aikahi Fire Station at the entrance to Kaneohe Marine Corps Air Station. Ambulance service is also available in back of the Kailua Fire Station.

Construction of the reservoir will have a positive impact on fire protection service for the Kailua area by supplying a reliable storage volume of water for fire fighting purposes. In addition, fire hydrants will be installed along the new transmission main on the access road to provide fire safety measures for the Old Kukanono Community where none currently exists. The nearest hydrants are currently located on Kailua Road, making it difficult to implement effective fire fighting measures.

Schools

Educational institutions in the vicinity of the site include Kailua High School, Kaelepulu Elementary School, and Kailua Intermediate School.

Kailua High School is less than one-fourth mile from the proposed site. Construction noise and dust may impact classroom activities. As much work as possible should be done during the summer months to mitigate the impacts from dust and noise. Dust and noise screens may also be constructed. Traffic generated by construction vehicles should not affect the school.

COMMUNITY RELATIONS

Area residents and workers will be kept informed about project activities. The following measures are suggested:

- **Maintain communication throughout the construction period with adjacent residents, neighborhood boards, and community associations.**
- **Publicize construction in the daily newspapers and in newsletters published by neighborhood boards and community associations.**
- **Maintain a procedure whereby questions, concerns, and complaints about the project will be handled expeditiously.**
- **Inform the public about the project's benefits. People should understand the need for the reservoir and that it is an integral part of the overall water system for the Windward Low Service System.**

CHAPTER 4 ALTERNATIVES TO THE PROPOSED PROJECT

This chapter discusses alternatives which could attain the objectives of the proposed action, albeit less economically or to lesser degrees of public advantage. In this way, the proposed action can be evaluated among all other alternatives considered but rejected as not cost-effective.

To restate, the Board of Water Supply's overall objectives for this project are to:

- Increase storage capacity in the Kailua area to closely approximate BWS operating standards for reliability and fire protection, and
- Provide uninterrupted water service to customers of Windward Oahu under normal and emergency operating conditions

NO ACTION

Under a no-action alternative, water service to Windward Oahu in the area extending from Kailua to Kaneohe will continue to operate significantly below the BWS's standards, which require reservoir capacities equal to 1.5 times the average daily use. Consequently, the likelihood of residents being without water during extended power outages would still exist, and fire fighting water may not be available in volume and pressure.

As municipal water demand increases due to economic expansion, population growth, and higher per capita consumption rate, this shortfall in reservoir capacity will be exacerbated, and public health and safety placed at higher risk.

Since the windward district's storage capacity is currently significantly "below standard", failure to act in a timely manner to remedy the shortage would not be an acceptable course of action.

ALTERNATE RESERVOIR CONFIGURATIONS

Construction of Smaller Reservoirs

Significant impacts are primarily due to the need to make extensive cuts in the Puu O Ehu ridge line to construct the reservoir spillway at elevation 272 feet MSL. Smaller diameter reservoirs could be constructed; however, the amount of earthwork required to situate multiple tanks at the site would, in fact, actually be more than for a single 4.0 MG tank. A tank of 2.0 MG capacity would have a diameter of approximately 130 feet, compared with the 185-foot diameter of the proposed 4.0 MG tank. To provide the needed increase in reservoir capacity, two such tanks would have to be constructed, which would actually cover a larger area than a single 4.0 MG tank, and hence, have probably more of a visual impact.

The topography and 50 percent slopes near the ridge line will not accommodate construction of smaller reservoirs in the mountainside at the required elevation.

Construction of Taller Reservoirs

An option of constructing a taller reservoir of smaller diameter in the mountainside was considered as a way to reduce the size of the cuts and avoid encroachment into the ridge line. This alternative would require design of a thicker base and tank sides for the high hydraulic pressures to be exerted on the structure. A suitable foundation of hard rock would have to be located, or concrete piles would need to be driven to depths resting on such strata. A 100-foot diameter tank with base elevation of 202 feet would have to be 70 feet tall, or 10 stories high, with its top close to the Puu O Ehu ridge and summit. Multiple small diameter tanks of shorter heights tucked into the mountainside are not possible because the terrain near the summit is too steep to allow this.

From an operational standpoint, the spillway elevation of any new tank in the Kailua low service system must be at the 272-foot elevation. The reason for this is that the height of each reservoir needs to match that of other tanks in the same service zone. If the reservoir heights are unequal, the reservoir with the highest water level would be the first to drain before the others are used. Since reservoir water levels seldom get this low in normal operation, the lower reservoirs within the same service zone would effectively be "locked out", going virtually unused, and its water would stagnate. This alternative is not hydraulically feasible since only the top 20 feet could be effectively utilized. Water levels would not likely drop to make use of the bottom 50 feet since other reservoirs in the system would drain first.

For aesthetic reasons, a 10-story structure near the ridge line would be unacceptable. Due to physical constraints, construction of multiple small diameter tanks with tops situated below the ridge line is impossible at this site.

Construction of Underground Reservoirs

Construction of underground or partially buried reservoirs at the proposed site is not possible when the spillway elevation must be maintained at 272 feet MSL. The difficulties in maintaining and repairing buried facilities also outweigh the advantages. Board of Water Supply standards require storage tanks that are accessible around their entire perimeters. Reservoirs that are fully or partially buried have reduced sanitary control. Water quality problems result (mainly microbiological) and therefore reduce the level of quality water service.

Construction of Elevated Tanks

Elevated water tanks are often used for storage and pressure in flat areas of the mainland where hills and mountains cannot be used to advantage. As a permanent facility, this option is not viable for Kailua because of unacceptable visual impacts, potential hazards to aircraft, dangers posed in case of steel tank malfunction or catastrophic rupture or damage from wind forces, and difficulty in maintenance and repair.

ALTERNATE RESERVOIR LOCATIONS

Site of Old Abandoned Kailua 272 and 275 Tanks

The site of the demolished Kailua Steel 272 tank is approximately 100 feet by 100 feet, and the site of the nearby abandoned Kailua 275 concrete reservoir is approximately 100 feet by 125 feet. The physical features of these sites restrict the dimensions of any new tank to no more than 100 feet in diameter. Considering the existing base elevation, a single 1.5 MG tank approximately 30 feet high could be constructed on this combined site. This would nonetheless require that a second 2.5 MG reservoir be constructed to augment the 1.5 MG tank.

The Board of Water Supply abandoned and demolished the Kailua Steel 272 reservoir because of rust and exorbitant maintenance and repair costs. A further factor in decommissioning the tank was a problem of undermining of the footing along the cliff fronting Hamakua Drive. For structural stability reasons, reuse of this site for a new concrete tank is undesirable.

Pohakupu Site

The BWS has a 6.0 MG and a 1.0 MG concrete reservoir on the Honolulu side of Puu O Ehu ridge adjacent to the Pohakupu residential subdivision (see Figure 3-8). Both tanks comprise part of the Kailua 272 low service system, and strategically, the additionally needed reservoir could be situated in this same area.

Photo 22 was taken from Kalaniana'ole Highway facing this alternative reservoir site. The women's correctional facility is located in the foreground of the photo, and the existing 1.0 MG Pohakupu reservoir can be seen through trees on the left side. A computer-generated color photo of the proposed 4.0 MG reservoir at this alternative site has been prepared for illustrative purposes (Photo 23). Mitigation of the visual impact of the reservoir has not been included on Photo 23. Landscaping of the reservoir face and cut slope with existing vegetation will reduce the visual impact of this site. However, the cut slope will be difficult to landscape due to the anticipated vertical rock face.

The major disadvantage of this site is the higher construction cost. A cost comparison was prepared for the selected site at Puu O Ehu ridge and the alternate Pohakupu site by the Board of Water Supply. The addition of the retaining wall and landscaped berm at the Puu O Ehu site increases the construction cost by \$1.7 million; from \$10.8 million to \$12.5 million, not including land cost. Despite the additional high cost, the Puu O Ehu site is approximately \$2.5 million to \$5 million less expensive than the Pohakupu site.

This cost difference is primarily due to the increase in excavation quantity required for site grading. For example, approximately 150,000 to 200,000 cubic yards of material will need to be removed at the Pohakupu site, compared to 55,000 cubic yards at the selected site. The cut face at the Pohakupu site is estimated to be about 80 feet high. A soils investigation at Pohakupu would be required to determine allowable cut slopes for a more precise cost estimate. At a unit construction cost of \$50 per cubic yard, the excavation cost at the

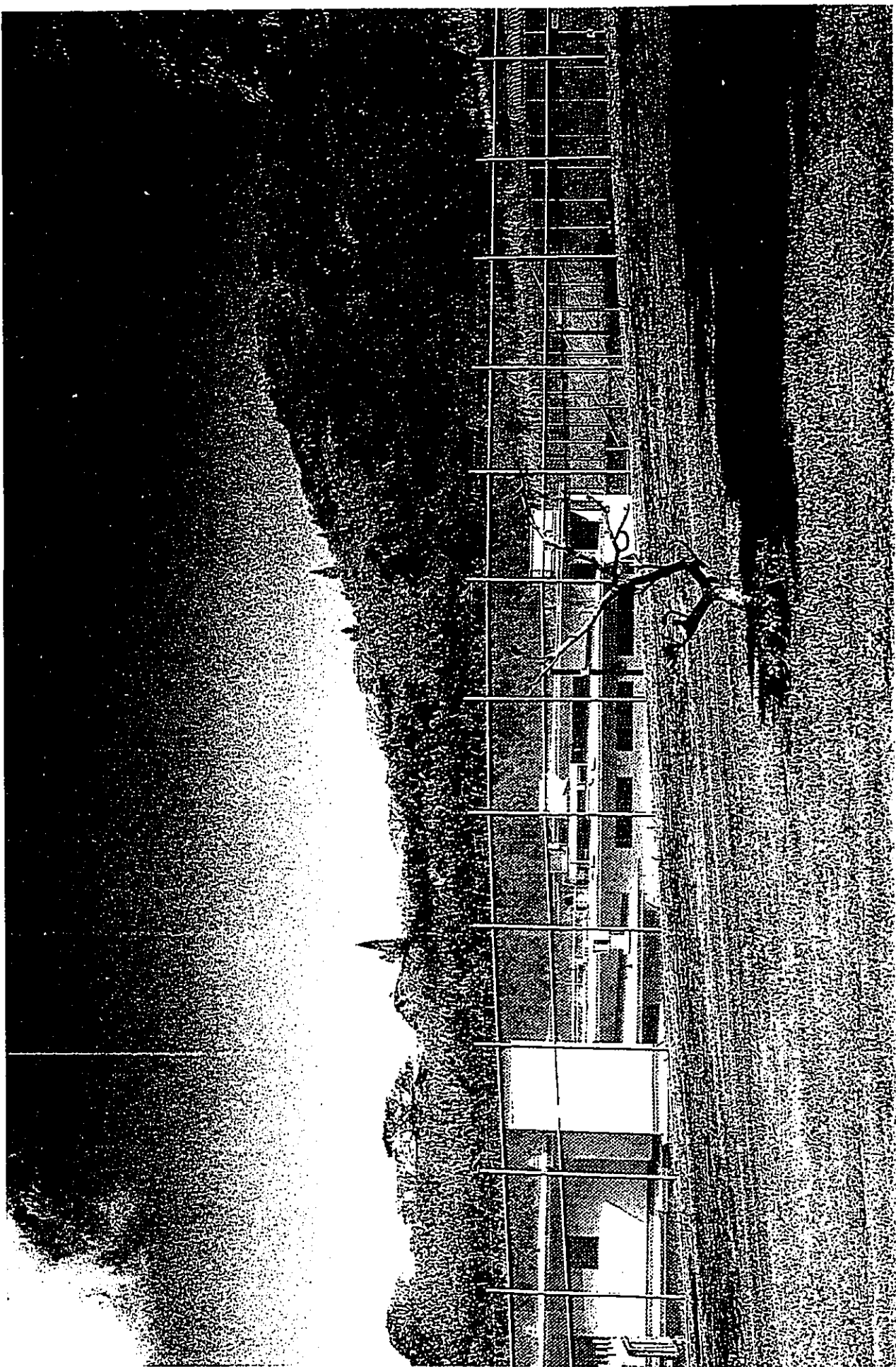


PHOTO 22 - ALTERNATE POHAKUPU SITE (EXISTING VIEW)

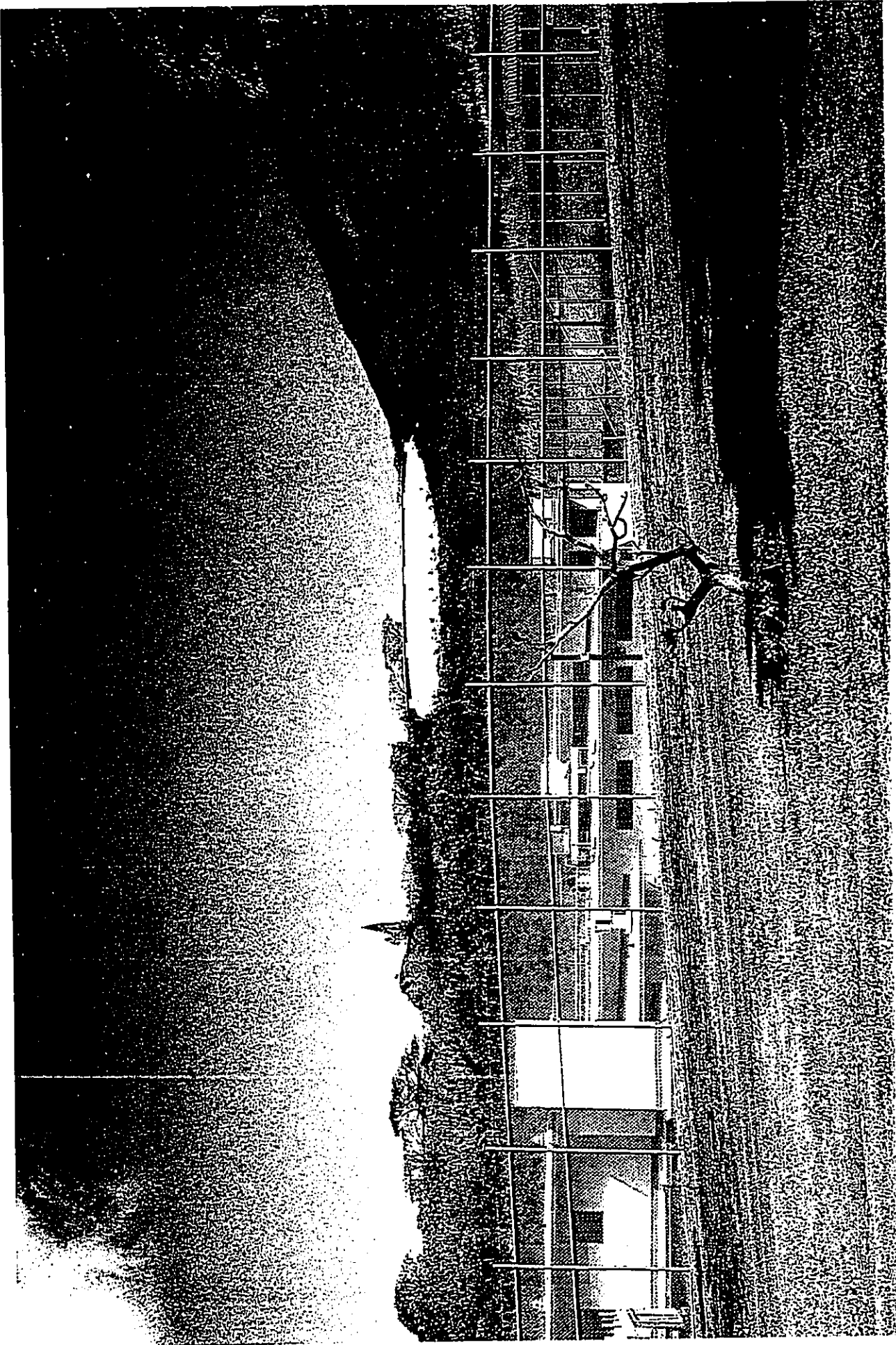


PHOTO 23 - ALTERNATE POHAKUPU SITE (EXPECTED VIEW)

Pohakupu site would range from \$7.5 million to \$10 million compared to \$2.75 million for the Puu O Ehu site.

The Puu O Ehu site has additional site specific costs that are not expected at the Pohakupu site, such as the retaining wall, berm, and new drain and water systems (including hire hydrants). However, the Pohakupu site will also incur additional costs for redesigning the reservoir including site specific studies, a new EIS, and associated personnel time. The cost difference of \$2.5 million to \$5 million is very significant, especially when public funds are involved. Clearly, the Pohakupu site is an alternative to Puu O Ehu ridge; however it is not viable from a financial standpoint.

Other Sites

Other locations for additional reservoirs have been considered and rejected. As part of an integrated water system, the new reservoir must be placed at a specific elevation. In the case of mainly serving the nearby community of Kailua, the reservoir spillway elevation must be at 272 feet above sea level.

A Kailua Heights location is a possibility, but it is not close enough to Kailua Town, where population and water demands are concentrated. Lanikai, another consideration, is even further away. Both sites are also well away from the existing large water transmission mains which must connect to the reservoirs for distribution services.

The Puu O Ehu ridge site is ideal since it is near the 24-inch water transmission mains and affords the required elevations and land area.

REPLACE 1.0 MG POHAKUPU RESERVOIR WITH 5.0 MG STRUCTURE

In contrast to adding a third tank to the Pohakupu site, consideration was given to replacing the 1.0 MG reservoir with a larger, 5.0 MG tank. The 1.0 MG reservoir is fully functional. In fact, the tank was recently refurbished and has an estimated life of over 20 years remaining. Demolition of this functional reservoir prior to reaching its life expectancy is not cost effective or preferable.

REFURBISH EXISTING ABANDONED STORAGE TANK

Abandoned reservoirs at Kailua Heights and Lanikai both have spillway elevations of 230 ft, which would be undesirable in conjunction with the 272 reservoir system. Reactivating the abandoned 230 reservoirs will reduce the available water pressures to the homes at the upper fringes of the Lanikai and Kailua Heights area near 130 feet to 170 feet. Also, topographic features preclude the sites from being used for new reservoirs without extensive grading and/or structural facilities.

INSTALL EMERGENCY POWER GENERATORS AT WELL SITE(S)

Installation of emergency power generators at well sites will provide water to the Kailua system in the event of electrical power outage. However, this alternative will not supply water to Kailua in the event of transmission line break/repair between the well site and demand centers in Kailua. The proposed reservoir will provide a reserve supply of water near the point of use.

The Board of Water Supply notes that the transmission system serving Kailua is about 25 miles long with portions submerged in ocean water. Age, susceptibility to corrosion coupled with the fact that the Windward Low Service System has the highest pumping pressures on Oahu, creates situations where main breaks occur relatively frequently. In 1994, BWS experienced about 180 main breaks in the Windward system. Therefore, adequate storage is critical to maintaining reliable water service to the area.

CHAPTER 5
RELATIONSHIP TO APPLICABLE LAND USE
PLANS, POLICIES, AND CONTROLS

STATE LAND USE LAW

The State Land Use Law (Chapter 205, Hawaii Revised Statutes), adopted in 1961, establishes the framework of land use management in Hawaii. All lands in the state are classified into one of four land use districts: Urban, Rural, Agricultural, or Conservation. District boundary amendments may be obtained by petition to the State Land Use Commission (LUC).

The project is situated on land classified Urban (U) and Conservation (C). Boundary Interpretation No. 92-12 on file with the LUC defines the land use boundaries between Urban and Conservation of this project. The Urban classification generally includes land characterized by a city-like concentration of people, structures, and services. The counties primarily have jurisdiction over urban lands through their ordinances and regulations.

The Conservation classification primarily includes lands in existing forests and water reserve zones. It also includes areas necessary for the protection of watersheds and water sources; scenic and historic areas; parks; wilderness; open space; recreational areas; habitats of endemic plants, fish, and wildlife; and all submerged lands seaward of the shoreline. Lands subject to flooding and soil erosion are also included. The Conservation District is controlled by the State Board of Land and Natural Resources, and its uses are governed by the rules of the Department of Land and Natural Resources. A Conservation District Use Application will have to be obtained for this project.

The project site is located within the general (G) subzone of the Conservation District. The objective of this subzone is to designate open space where specific conservation uses may not be defined, but where urban use would be premature. Land uses permitted in the general subzone include those land uses permitted in the protective, limited and resource subzones. Development of the reservoir would fall under the following permitted land uses:

- Landscaping, defined as alteration (including clearing) of plant cover.
- Land use undertaken by the City & County of Honolulu to fulfill a mandated governmental function, activity, or service for public benefit and in accordance with public policy and the purpose of the Conservation District.
- Demolition, removal, or alteration of existing structures, facilities and equipment.
- Demolition, grading, removal or alteration of topographic features.

The proposed reservoir project is consistent with existing land use designations.

HAWAII STATE PLAN

The Hawaii State Plan (Chapter 226, Hawaii Revised Statutes) establishes a system for the planning, coordination, and integration of major State and County activities. Part I of the Plan lists the State's long-range goals, objectives, policies, and priorities. Applicable sections are discussed below. Part II establishes a statewide planning system to coordinate and implement the plan, and Part III establishes priority guidelines to address areas of statewide concern. None of the priority guidelines listed in Part III relate to the proposed project.

Section 226-4: State Goals

- (2) *A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.*

The proposed reservoir and access road will be consistent with the goals of the State. The site will be landscaped and the reservoir painted to blend with the surrounding natural environment. Measures will be taken to reduce the effects of noise, dust, and traffic associated with construction activities. Once constructed, the effects of noise, dust, and traffic should be minimal.

Section 226-11: Objectives and Policies for the Physical Environment--Land-Based, Shoreline, and Marine Resources

- (a) *Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:*
 - (1) *Prudent use of Hawaii's land-based, shoreline, and marine resources.*
 - (2) *Effective protection of Hawaii's unique and fragile environmental resources.*
- (b) *To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to:*
 - (1) *Exercise an overall conservation ethic in the use of Hawaii's natural resources.*
 - (3) *Take into account the physical attributes of areas when planning and designing activities and facilities.*
 - (4) *Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.*
 - (8) *Pursue compatible relationships among activities, facilities, and natural resources.*

The reservoir and access road will be compatible with existing activities, facilities, and natural resources. There will be no irreparable environmental damages to biological or natural resources. The physical attributes of the site were considered in selecting the location for the reservoir since there is adequate space at the required elevation.

Section 226-12: Objectives and Policies for the Physical Environment—Scenic, Natural Beauty, and Historic Resources

- (a) *Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources.*
- (b) *To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to:*
 - (1) *Promote the preservation and restoration of significant natural and historic resources.*
 - (3) *Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.*
 - (5) *Encourage the design of developments and activities that complement the natural beauty of the islands.*

Because of the prominent location of the project, special emphasis on appearance and beautification of the facilities will be given to minimize the visual impact of the reservoir. Chapter 3 of the EIS discusses this issue.

Section 226-13: Objectives and Policies for the Physical Environment—Land, Air, and Water Quality

- (a) *Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives:*
 - (1) *Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.*
 - (2) *Greater public awareness and appreciation of Hawaii's environmental resources.*
- (b) *To achieve the land, air, and water quality objectives, it shall be the policy of this State to:*
 - (2) *Promote the proper management of Hawaii's land and water resources.*
 - (3) *Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.*
 - (6) *Encourage design and construction practices that enhance the physical qualities of Hawaii's communities.*
 - (8) *Foster recognition of the importance and value of the land, air, and water resources to Hawaii's people, their cultures and visitors.*

The proposed reservoir is consistent with the City and County of Honolulu Land Use Ordinance and Development Plan for the Primary Urban Center. The City's Public Facilities Map designates a reservoir at the proposed site. A portion of the project site was once the location of an abandoned reservoir.

Construction of the reservoir and access road will be beneficial to the residents in the district since the Board of Water Supply will be able to improve water service in the area. Adherence to the State's land, air, and water quality objectives will be assured through proper design and construction practices.

Section 226-14: Objective and Policies for Facility Systems--In General

- (a) *Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.*
- (b) *To achieve the general facility systems objective, it shall be the policy of this State to:*
 - (1) *Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.*
 - (2) *Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.*
 - (3) *Ensure that required facility systems can be supported within resource capabilities and at reasonable cost to the user.*

The new reservoir will be consistent with State and County plans. Major concerns of the Board of Water Supply are furnishing a reliable and safe drinking water supply and meeting the needs of the communities with regard to the quality and quantity of its water supply. This reservoir will replace four abandoned reservoirs in the Kailua area and is necessary to increase reservoir storage capacity in the Windward Low Service System to BWS standard.

Section 226-16: Objective and Policies for Facility Systems--Water

- (a) *Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.*
- (b) *To achieve the facility systems water objective, it shall be the policy of this State to:*
 - (4) *Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.*

Construction of the reservoir will increase the Board of Water Supply's storage capacity in the district. This increase in storage capacity will provide additional reliability and flexibility to the existing water distribution system. This reservoir will also replace four reservoirs taken out of service over the past ten years.

STATE FUNCTIONAL PLANS

The primary means of implementing the goals, objectives, and policies of the Hawaii State Plan are set forth in State functional plans. These functional plans delineate the policies and actions that need to be addressed in the short-term in these specific areas: agriculture, conservation lands, education, employment, energy, health, higher education, historic preservation, housing, human services, recreation, tourism, and transportation. They are intended to act in a coordinated fashion with County General Plans and Development Plans but are not to be interpreted as law or as mandatory county or private sector actions.

Each functional plan sets forth the policies, statewide guidelines, and priorities within a specific field of activity, when such activity or program is proposed, administered, or funded by any agency of the State (Chapter 226, Section 226-2, Hawaii Revised Statutes). Of the functional plans adopted by the State, the Conservation Lands functional plan was examined to determine its applicability to the proposed project. This plan primarily affects State operations. The project is consistent with the State's goal to assure adequate municipal water supply.

OAHU GENERAL PLAN

The General Plan for the City and County of Honolulu is a statement of long-range social, economic, environmental, and design objectives for Oahu. It addresses (1) population; (2) economic activity; (3) natural environment; (4) housing; (5) transportation and utilities; (6) energy; (7) physical development and urban design; (8) public safety; (9) health and education; (10) culture and recreation; and (11) government operations and fiscal management.

Natural Environment

Objective A: To protect and preserve the natural environment.

- *Protect Oahu's natural environment, especially the shoreline, valleys, and ridges, from incompatible development.*
- *Require development projects to give due consideration to natural features such as slope, flood and erosion hazards, water-recharge areas, distinctive land forms, and existing vegetation.*
- *Design surface drainage and flood-control systems in a manner which will help preserve their natural setting.*
- *Protect the natural environment from damaging levels of air, water, and noise pollution.*

The Development Plan Public Facilities Map was amended by Ordinance No. 92-14 dated March 10, 1992 by adding a water reservoir modification symbol. Thus, the project is compatible with the existing land use designation.

Storm, flood, erosion hazards, drainage, and pollution will be considered in the design. These issues are addressed in Chapter 3.

Objective B: To preserve and enhance the natural monuments and scenic views of Oahu for the benefit of both residents and visitors.

- *Protect Oahu's scenic views, especially those seen from highly developed and heavily travelled areas.*
- *Locate roads, highways, and other public facilities and utilities in areas where they will least obstruct important views of the mountains and the seas.*

Design of the reservoir will take into consideration measures to blend the structure with its natural environment. A detailed view analysis is presented in Chapter 3.

Transportation and Utilities

Objective B: To meet the needs of the people of Oahu for an adequate supply of water and for environmentally sound systems of waste disposal.

- *Develop and maintain an adequate supply of water for both residents and visitors.*
- *Encourage the development of new technology which will reduce the cost of providing water and the cost of waste disposal.*

The project will improve the water system in the Kailua area by providing additional system reliability and flexibility in meeting the water demand of residents in the area.

Objective C: To maintain a high level of service for all utilities.

- *Maintain existing utility systems in order to avoid major breakdowns.*
- *Provide improvements to utilities in existing neighborhoods to reduce substandard conditions.*
- *Provide for the timely and orderly expansion of utility systems.*

Presently, the reservoir system storage capacity in the Windward Low Service System does not meet BWS standards. The project will improve the reliability of fire fighting capabilities.

Objective D: To maintain transportation and utility systems which will help Oahu continue to be a desirable place to live and visit.

- *Give primary emphasis in the capital improvement program to the maintenance and improvement of existing roads and utilities.*
- *Evaluate the social, economic, and environmental impact of additions to the transportation and utility systems before they are constructed.*

The Board of Water Supply's Capital Improvement Program for 1991 includes the project. Social, economic, and environmental impacts of the project are evaluated in the EIS process.

Physical Development and Urban Design

Objective A: To coordinate changes in the physical environment of Oahu to ensure that all new developments are timely, well-designed, and appropriate for the areas in which they will be located.

- *Plan for the construction of new public facilities and utilities in the various parts of the Island according to the following order of priority: first, in the primary urban center; second, in Ewa; and third, in the urban-fringe and rural areas.*

The Koolaupoko Development Plan Public Facilities Map, Ordinance 92-14, designates a water reservoir at the site. In addition to providing a flexible and reliable water system, this project will replace abandoned reservoirs in the Kailua area.

Objective D: To create and maintain attractive, meaningful, and stimulating environments throughout Oahu.

- *Design public structures to meet high aesthetic and functional standards and to complement the physical character of the communities they will serve.*

The project will incorporate aesthetic and functional standards in the design. Mitigation measures to complement the physical character of the reservoir with its environment are addressed in Chapter 3.

Objective E: To promote and enhance the social and physical character of Oahu's older towns and neighborhoods.

- *Provide and maintain roads, public facilities, and utilities without damaging the character of older communities.*

The reservoir and associated appurtenances will be constructed in such a way that the character of the surrounding community is not damaged.

Government Operations and Fiscal Management

Objective A: To promote increased efficiency, effectiveness, and responsiveness in the provision of government services by the City and County of Honolulu.

- *Maintain City and County government services at the level necessary to be effective.*
- *Ensure that government attitudes, actions, and services are sensitive to community needs and concerns.*

As previously stated, the Board of Water Supply is concerned with providing a safe and reliable water supply and meeting the needs of the community in terms of quality and quantity of the water supply. This project is consistent with these objectives.

DEVELOPMENT PLAN

The City and County of Honolulu Development Plans provides a framework for implementing the Oahu General Plan objectives. The desired sequence, pattern, and characteristics of development are set forth in public facilities maps for each development plan area.

Part I: Development Plan Special Provisions for Koolaupoko

Koolaupoko extends from Makapuu Point to Kaoio Point at the northern end of Kaneohe Bay and is bounded by the Koolau mountain range and the sea. Kailua is described as an "urban-fringe" area. The Special Provisions identifies significant open spaces and public views that should be protected whenever possible.

Section 24-6.2(a)(1) Open Space. The visibility, preservation, enhancement and accessibility of open space areas as defined in Section 24-1.4 of the development plan common provisions shall be given high priority in the design of adjacent and nearby developments in Koolaupoko.

Puu O Ehu is one of the areas listed under Section 24-6.2(a)(1). The proposed reservoir will be located approximately 1,500 feet from Puu O Ehu, the ridge summit. Over one half of

the reservoir height will be shielded from surrounding views due to the landscaped earth berm which will partially encircle a portion of the tank. Existing hillside vegetation will be used for landscaping, and the tank will be painted to blend with the surroundings.

Section 24-6.2(a)(2) Public Views. In order to promote pleasing and attractive living environments and panoramic mauka and makai views from public places, views of major landmarks from public places shall be protected whenever possible.

The view of Puu O Ehu ridge from the Kaelepulu Pond area is listed as an important view. However, due to the proposed position of the reservoir behind Puu O Ehu, the ridge summit, most of the area surrounding Kaelepulu Pond will not have a view of the reservoir. Public view planes from Kaelepulu Pond will be protected as much as possible due to the landscaped earth berm and tank painting described above.

Refer to the visual impact analysis included in Chapter 3 for further information.

Part II: Development Plan Maps for Koolaupoko

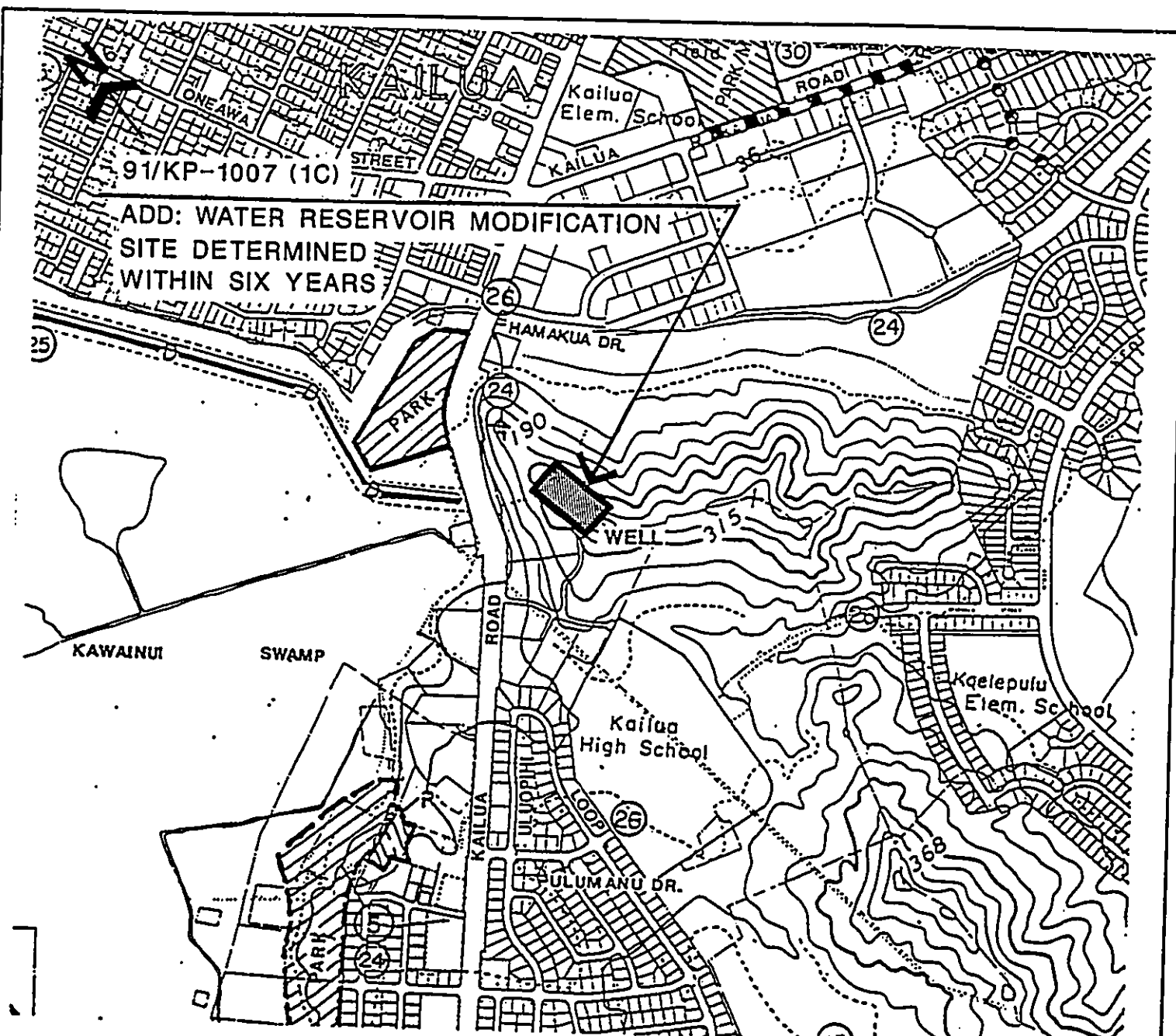
Public facilities maps identify the general locations of proposed facilities. The general time frame (i.e., within six years, beyond six years) for land acquisition and/or construction are also shown on the maps.

Ordinance No. 92-14 dated March 10, 1992 amended the Koolaupoko Development Plan Public Facilities Map by the addition of a water reservoir symbol (Figure 5-1). This project is therefore consistent with County plans.

LAND USE ORDINANCE

The Land Use Ordinance (LUO) of the City and County of Honolulu regulates land use in accordance with adopted policies such as the Oahu General Plan and the Development Plans. The LUO provides development and design standards regarding location, height, size of structure, open spaces, use of structure and land, etc.

Article 2 of the LUO establishes zoning districts. The project is in the area zoned Preservation, Restricted (P-1) and Country. The purpose of the Preservation District is to preserve and manage major open space and recreation lands and lands of scenic and other natural resource value. Within this P-1 Restricted Preservation District, all uses, structures, and development standards shall be governed by the appropriate State agencies. The Country District provides for areas with limited potential for agricultural activities but for which open space and/or the rural character is desired. Basic public services and facilities to support the district are permitted in lands designated Country.



PROJECT NAME: KAILUA 272 RESERVOIR MODIFICATION
 APPLICANT: BOARD OF WATER SUPPLY
 TAX MAP KEY: 4-2-03: 16, POR. 9 & POR. 17
 FOLDER NO. 91/KP-1007 (IC)
 PREPARED BY: DEPARTMENT OF GENERAL PLANNING
 CITY AND COUNTY OF HONOLULU
 PUBLIC HEARING: PLANNING COMMISSION CITY COUNCIL

ORD. NO. 92-14
 EFF. DATE: MAR 10, 1992

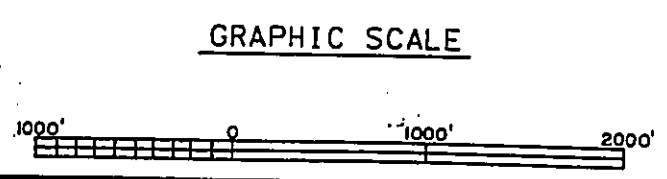


FIGURE 5-1
 DEVELOPMENT PLAN
 PUBLIC FACILITIES MAP
 KOOLAUPOKO

SPECIAL MANAGEMENT AREA

The purpose of the Special Management Area (Chapter 33 of the Revised Ordinances of Honolulu) is to preserve, protect, and, where possible, restore the natural resources of the coastal zone. The Special Management Area (SMA) shall include areas on the Island of Oahu designated on SMA maps (Figure 5-2).

The following guidelines are used in reviewing developments proposed in the SMA:

1. All developments in the special management area shall be subject to reasonable terms and conditions set by the council to insure that:
 - D. Alterations to existing land forms and vegetation, except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of earthquake.
2. No development shall be approved unless the council has first found that:
 - A. The development will not have any substantial adverse environmental or ecological effect except as such adverse effect is minimized to the extent practicable and clearly outweighed by public health and safety, or compelling public interest. Such adverse effect shall include, but not be limited to, the potential cumulative impact of individual developments, each one of which taken in itself might not have a substantial adverse effect and the elimination of planning options;
 - B. The development is consistent with the objectives and policies set forth in Section 33-3.1 and area guidelines contained in Section 205A-26, Hawaii Revised Statutes; and
 - C. The development is consistent with the County General Plan, development plans, and zoning. Such a finding of consistency does not preclude concurrent processing where a development plan amendment or zone change may also be required.

A Special Management Area Use Permit will be required for this project.

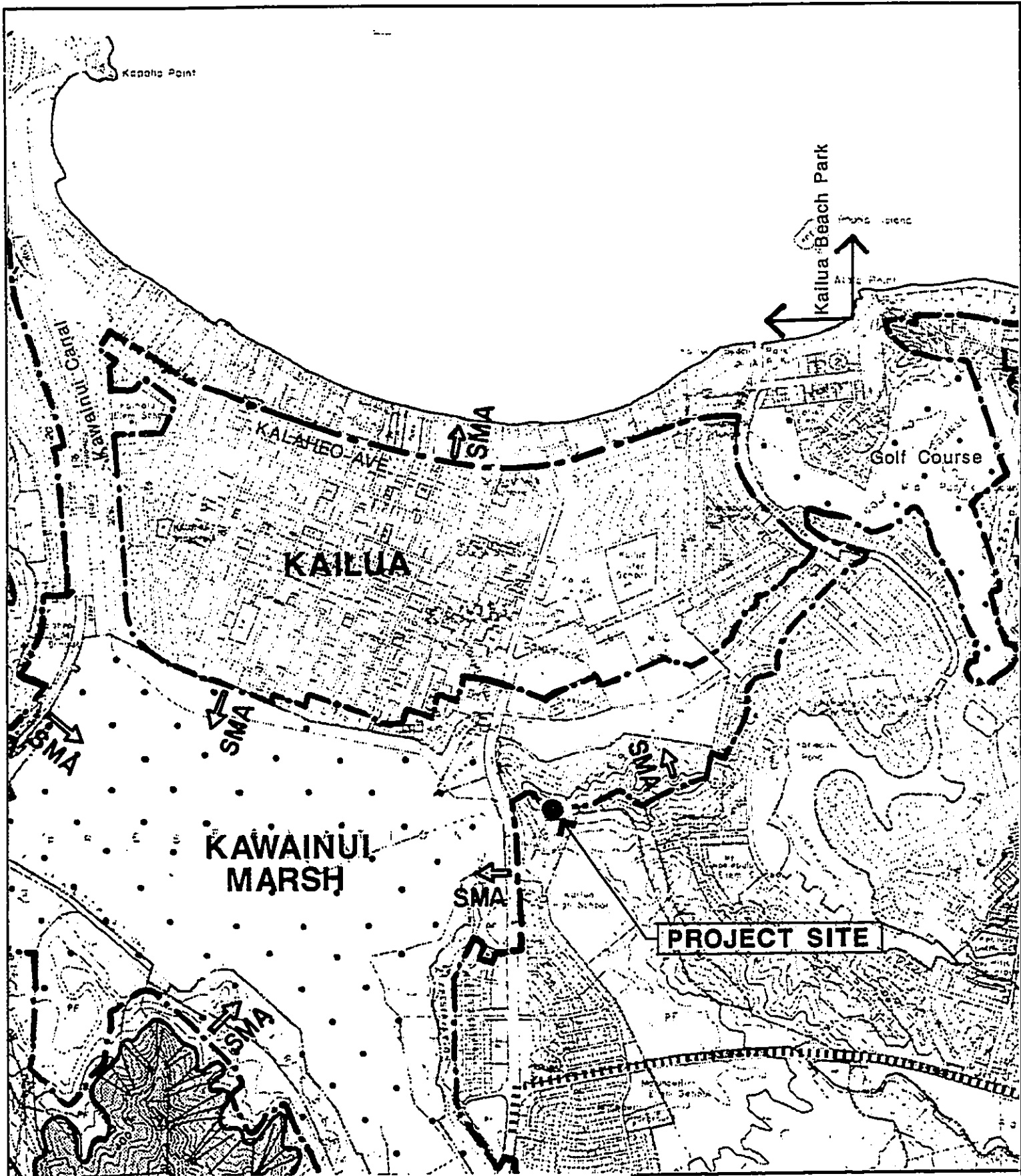
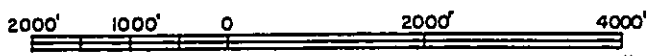


FIGURE 5-2

SPECIAL MANAGEMENT AREA

GRAPHIC SCALE



CHAPTER 6 UNRESOLVED ISSUES

This environmental impact statement has disclosed potential impacts associated with the project and mitigation measures to alleviate public concerns relating to these potential impacts. The purpose of the EIS process is disclosure of information. Resolution of issues and concerns will be addressed as the project proceeds with the planning, permitting and design phases. Four issues remain unresolved.

METHOD OF EXCAVATION

An unresolved issue is the method of excavation used to remove approximately 50,000 cubic yards of earth and rock. Two alternatives are the use of blasting or hoe ram equipment. Due to the amount and type of excavation involved, the use of small explosives would appear to be more economical and would shorten the construction period. However, the contractor hired to construct the reservoir will determine whether blasting or excavation equipment will be used, after considering the advantages and disadvantages of each method. If blasting is selected, the contractor must adhere to specific BWS procedures to minimize vibration. Additional information on the construction method will be submitted for processing of the CDUA.

VISUAL IMPACT ANALYSIS

Concern has been expressed over the visual impact of construction of the reservoir on Puu O Ehu ridge. In response to these concerns, construction of a 10-ft high retaining wall with earthen berm backfill has been incorporated into the project to mitigate the visual impact of the reservoir.

Construction of this wall and berm is an unprecedented commitment by the Board of Water Supply to minimize the visual impact of the reservoir. The wall and berm will shield nearly one half of the 22-ft high reservoir from view. Landscaping of the berm with existing vegetation will add several feet in height to further obscure view of the tank. Painting of the tank in non-obtrusive colors to match the surroundings will provide additional mitigation.

Computer-generated images of the reservoir have been depicted on color photographs taken from significant view planes to illustrate the impact of the project incorporating these mitigation measures. In spite of these efforts, it is anticipated that the visual impact of the project will continue to be an unresolved issue to opponents of the project.

CIVIL DEFENSE SIREN

The BWS has agreed to allow installation of a solar-powered 121 dB civil defense siren warning device at the reservoir site, as requested by State Civil Defense. However, the cost

of installation and maintenance of the siren system must be borne by the state. The BWS has agreed to the siren to benefit the Kailua community and because the site affords an adequate buffer zone of 250-ft radius in which there are no existing or proposed residential structures. Concern has been expressed over the noise disturbance to horses and cattle which graze in the area. This negative, long-term impact to the neighborhood is unresolved.

DRAINAGE SYSTEM DISCHARGE

The proposed drainage system will convey storm water from the reservoir site and neighboring residences along the private road to Kailua Road. However, once storm runoff is conveyed to Kailua Road, there are several options for discharge from the storm drain system. In the vicinity of the project site, the State DOT Kailua Road storm drain discharges toward Kawai Nui Marsh at an outfall headwall. The Board of Water Supply will coordinate with DOT to resolve the drainage discharge from the proposed storm drain.

**CHAPTER 7
REFERENCES**

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United States Government, Department of the Army, the Air Force, and the Navy, Noise and Vibration Control for Mechanical Equipment, December 1983.

United States Government, Environmental Protection Agency, Office of Noise Abatement and Control, Washington, D.C., About Sound, May 1976.

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University of Hawaii, Department of Geography, Atlas of Hawaii, Second Edition, 1983.

CHAPTER 8 CONSULTATION

PARTICIPANTS

The environmental impact statement was prepared for the Board of Water Supply, City and County of Honolulu, by Engineering Concepts, Inc. The following organizations were also involved in the preparation of this report.

<u>Organization</u>	<u>Area of Expertise</u>
Ernest K. Hirata & Associates:	Soils Investigation
Char & Associates:	Flora
Cultural Surveys Hawaii:	Archaeology
Y. Ebisu & Associates:	Noise and Vibration

CONSULTED PARTIES DURING PREPARATION OF THE DRAFT EIS

The following is a list of agencies, organizations, or individuals who were asked to comment on the project. Those who responded with comments are marked with an asterisk (*). Those who responded with no comments are marked with a plus (+).

Federal Government

- Department of Agriculture, Soil Conservation Service
- * Army Corps of Engineers, Honolulu
- Department of Commerce, National Marine Fisheries Service
- Environmental Protection Agency, Region IX, San Francisco
- Department of the Interior, Fish and Wildlife Service
- Department of the Interior, Geological Survey

State Government

- President of the Senate and Senators from Districts 24 & 25
- Speaker of the House and Representatives from Districts 49, 50 and 51
- + Department of Accounting and General Services
- Department of Agriculture
- * Department of Business, Economic Development, and Tourism
- Department of Commerce and Consumer Affairs
- * Department of Defense
- * Department of Education
- + Department of Hawaiian Home Lands
- * Department of Health
- * Department of Land and Natural Resources
- * Department of Land and Natural Resources, State Historic Preservation Officer
- + Department of Transportation
- + Housing Finance and Development Corporation
- Legislative Reference Bureau

Office of Hawaiian Affairs
Office of State Planning
University of Hawaii, Environmental Center
State Libraries
 Business, Economic Development & Tourism
 Hawaii State
 Hilo Regional
 Kailua
 Kaimuki Regional
 Kaneohe Regional
 Kauai Regional
 Pearl City Regional
 University of Hawaii, Hamilton Library
 Wailuku Regional

City and County Government

Chair of the City Council and Council Members from Districts 2 and 3
+ Building Department
+ Fire Department
* Police Department
* Department of General Planning
+ Department of Housing and Community Development
* Department of Land Utilization
+ Department of Parks and Recreation
* Department of Public Works
* Department of Transportation Services
Municipal Reference and Records Center
Neighborhood Board No. 31

Others

American Lung Association
Lanikai Community Association
Pohakupu-Kukanono Community Association
* Old Kukanono Community Association
Kaapuni Community Association
Kuulei Tract Community Association
Enchanted Lakes Community Association
Olomana Community Association
Ducks Unlimited, Inc.
Hawaii Audubon Society
Hawaiian Trail and Mountain Club
Kailua Chamber of Commerce
Kailua Community Council
Kukilakila Association
Lani-Kailua Outdoor Circle
Sierra Club, Hawaii Chapter
* Trustees of the Kapaa Trust/Kaneohe Ranch

Henry & Rebecca Awana
Donald & Martha Cann
Jess Curb and Judith Kautz
Michael & Patricia Gorelangton
Peter Lenhart
James Love
John Murley
John & Patricia Reilly
* Richard & Elizabeth Riegels
Michael & Joanmarie Ryan

COMMENTS ON THE EIS PREPARATION NOTICE

Reproduced in Appendix A are letters commenting on the EIS Preparation Notice and letters by the BWS responding to the comments.

CONSULTED PARTIES DURING PREPARATION OF THE FINAL EIS

One hundred and six (106) copies of the Draft EIS were mailed to agencies on the OEQC distribution list, and other interested parties. A complete listing of these consulted parties follows.

The Draft EIS notice was published in the April 23, 1994 edition of the OEQC Bulletin. A total of 42 comment letters were received during and after the extended public review period which ended on July 23, 1994. Organizations/agencies who responded to the request for comments are marked with an asterisk (*). Those who responded with no comments are marked with a plus (+).

Federal Government

- * Department of Agriculture, Soil Conservation Service
- * Army Corps of Engineers, Honolulu
U.S. Army Support Command Hawaii, Fort Shafter
- Department of Commerce, National Marine Fisheries Service
- + Department of the Navy, Naval Base Pearl Harbor
- Environmental Protection Agency, Region IX, San Francisco
- + Department of the Interior, Fish and Wildlife Service
- + Department of the Interior, Geological Survey
- U.S. Coast Guard

State Government

- President of the Senate and Senators from Districts 24 & 25
- Speaker of the House and Representatives from Districts 50 and 51
- * Cynthia Thielen, District 49 State Representative
- + Department of Accounting and General Services
- Department of Agriculture

- + Department of Business, Economic Development and Tourism
- + Department of Business, Economic Development and Tourism, State Energy Division
- Department of Commerce and Consumer Affairs
- * Department of Defense
- + Department of Education
- Department of Hawaiian Home Lands
- + Department of Health
- * Department of Land and Natural Resources
- + Department of Land and Natural Resources, Historic Preservation Division
- * Department of Transportation
- + Housing Finance and Development Corporation
- Legislative Reference Bureau
- + Office of Environmental Quality Control
- + Office of Hawaiian Affairs
- Office of State Planning
- University of Hawaii, Water Resources Research Center
- * University of Hawaii, Environmental Center
- State Archives
- State Libraries
 - Business, Economic Development & Tourism
 - Hawaii State
 - Hilo Regional
 - Kailua
 - Kaimuki Regional
 - Kaneohe Regional
 - Kauai Regional
 - Pearl City Regional
 - University of Hawaii, Hamilton Library
 - Wailuku Regional
 - Waimanalo Public & School Library

City and County Government

- Chair of the City Council and Councilmember from District III
- * Steve Holmes, District II Councilmember
- + Building Department
- + Fire Department
- Police Department
- * Planning Department (2 letters)
- + Department of Housing and Community Development
- * Department of Land Utilization
- + Department of Wastewater Management
- + Department of Parks and Recreation
- * Department of Public Works
- + Department of Transportation Services
- Municipal Reference and Records Center
- * Kailua Neighborhood Board No. 31 (Ronald Jackson)

Others

- Hawaiian Electric Company
- American Lung Association
- Lanikai Community Association
- Pohakupu-Kukanono Community Association
- Old Kukanono Community Association
- Kaapuni Community Association
- Kuulei Tract Community Association
- Enchanted Lakes Community Association
- Olomana Community Association
- Ducks Unlimited, Inc., Western Regional Office
- Hawaii Audubon Society
- Hawaiian Trail and Mountain Club
- Honolulu Advertiser
- Honolulu Star Bulletin
- Sun Press
- Kailua Chamber of Commerce
- * Kailua Urban Design Task Force (Jamie Osborne, Paul Remington)
- Kailua Community Council
- * Kawai Nui Heritage Foundation
- Kukilakila Association
- * Outdoor Circle
- Sierra Club, Hawaii Chapter
- * Trustees of the Kapaa Trust c/o Kaneohe Ranch
- Henry & Rebecca Awana
- * Donald & Martha Cann
- * Michael Compton
- Jess Curb and Judith Kautz
- Michael & Patricia Gorelangton
- Peter Lenhart
- James Love
- John Murley
- John & Patricia Reilly
- * Richard & Elizabeth Riegels
- Michael & Joanmarie Ryan
- * Donna Wong

COMMENTS ON THE DRAFT EIS

Reproduced in Appendix B are letters commenting on the Draft EIS and letters by the BWS responding to the comments.

APPENDIX A

COMMENTS AND RESPONSES TO THE EIS PREPARATION NOTICE

COPY



BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

July 7, 1993



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, HONOLULU
FORT SHAFTER, HAWAII 96858-5440

April 22, 1993

931070

Planning Division

Mr. Kazu Hayashida
State of Hawaii
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Hayashida:

Thank you for the opportunity to review and comment on the Environmental Assessment for the Kailua 272 Reservoir, Kailua, Oahu (TMK 4-2-3: 9, 16, 17). The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army permits (DA) under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act.

- a. The project does not involve work in waters of the U.S.; therefore, a DA permit is not required.
- b. According to the enclosed Federal Emergency Management Agency's Flood Insurance Rate Map, panel number 150001-0090-C, dated September 28, 1990, the project site is located in Zone X, unshaded (areas determined to be outside of the 500-year flood plain).

Sincerely,

Kisuk Cheung
Kisuk Cheung, P.E.
Director of Engineering

Enclosure
Copy Furnished:
Mr. Kenneth Ishizaki
Engineering Concepts, Inc.
250 Ward Avenue, Suite 206
Honolulu, Hawaii 96814

Mr. Kisuk Cheung
Director of Engineering
Department of the Army
U. S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858-5440

Dear Mr. Cheung:

Subject: Your Letter of April 22, 1993 Regarding the Environmental Assessment for the Board of Water Supply's Proposed Kailua 272 Reservoir, TMK: 4-2-03: 16, Portion 9 and 17

Thank you for your letter regarding our proposed reservoir project in Kailua.

We note that the project does not involve work in waters of the United States and therefore, does not require a Department of Army Permit.

In addition, the project site is located outside the 500-year flood plain (Zone X) according to the Federal Emergency Management Agency's Flood Insurance Rate Map.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

✓cc: Engineering Concepts, Inc.

✕

REG. FILED
OFFICE OF THE
CLERK OF THE
COURT

JOHN WARR
GOVERNOR

APR 3 2 10 PM '93



STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P. O. BOX 114, HONOLULU, HAWAII 96810

931.i31

ROBERT P. TARDUHI
COMPTROLLER
LLOYD T. UNESAKI
DEPUTY COMPTROLLER

LETTER NO. (P) 1259.3

APR 28 1993

PE

Board of Water Supply
City and County of Honolulu
630 S. Beretania Street
Honolulu, Hawaii 96813

Attention: Mr. Kazu Hayashida

Gentlemen:

Subject: Kailua "272" Reservoir
Kailua, Oahu, Hawaii
Environmental Assessment

Thank you for the opportunity to review the subject document. We have no comments to offer.

If there are any questions, please have your staff contact Mr. Ralph Yukumoto of the Planning Branch at 586-0488.

Very truly yours,
Gordon Matsuoka
GORDON MATEUOKA
State Public Works Engineer

RY:jj
cc: Engineering Concepts, Inc.
OEJC

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



COPY

July 7, 1993

Mr. Gordon Matsuoka
Department of Accounting
and General Services
State of Hawaii
P. O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Matsuoka:

Subject: Your Letter of April 28, 1993 Regarding the Environmental Assessment for the Board of Water Supply's Proposed Kailua 272' Reservoir, TMK: 4-2-03: 16, Portion 9 and 17

Thank you for your letter regarding our proposed reservoir project in Kailua.

We note that our project will have no effect on the responsibilities of your department. If you have any questions, please contact Roy Doi at 527-5235.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

✶



COPY



BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

July 7, 1993

JOHN WARREN
Governor
MUIF HANNEMANN
Deputy Governor
BARBARA HANAUSSON
Deputy Director
JACK LEGG
Deputy Director
SARAH YOSHIMIZU
Deputy Director

931090

RECEIVED
SD OF HONOLULU
9 07 1993

DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM

Central Post Office 270 South King Street, 15th Floor, Honolulu, Hawaii
Mailing Address: P.O. Box 2159, Honolulu, Hawaii 96844 Tel: (808) 546-7426 Fax: (808) 546-3177



April 21, 1993

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

Dear Mr. Hayashida:

The Department of Business, Economic Development & Tourism is pleased to submit the enclosed comments on the Environmental Assessment for the Kailua 272' Reservoir.

The comments were provided by the Land Use Commission. Questions regarding these comments may be directed to Esther Ueda, LUC Executive Officer at 587-3826.

Thank you for the opportunity to comment.

Sincerely,

Mufi Hannemann
Mufi Hannemann

Enclosure
cc: Mr. Bert Kuitoka
Mr. Kenneth Ishizaki

Mr. Mufi Hannemann
Department of Business, Economic
Development and Tourism
State of Hawaii
P. O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Hannemann:

Subject: Your Letter of April 21, 1993 Regarding the Environmental Assessment for the Board of Water Supply's Proposed Kailua 272' Reservoir, TMK: 4-2-03: 16, Portion 9 and 17

Thank you for your letter and for providing comments from the State Land Use Commission regarding our proposed reservoir project in Kailua.

We note that a portion of the project is within the "G" subzone of the Conservation District of which facilities are a permitted use. We will be filing a Conservation District Use Application (CDUA) with the Office of Conservation and Environmental Affairs.

The environmental assessment's State Land Use District Boundary Map, Figure 6, will be coordinated with the State Land Use Commission's official map.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

✓cc: Engineering Concepts, Inc.

NEW HAWAII
GOVERNOR

ED OF
HAWAII

5-22-93

CHARLES T. TOGUCHI
SUPERINTENDENT

931071



STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2149
HONOLULU, HAWAII 96844

OFFICE OF THE SUPERINTENDENT

April 19, 1993

Mr. Kazu Hayashida -2- April 19, 1993

Traffic in the area will also be a concern during construction. With heavy equipment being used and accessibility to the project site limited, traffic congestion in the neighborhood will have an impact on the students attending Kailua High School during the morning and afterschool hours. Steps should be taken so traffic congestion is minimized during the opening and closing of school.

Should there be any questions, please call the Facilities Branch at 737-4743.

Sincerely,

Charles T. Toguchi
Charles T. Toguchi
Superintendent

CTT:hy

cc: A. Suga, Asst. Supt.
J. Sosa, WDO

PE

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

Dear Mr. Hayashida:

SUBJECT: Environmental Assessment
Kailua "272" Reservoir
Kailua, Oahu, Hawaii
THKI 4-2-93: 16, pgs. 9 and 17

Our review of the subject assessment indicates that the proposed reservoir may have a severe impact on nearby Kailua High School during the construction phase. Traffic, noise, and dust during the construction of the reservoir are major concerns to the Department of Education (DOE).

The DOE will request that noise and dust mitigating measures be implemented to minimize teaching and learning disruptions at the school. If noise and dust levels are beyond the standards set by the Department of Health, we will require the developer to provide and install air-conditioning units in classrooms which qualify during the construction period.

100-
100-
100-

Ⓟ

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

JOHN WAIHEE
GOVERNOR
STATE OF HAWAII



STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P. O. BOX 1978
HONOLULU, HAWAII 96813

April 23, 1993

Mr. Kazu Hayashida
City and County of Honolulu
Board of Water Supply
650 South Beretania Street
Honolulu, Hawaii 96813

Dear Mr. Hayashida:

Subject: Kailua 272' Reservoir - EA/EIS Preparation
Notice

Thank you for the opportunity to comment on the subject document. The Department of Hawaiian Home Lands has no comment regarding the proposed reservoir at this time.

However, we look forward to reviewing the subject EIS upon its completion.

Warmest aloha,

Hoaliku L. Drake
Hoaliku L. Drake, Chairman
Hawaiian Homes Commission

cc: Bert Kuioke, Board of Water Supply
Kenneth Ishizaki, Engineering Concepts, Inc.
Office of Environmental Quality Control

HLD:BH:CI:AA/1935L.12

931049

CD OF HAWAII

HOALIKU L. DRAKE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

PL

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



COPY

July 7, 1993

Mr. Hoaliku L. Drake, Chairman
Department of Hawaiian Home Lands
State of Hawaii
P. O. Box 1879
Honolulu, Hawaii 96805

Dear Mr. Drake:

Subject: Your Letter of April 23, 1993 Regarding the Environmental Assessment
for the Board of Water Supply's Proposed Kailua 272' Reservoir,
TMK: 4-2-03: 16, Portion 9 and 17

Thank you for your letter regarding our proposed reservoir project in Kailua.

We note that our project will have no effect on the responsibilities of your department. We will be forwarding our draft environmental impact statement for your review when it becomes available.

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

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: ✓ Engineering Concepts, Inc.



STATE OF HAWAII
DEPARTMENT OF HEALTH

P. O. BOX 3378
HONOLULU, HAWAII 96801

May 28, 1993

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

IN REPLY, PLEASE REFER ME:

93-111/epo

RECEIVED

JUN 4 1993

ENGINEERING CONCEPTS

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

Dear Mr. Hayashida:

Subject: Request for Comments
Environmental Assessment
Kaliua 272' Reservoir
Kaliua, Oahu, Hawaii
TMK: 4-2-03: 16 por. 9 & 17

Thank you for allowing us to review and comment on the subject project. We have the following comments to offer at this time.

Noise & Radiation

1. Activities associated with the construction phase of the project must comply with the provisions of Chapter 43, Community Noise Control for Oahu.
 - a. The contractor must obtain a noise permit since the noise level from the construction activities are expected to exceed the allowable levels of the regulations.
 - b. Construction equipment and on-site vehicles requiring an exhaust of gas or air must be equipped with mufflers.
 - c. The contractor must comply with the conditional use of the permits as specified in the regulations and conditions issued with the permit.
2. Heavy vehicles travelling to and from the project site must comply with the provisions of Title II, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.

If you should have any questions on this matter, please call Mr. Jerry Haruno, Environmental Health Program Manager, Noise and Radiation Branch at 586-4701.

Mr. Kazu Hayashida
May 28, 1993
Page 2

Nonpoint Source Pollution

During the construction phase of the project, the following measures should be considered in addition to those required by the County Grading Ordinance, Erosion and Sediment Control Plan:

1. Conduct grubbing and grading activities during the low rainfall months (April - October).
2. Replant or cover bare areas as soon as grading is completed. New plantings will require soil amendments, fertilizers, and temporary irrigation to become established. Use high seeding rates to ensure rapid stand establishment.

An area approximately 50 feet deep and covering an acre will be excavated to bring the elevation of the reservoir base pad down to its desired level. Loosened and excavated soil should be disposed of properly and promptly to avoid erosion and sedimentation of the neighboring residential and preservation area.

The following measures should be considered in areas where the proposed reservoir access road runs up and down the slope.

1. Grade roads to prevent stormwater runoff.
2. Install and maintain swales or waterways along the side of the access road to provide a non-erosive outlet for stormwater runoff.

If you should have any questions on this matter, please contact Ms. Shirley Nakamura of the Environmental Planning Office at 586-4337.

Very truly yours,

John C. Lewin

JOHN C. LEWIN, M.D.
Director of Health

c: Board of Water Supply
Engineering Concepts Inc.
Noise & Radiation Branch
Environmental Planning Office

12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



COPY

July 7, 1993

RECEIVED

John C. Lewin, M. D.
Director
Department of Health
State of Hawaii
P. O. Box 3378
Honolulu, Hawaii 96801

JUL 8 1993
ENGINEERING CONCEPTS

Dear Dr. Lewin:

Subject: Your Letter of May 28, 1993 Regarding the Environmental Assessment for the Board of Water Supply's Proposed Kailua 272 Reservoir. TMK: 4-2-03: 16, Por. 9 and 17

Thank you for your letter regarding our proposed reservoir project in Kailua. We have the following response to your concerns:

1. The construction contractor will be required to obtain a Noise Permit in compliance with the provisions of Chapter 43, Community Noise Control. All equipment and vehicles requiring an exhaust of gas or air will be equipped with mufflers.
2. Heavy vehicles travelling to and from the project site will comply to Chapter 11-42, Vehicular Noise Control.
3. An Erosion Control Plan addressing stormwater runoff from a construction activity will be submitted to the Department of Public Works for their review and approval. Structural and non-structural controls and other best management practices will be provided to retain silt-laden stormwater runoff on site. All graded areas will be grassed as soon as possible. A new drainage system will be installed along the access roadways to adequately accommodate stormwater runoff.

We also note that the total construction area is under five acres and therefore, a National Pollutant Discharge Elimination System (NPDES) General Permit for stormwater runoff from a construction activity is not required. We will be submitting a hydrotesting NPDES application for your review and approval prior to the flushing and chlorination activity.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: ✓ Engineering Concepts, Inc.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



COPY

July 7, 1993

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

Dear Mr. Ahue:

Subject: Your Letter of May 7, 1993 Regarding the Environmental Assessment
for the Board of Water Supply's Proposed Kailua 272' Reservoir,
TMK: 4-2-03: 16, Portion 9 and 17

Thank you for your letter regarding our proposed reservoir project in Kailua.

We note that a portion of the project is within the "C" subzone of the Conservation District where water facilities are a permitted use. We will be filing a Conservation District Use Application (CDUA) for your review and approval prior to construction.

We are coordinating the environmental assessment's State Land Use District Boundary Map, Figure 6, with the State Land Use Commission official map.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

JOHN WARRIS
GOVERNOR
ED OF HONOLULU

APR 23 10 57 AM '93



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
885 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

APR 27 1993

9331093

REX D. JOHNSON
DIRECTOR
DEPUTY DIRECTORS
JOYCE T. OLSON
AL PANG
JEANNE K. BOHARTZ
CALVIN ALTRUDA
IN REPLY REFER TO:

RHY-PS
2.6543

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



COPY

July 7, 1993

PS

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

Dear Mr. Hayashida:

Environmental Assessment
Kailua "272" Reservoir, Kailua, Oahu
THK: 4-2-03:16, por. 9 and 17

Thank you for the opportunity to review the subject document.
The proposed Kailua reservoir will not affect our State highway facilities.

Sincerely,

[Signature]
Rex D. Johnson
Director of Transportation

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

Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843
Attn: Mr. Bert Kuioka

Engineering Concepts, Inc.
250 Ward Avenue, Suite 206
Honolulu, Hawaii 96814
Attn: Mr. Kenneth Ishizaki

Mr. Rex Johnson, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Johnson:

Subject: Your Letter of April 27, 1993 Regarding the Environmental Assessment
for the Board of Water Supply's Proposed Kailua 272' Reservoir,
THK: 4-2-03:16, Portion 9 and 17

Thank you for your letter regarding our proposed reservoir project in Kailua.
We understand it will not affect the State highway facilities in the vicinity.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

COPY



BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

July 7, 1993

04 7/14 931258
JOSEPH K. CONANT
EXECUTIVE DIRECTOR



RECEIVED
BO OF WATER SUPPLY
MAY 14 11 23 AM '93

STATE OF HAWAII
DEPARTMENT OF BUDGET AND FINANCE
HOUSING FINANCE AND DEVELOPMENT CORPORATION
677 QUEEN STREET, SUITE 300
HONOLULU, HAWAII 96813
FAX (808) 521-9468

IN REPLY REFER TO:
93:RPE/2220

May 10, 1993

Mr. Kazu Hayashida
Board of Water Supply
City & County of Honolulu
630 S. Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Hayashida:

Re: Environmental Assessment for the Kailua "272" Reservoir
Thank you for the opportunity to review the subject report. We
have no comments to offer.

Sincerely,

Joseph K. Conant
JOSEPH K. CONANT
Executive Director

c: OEQC
Mr. Bert Kuiuoka, BWS
Mr. Kenneth Ishizaki, Engineering Concepts

Mr. Joseph K. Conant
Executive Director
Department of Budget
and Finance
Housing Finance and
Development Corporation
State of Hawaii
677 Queen Street, Suite 300
Honolulu, Hawaii 96813

Dear Mr. Conant:

Subject: Your Letter of May 10, 1993 Regarding the Environmental Assessment
for the Board of Water Supply's Proposed Kailua 272' Reservoir,
TMK: 4-2-93: 16, Portion 9 and 17

Thank you for your letter regarding our proposed reservoir project in Kailua.

We note that our project will have no affect on the responsibilities of your department.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

✓cc: Engineering Concepts, Inc.

04 7/14 931258

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY



July 7, 1993

PB 93-403

April 15, 1993

Office of Environmental Quality Control
220 South King Street, 4th Floor
Honolulu, Hawaii 96813

Gentlemen:

Subject: Kailua #272nd Reservoir
Environmental Assessment

We have reviewed subject environmental assessment and have no comments to offer. Thank you for allowing us to review the document.

Very truly yours,

HERBERT K. MURAOKA
Director and Building Superintendent

CN:jo
cc: J. Harada
Bd. of Water Supply
(Bert Kuioka)
Engineering Concepts, Inc.
(Kenneth Ishizaki)

TO: HERBERT K. MURAOKA, DIRECTOR
BUILDING DEPARTMENT

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

SUBJECT: YOUR LETTER TO THE OFFICE OF ENVIRONMENTAL QUALITY CONTROL DATED APRIL 15, 1993 REGARDING THE ENVIRONMENTAL ASSESSMENT FOR THE BOARD OF WATER SUPPLY'S PROPOSED KAILUA 272nd RESERVOIR. TMK: 4-2-03: 16, PORTION 9 AND 17

Thank you for providing comments on our proposed reservoir project in Kailua.

We note you have no comments to offer at this time. Our consultant will be submitting a building permit application for your review and approval prior to initiating any construction.

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

cc: Engineering Concepts, Inc.

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CITY AND COUNTY OF HONOLULU
FIRE DEPARTMENT
3319 KOPAKA STREET, SUITE 403
HONOLULU, HAWAII 96819-1189

931066



CD OF
DONALD M. CHANG
FIRE CHIEF
RECEIVED SETO-MORRIS
4/21/93

April 21, 1993

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

FROM: DONALD S. M. CHANG, FIRE CHIEF

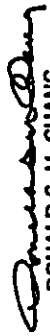
SUBJECT: KAILUA "272" RESERVOIR
KAILUA, OAHU, HAWAII
TAX MAP KEY: 4-2-03:06. FOR. 9 AND 17

We have reviewed the application for the above subject request and have no objections to the proposal.

Should you have any questions, please call Assistant Chief Attilio Leonard of our Administrative Services Bureau at 831-7775.

AKL:ny

Copy to: Engineering Concepts, Inc.
Attn: Kenneth Ishizaki


DONALD S. M. CHANG
Fire Chief

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



COPY

July 7, 1993

TO: DONALD M. CHANG, FIRE CHIEF
FIRE DEPARTMENT

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

SUBJECT: YOUR MEMORANDUM DATED APRIL 21, 1993 REGARDING THE ENVIRONMENTAL ASSESSMENT FOR THE BOARD OF WATER SUPPLY'S PROPOSED KAILUA 272 RESERVOIR. TMK: 4-2-03: 16, FOR. 9 AND 17

Thank you for providing comments on our proposed reservoir project in Kailua.

We note you have no comments at this time.

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

✓cc: Engineering Concepts, Inc.

RECEIVED BOARD OF WATER SUPPLY JUL 13 1993

PLANNING DEPARTMENT
CITY AND COUNTY OF HONOLULU

530 SOUTH KING STREET
HONOLULU HAWAII 96813



FRANK FARI
MAYOR

931498

MAY 11 10 57 AM '93

ADMINISTRATIVE
CHIEF PLANNING OFFICER
ROLAND D. LIBBY, JR.
DEPARTMENT OF PLANNING OFFICE
RM 4/93-967

May 6, 1993

MEMORANDUM

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

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

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR THE
KAILUA "272" RESERVOIR
TAX MAP KEY 4-2-03: 16, POR. 9 AND 17

In response to your request, we have the following comments on the Environmental Assessment for the Kailua "272" Reservoir:

1. The subject site is designated for Preservation on the Development Plan Land Use Map for Koolauopoko.
 2. The proposal is consistent with the Koolauopoko Development Plan Public Facilities Map which was recently amended by Ordinance 92-14 to establish a Water Reservoir Modification symbol, site determined, within six years.
 3. The Koolauopoko Development Plan Special Provisions identifies Puu O Ehu as an important scenic resource which should be preserved and enhanced.
- Therefore, the design of the reservoir should not impose visually on the Puu O Ehu ridgeline. Alternatives such as placing portions of the structure underground and/or use of berms should be considered.

Kazu Hayashida, Manager and Chief Engineer
Board of Water Supply
May 6, 1993
Page 2

Thank you for the opportunity to comment on this matter. Should you have any questions, please contact Mai Murakami of our staff at 527-6020.

Roland D. Libby
ROLAND D. LIBBY, JR.
Acting Chief Planning Officer

RDL:js

cc: Office of Environmental Quality Control
Engineeri.g Concepts, Inc.

MAY 11 10 57 AM '93
PLANNING BRANCH

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10/24/93

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

932390

AUG 23 11:11 AM '93



ROBIN FOSTER
CHIEF PLANNING OFFICER
ROLAND D. LIBBY, JR.
DEPUTY CHIEF PLANNING OFFICER
LW 7/93-1656

August 23, 1993

Dog
AUG 23 1993 *RF*

Kazu Hayashida, Manager and Chief Engineer
Board of Water Supply
August 23, 1993
Page 2

We will call you to follow up on this request. Should you have any questions, please contact Lin Hong of our staff at 4485.

RF
ROBIN FOSTER
Chief Planning Officer

RF:js

MEMORANDUM

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

FROM: ROBIN FOSTER, CHIEF PLANNING OFFICER
PLANNING DEPARTMENT

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED KAILUA 272' RESERVOIR. TAX MAP KEY: 4-2-03: 16. PORTION 9 AND 17

In response to your memorandum of July 8, 1993, we wish to reiterate our concern over the proposed project's visual impact on Puu O Ehu.

Puu O Ehu is identified in the City's Development Plan Special Provisions for Koolaupoko, Section 24-6.2(2)(1) as an important scenic resource which should be preserved and enhanced.

The identification of views of the ridge from the Kaelepulu Pond area should not be construed to mean that views of the landmark from the Pali Highway and Kailua Town or any other public place are less important. The Common Provisions relating to Public Views, Section 24-1.4(1), state that all the "design and siting of all structures shall reflect the need to maintain and enhance available views of significant landmarks." The Common Provisions relating to Open Space, Section 24-1.4(b) also requires that high priority be given to the preservation and enhancement of our scenic resources.

Assuming that the reservoir will be sited high on the hillside, we recommend that it not be silhouetted above the ridgeline and instead be screened from public view and/or be painted a color to blend into the hillside.

We would very much appreciate the opportunity to review the approach you intend to pursue in addressing aesthetic impacts prior to issuing the draft EIS.

D



9207

COPY

RECEIVED

OCT 15 1993

ENGINEERING CONCEPTS

October 13, 1993

TO: ROBIN FOSTER, CHIEF PLANNING OFFICER
PLANNING DEPARTMENT

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

SUBJECT: YOUR MEMORANDUM OF AUGUST 23, 1993 REGARDING THE BOARD OF
WATER SUPPLY'S KAILUA 272-FOOT RESERVOIR PROJECT; TMK: 4-2-03: 16,
PORTION 9 AND 17

Thank you for your additional comments to our environmental assessment for the proposed reservoir project.

We understand the Koolauopoko Development Plan Special Provisions identifies Puu O Ehu as an important scenic resource which should be preserved and enhanced. Visual impact from all view angles including Pali Highway and Kailua Town, as well as Kaelepulu Pond, will be thoroughly addressed in the Draft Environmental Impact Statement (DEIS) which will be submitted for your review and approval.

The reservoir's visual impact will be minimized as much as possible. This is being achieved by limiting the 4.0 million gallon reservoir's height to 22 feet, painted earth tones to blend in with the existing hillside and landscaped with drought tolerant plants to further screen the reservoir from all view angles.

We are presently finalizing the DEIS for issuance and attach a visual impact analysis. We welcome any input from your staff to further mitigate adverse visual impacts.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

Attachment

cc: Engineering Concepts, Inc.

RECEIVED OCT 15 1993

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
450 SOUTH KING STREET, 5TH FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 933-4437 • FAX: (808) 937-4488

BY
930995
PE

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

July 7, 1993



E. JAMES TURSE
DIRECTOR
DIA LA HATO
DEPUTY DIRECTOR

April 16, 1993

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

Dear Mr. Hayashida:

Subject: Kailua "272" Reservoir

The Department has reviewed the subject Environmental Assessment and the development does not conflict with any current or proposed City project. The Department does not oppose the proposed project. We have no comments at this time.

Thank you for the opportunity to review and comment on the Environmental Assessment for the proposed project.

Sincerely,

Jim
E. JAMES TURSE
Director

cc: Engineering Concepts, Inc.

TO: E. JAMES TURSE, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

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

SUBJECT: YOUR MEMORANDUM DATED APRIL 16, 1993 REGARDING THE ENVIRONMENTAL ASSESSMENT FOR THE BOARD OF WATER SUPPLYS PROPOSED KAILUA 272' RESERVOIR. JMK: 4-2-03; 16, POR. 9 AND 17

Thank you for providing comments on our proposed reservoir project in Kailua.

We note that our project will not affect the responsibilities of your department.

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

cc: Engineering Concepts, Inc.

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DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
400 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 531-4132

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY



2891



FRANK F. FARI
MAYOR

DONALD A. CLEGG
DIRECTOR
LONETA K. C. CHEE
DEPUTY DIRECTOR

July 7, 1993

April 29, 1993

93-02490 (AC)

PE

MEMORANDUM

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

FROM: DONALD A. CLEGG, DIRECTOR

TO: DONALD A. CLEGG, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

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

SUBJECT: YOUR MEMORANDUM DATED APRIL 29, 1993 REGARDING THE ENVIRONMENTAL ASSESSMENT FOR THE BOARD OF WATER SUPPLY'S PROPOSED KAILUA 272' RESERVOIR, TMK: 4-2-03: 16, PORTION 9 AND 17

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA), KAILUA "272" RESERVOIR, KAILUA, OAHU, TMK: 4-2-03: 16, POR. 9 & 17

Thank you for allowing the Department of Land Utilization (DLU) the opportunity to review and comment on the above-referenced Environmental Assessment. The EA should include a section which describes the governmental permits required for construction. We have examined the list of figures and note that the proposed project may be within the Special Management Area (SMA). The EA should specifically state whether the project is within the SMA. an SHA permit will be required prior to construction.

Thank you for providing comments on our proposed reservoir project in Kailua.

The reservoir site is partially within the Special Management Area and therefore, a Special Management Area Permit will be required and submitted for your review and approval prior to any construction.

The draft environmental impact statement will include a listing of all governmental permits required for the project.

If you have any questions, please call Mr. Art Challacombe of our staff at 523-4107.

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

Donald Clegg
DONALD A. CLEGG
Director of Land Utilization

cc: Engineering Concepts, Inc.

DAC:ak
Glea-272".edc

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DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU 931077
385 SOUTH KING STREET
HONOLULU, HAWAII 96813

APR 28 11 39 AM '93



WALTER M. OZAWA
DIRECTOR
ALVIN C. CAU
DEPUTY DIRECTOR

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



COPY

July 7, 1993

April 26, 1993

APR 28 1993

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

FROM: WALTER M. OZAWA, DIRECTOR

SUBJECT: KAILUA "272" RESERVOIR
KAILUA, OAHU, HAWAII
TAX MAP KEY 4-2-03: 16, POR. 9 AND 17

TO: WALTER M. OZAWA, DIRECTOR
DEPARTMENT OF PARKS AND RECREATION

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

SUBJECT: YOUR MEMORANDUM DATED APRIL 26, 1993 REGARDING THE
ENVIRONMENTAL ASSESSMENT FOR THE BOARD OF WATER
SUPPLY'S PROPOSED KAILUA 272' RESERVOIR, TMK: 4-2-03: 16,
PORTION 9 AND 17

We have reviewed the environmental assessment for the subject project and have no comment to offer at the present time. Should you have any questions, please contact Lester Lai of our Advance Planning Branch at extension 4696.

Thank you for providing comments on our proposed reservoir project in Kailua. If you have any questions, please contact Roy Doi at 527-5235.

[Signature]

For WALTER M. OZAWA, Director

WHO:ei
cc: Office of Environmental Quality Control
Board of Water Supply (Bert Kufoka)
Engineering Concepts, Inc. (Kenneth Ishizaki)

cc: Engineering Concepts, Inc.

We Add Quality to Life

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DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
930950
RECEIVED
BD OF WATER SUPPLY
HONOLULU, HAWAII 96813
APR 14 3 10 PM '93



C. MICHAEL STREET
DIRECTOR AND CHIEF ENGINEER
FELDER LIMITED
DEPUTY DIRECTOR
ENV 93-89

April 13, 1993

MEMORANDUM

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

FROM: C. MICHAEL STREET, DIRECTOR AND CHIEF ENGINEER

SUBJECT: ENVIRONMENTAL ASSESSMENT (EA)
KAILUA "272" RESERVOIR
TMK: 4-2-03:16, POR. 9 AND 17

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

1. We have no objection to the proposed project.
 2. The EA should address the potential impact on storm water discharge associated with construction activities on water quality of the receiving waters.
 3. The EA should also state what structural or non-structural best management practices (BMP) will be provided to control and reduce the discharge of pollutants resulting from the construction operation.
 4. If hydrotesting of pipe is involved, a permit from the State Department of Health will be required.
- Should you have any questions, please contact Mr. Alex Ho, Environmental Engineer, at 523-4150.

C. Michael Street
C. MICHAEL STREET
Director and Chief Engineer

cc: Office of Environmental Quality Control
Board of Water Supply (Bert Kuiuoka)
Engineering Concepts, Inc. (Kenneth Ishizaki)

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

July 9, 1993



TO: C. MICHAEL STREET, DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

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

SUBJECT: YOUR MEMORANDUM DATED APRIL 13, 1993 REGARDING THE
ENVIRONMENTAL ASSESSMENT FOR THE BOARD OF WATER SUPPLYS
PROPOSED KAILUA 272' RESERVOIR. TMK: 4-2-03: 16, POR. 9 AND 17

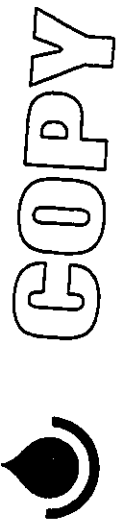
Thank you for providing comments on our proposed reservoir project in Kailua. We have the following response to your concerns:

1. The potential impact of storm water discharges associated with construction activity on State receiving waters as well as structural and nonstructural best management practices (BMP) will be addressed in the draft environmental impact statement.
2. An Erosion Control Plan will be submitted indicating BMP measures to retain silt-laden storm water runoff on the project site. The total project area is less than five acres, therefore, a National Pollutant Discharge Elimination System (NPDES) general permit for storm water runoff is not required.
3. We plan to install a new drainage system along the existing private roadway across Kailua Road and utilizing an existing head wall into Kawaiui Marsh. A permit to connect to the municipal storm sewer system as well as a permit to discharge effluent for our hydrotesting activity into the storm sewer will be required.

If you have any questions, please contact Roy Doi at 527-5235.
/cc: Engineering Concepts, Inc.

KANEHOHE RANCH 930975
The Estates of Harold KREGENBERG and Alice H. Castle
BOARD OF WATER SUPPLY
Apr 16 9 45 AM '93
Castle Junction
1199 Auloa Road
Kailua, Hawaii 96734-4606
Telephone (808) 266-1100

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



Mr. Kazu Hayashida
Board of Water Supply
610 South Beretania Street
Honolulu, HI 96843

April 14, 1993

Dear Mr. Hayashida,

Subject: Environmental Assessment for proposed Kailua "272" reservoir
TMK: 4-2-3-16, por. 9 and 17

Thank you for sending us for our review a copy of the environmental assessment prepared for the proposed Kailua "272" reservoir on Puu o Ehu ridge. The Castle Trustees are the fee owner of the parcel identified as TMK 4-2-3-17.

The Castle Trustees have proposed the development of a retirement community and a community center on the lower portion of their property, between Puu o Ehu ridge and Kawainui Stream. We ask that the impact of the proposed reservoir on the Castles' proposed development be evaluated in the environmental impact statement that will be prepared for the proposed reservoir.

The Castle Trustees have agreed to donate to Ducks Unlimited, Inc., a wetlands preservation group, approximately 22 acres of wetland at the makai base of Puu o Ehu ridge. We encourage you to include Ducks Unlimited in the list of organizations you plan to contact during the preparation of the environmental impact statement. Ducks Unlimited's contact person and mailing address are:

Mr. Andrew Engilis, Jr., project biologist
Ducks Unlimited, Inc.
Western Regional Office
9823 Old Winery Place, Suite 16
Sacramento, CA 95827

Sincerely yours,

Randolph G. Moore
Randolph G. Moore

copies to:
Mr. Ben Kuida, BWS
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.
Office of Environmental Quality Control

July 8, 1993

Mr. Randolph G. Moore
Kaneohe Ranch
1199 Auloa Road
Kailua, Hawaii 96734-4606

Dear Mr. Moore:

Subject: Your Letter of April 14, 1993, Regarding the Environmental Assessment for the Board of Water Supply's Proposed Kailua 272' Reservoir, TMK: 4-2-03-16, Por. 9 and 17

Thank you for your letter regarding our proposed reservoir project in Kailua. The impact of our reservoir project on Castle's Kailua Gateway development will be addressed in our Draft Environmental Impact Statement (EIS). We do not anticipate a significant impact because we are installing a drainage system to accommodate all drainage toward Kawainui Marsh. Therefore, the flowage easement through the Kailua Gateway development will not be necessary.

We have included Ducks Unlimited, Inc. in the EIS consultation process. If you have any questions, please contact Roy Doi at 527-5235.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

931189

MR. & MRS. RICHARD RIEGELS
1005-B Kailua Road
Kailua, Hawaii 96734
(808) 261-7678

Mr. Kazu Hayashita
May 7, 1993

May 7, 1993

Mr. Kazu Hayashita
Board of Water Supply
630 S. Beretania Street
Honolulu, HI 96843

Subject: Kailua "272" Reservoir

Gentlemen,

We are writing in regard to the Board of Water Supply's proposal to construct a new four million gallon reservoir in Kailua and the Environmental Assessment recently prepared for it. We are residents of the Old Kukanono Community Association through which all construction traffic generated by the project will pass. We would like to preface our remarks by saying that, in concept, we are not opposed to this project. However, we have specific concerns about the short and long term implications of the project to our community, including its effect on existing roadways and drainage systems and neighborhood safety and security. We believe that if the Board of Water Supply continues to demonstrate its commitment to participatory planning and follow through, the truly significant impacts that this project will place upon our small community can be managed and resolved to all parties' best interest.

Background

Currently, the Board of Water Supply (BWS) has an abandon reservoir site located on Puu o Ehu ridge, just mauka of the Kailua town center. This site is accessed along an easement that runs along a portion of an existing roadway that serves the nine lots that form the "Old Kukanono Community Association" (OKCA). OKCA owns and is responsible for the maintenance of the roadway and the storm drain ditch which are located within the 30' right-of-way.

BWS has approached Mr. Michael Gorelangton and the Kapaa Trust with the proposal that it purchase that portion of Puu o Ehu Ridge immediately southeast of its abandon reservoir site for the construction of the new 4 million gallon storage structure. The new reservoir would be approached via the existing access easement across OKCA property. Construction of the new reservoir will require the excavation of the top 50' of the ridge. This means that

over 100,000 CY of rock and soil (approximately 5,000 truck loads of material) must be blasted, loaded and hauled from the site. The new reservoir will be constructed of reinforced concrete. Construction will require the placement of nearly a thousand yards of concrete as well as the placement of hundreds of yards of granular materials for reservoir slab cushion and roadway base. Obviously, during the two year construction phase, there will be many thousands of trips made by heavy trucks up and down our community's only access road.

Existing Roadway

As indicated previously, OKCA owns and is responsible for the maintenance of the roadway and the adjacent drainage ditch. The OKCA roadway system was built many years ago. It is obvious that the existing roadway was not built to current City and County standards. The roadway is very steep. The portion of the roadway which will be used by BWS for construction access has inclines ranging from 13% to 25%. The roadway is very narrow. The portion of the roadway which will be used by BWS for construction access is 16' wide (or less) and maintains an unguarded 18"-24" deep drainage ditch along one shoulder. The roadway section can only be guessed at but recent construction use has severely distressed the surface of the roadway. Visual inspection shows a large number of cracks in the roadway surface which are the result of softness of the roadbed and lateral movement of the roadbed toward the roadway shoulders.

The BWS Development Plan

Through discussions with BWS staff and the design consultants on this project, we have been told that construction of the reservoir is expected to take two years. During this time, we will be asked to accommodate the disruption caused by construction of the reservoir as well as the construction of a new large diameter water line down our right-of-way.

As we understand them, current plans call for little in the way of temporary or permanent improvements to the present roadway prior to the start of construction. The one exception to this is the need to relocate an existing internal intersection so that it would cut across the corner of Lot 19. This would be done so that large trucks would have adequate turning room to negotiate a 110° switchback on their way to the top of the ridge. Obviously, the roadway may need to be temporarily widened or relocated to permit safe truck access as well as to permit the construction of the new 24" water line. We have not seen anything from BWS that would indicate how this work would be accomplished.

11 7 56 AM '93
P. S. BERETANIA STREET

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RECEIVED MAY 11 1993 11 56 AM '93

Mr. Kazu Hayashita
May 7, 1993

Once the reservoir is completed, BWS indicated that they will repair the roadway as required and that the BWS's portion of the new access road would have a chain across it to prevent unauthorized use and access. BWS indicated that, upon completion, traffic to the reservoir would be minimal (1-2 vehicles per week).

Concerns and Recommendations

1. Our roadway is used daily by families commuting to work and to school, by visitors to the Gorelangton stables, and by mail, emergency and delivery vehicles. Since this is our only means of approach to our homes, we must have guaranteed 24 hr. unimpaired access along this road throughout the course of construction. We recommend that all temporary roadway and drainage improvements or rerouting be completed prior to start of construction.
2. During the recent construction of a new home on Lot 14, several small trucks lost their brakes coming down the access road and plunged into the halakoa underbrush. Fortunately, the undergrowth brought them to a stop before they did significant property damage. We are concerned with what would happen if a fully loaded semi, weighing approximately 75,000 lbs., were to lose its brakes while coming down the access road. We doubt that even a house would be able to slow its progress down the steep slopes of our neighborhood. We don't have an answer for this except to demand that everyone on the job prepare and follow detailed safety plans, conduct frequent vehicle inspections and employ vigilant and safety minded supervisors.
3. Storm drainage during construction will be a major problem. During BWS's preliminary site investigation, a pioneer road was cut to the proposed site. No berms, settling basins or silt control structures were constructed. As a result, a significant amount of silt was carried down the access road and into our drainage system. Hopefully, BWS and its contractors will adhere to the new State of Hawaii NPDES permit requirements for new construction.

Storm drainage after completion of the reservoir is of an even greater concern. The new structure and roadway will increase the storm water load that will have to be handled by our private drainage system. Preliminary BWS plans show that storm drainage from the new access road extension will be channeled down the middle of the existing access road (this will require reconstruction of this portion of the road) and from there into the existing open ditch system. Currently, under heavy storm conditions, the existing ditch system is barely adequate to handle the flows. We recommend that BWS include a piped drainage system into its plans so that storm waters generated by the new project do not impact our system.

Mr. Kazu Hayashita
May 7, 1993

4. Roadway improvements are perceived as a double edged sword. We like the rural nature of our existing narrow roadway. However, we realize that if we are to maintain unimpeded access during construction, the roadway may have to be temporarily widened. Once widened, we will have lost a great deal of the rural charm of our community. Upon completion of construction, we recommend that the roadway be reconstructed in its original location and the roadway shoulders be regraded and grassed.

5. We have all the normal concerns regarding noise, dust and vibration. We recommend that all State Department of Health regulations concerning these nuisances be followed. Roadways should be kept clean, trucks tarped and cleaned prior to moving on to the roadway system, etc. Blasting, if permitted, must be performed safely so that our homes are not damaged by vibration or by flying rock and debris.

6. Our neighborhood is quite a distance away from the nearest fire hydrants (on Kailua Road and on the grounds of Kailua High School). In addition, our community has had a rash of failures of the old galvanized steel water supply line serving our homes. This was accentuated during the home construction period when heavily loaded ready mix trucks broke the line at least four times over a six month period. Since we do not have a dependable source for domestic and emergency water, we recommend that BWS consider the installation of a new water distribution system within the neighborhood as well as installing one or more fire hydrants in conjunction with the construction of the new 24" supply main.

7. Finally, our community occasionally encounters problems with the illegal use of the abandon BWS reservoir site by young adults for late night parties. We recommend that BWS work closely with the community to develop a viable means of controlling access to the reservoir site. This will become especially important since the new reservoir will be highly visible to the surrounding community. The expedient solution of a chain across the roadway will not work. We would also like to discuss with you your plans for the demolition of the existing reservoir structure and the disposition of your unused land.

We would like to thank your staff for their honest efforts in helping us understand this project and its implications to our community.

Sincerely,



Richard B. Riegels



COPY



COPY

July 13, 1993

Mr. Richard B. Riegels
Old Kukanono Community Association
1005-B Kailua Road
Kailua, Hawaii 96734

Dear Mr. Riegels:

Subject: Your Letter of May 7, 1993 Regarding the Environmental Assessment for the Board of Water Supply's Proposed Kailua 272 Reservoir, TMK: 4-2-03: 16, Por. 9 and 17

Thank you for your well prepared and informative letter regarding our proposed reservoir project in Kailua. We have the following response to your concerns:

1. The construction contractor will be required to maintain continuous roadway access throughout the construction period.
2. We will forward your concerns regarding vehicular safety to the contractor and require that all necessary precautions be taken. They will also be required to comply with the safety standards of the Division of Safety and Health.
3. Erosion control measures to minimize storm water runoff from the construction activity will be addressed in detail when the Grading and Erosion Control Plans are submitted to the Department of Public Works. If applicable, National Pollutant Discharge Elimination System (NPDES) requirements will be followed. Long term storm water runoff will be handled by catch basins on a new drain line along the private roadway sized to accommodate additional flows caused by the reservoir project.
4. Damage to the existing roadways due to vehicular traffic and the installation of the water and drain facilities are unavoidable; however, the roadways will be resurfaced and the shoulder areas restored (regraded and grassed) close to their original condition to maintain the rural nature of the area.
5. The contractor will comply with all regulations regarding noise, dust and vibration due to blasting.

Mr. Richard Riegels
Page 2
July 13, 1993

6. Fire hydrants will be provided at standard intervals along the 24-inch main route according to BWS fire protection standards. A 4-inch distribution main will be installed along the transmission main alignment replacing the existing galvanized piping. We suggest that any adjacent homeowners coordinate any transfer of water services while the project is in the design phase to ensure timely installation prior to roadway repaving.

7. We acknowledge your problems of illegal access to our abandoned reservoir site. We plan to demolish the abandoned 275'-0.3 million gallon concrete reservoir as part of this project. Our standard procedure is to install a chain across the entrance of our access roadway and enclose the entire reservoir site with a 6-foot high chain link fence topped with barbed wire and a locked entrance gate. We are open to further discussions regarding access controls to the reservoir site; the demolition of the existing reservoir; and the disposition of the land.

Prior to construction, our construction inspector will meet with your community as our liaison to whom any additional concerns can be addressed. Thank you for your patience in accommodating our reservoir project. We will do our best to minimize any inconveniences to your community during the construction of our reservoir.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: ✓ Engineering Concepts, Inc.

1005-B KAILUA ROAD, KAILUA, HAWAII 96734

APPENDIX B

COMMENTS AND RESPONSES TO THE DRAFT EIS

ENGINEERING DIVISION

TEL No. 808-527-6195

Jun 7, 94 14:08 No. 008 P. 02

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BO OF WATER SUPPLY

941414

United States
Department of
Agriculture

Soil
Conservation Service
May 31 1994

P. O. Box 50004
Honolulu, HI
96850-0001

May 24, 1994

PE

Mr. Kazu Hayashida, Manager
BOARD OF WATER SUPPLY
City and County of Honolulu
630 South Beretania
Honolulu, Hawaii 96850

Dear Mr. Hayashida:

Subject: Draft Environmental Impact Statement for the Proposed
Kahe 272 Reservoir, TMK: 4-2-03:16 per. 9 & 17, Koolaupeke, Oahu

We have reviewed the Draft Environmental Impact Statement for the proposed reservoir project at Kahe, Oahu. We have no major resource concerns about this project. However, since the community continues to be aggressively concerned with water quality issues, we highly recommend that appropriate erosion control measures be installed and maintained during the construction of the access road and reservoir site. It is also important that appropriate vegetative measures be maintained after completion of construction activities by the contractor and monitored by the Board of Water Supply.

Thank you for the opportunity to provide comments on this proposal. Should you have any questions, please contact Mr. Michael C. Tsiang at (808) 541-2608 or Mr. Michael Bjorning at (808) 541-2605.

Sincerely,



KENNETH M. KANESHIRO
Acting State Conservationist

cc: Michael Bjorning, District Conservationist, Honolulu Field Office.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



COPY

December 7, 1994

Mr. Kenneth M. Kaneshiro, Chief
Soil Conservation Service
U. S. Department of Agriculture
P. O. Box 50004
Honolulu, Hawaii 96850-0001

Dear Mr. Kaneshiro:

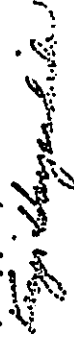
Subject: Your Letter of May 24, 1994 Regarding the Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's Proposed Kahe 272 Reservoir at Puu O Ehu, Keolu, Hawaii. TMK: 4-2-03: 16, Portions 9 and 17

Thank you for your letter regarding the DEIS for the proposed reservoir project.

The contractor will be required to take necessary precautions to minimize erosion during construction, including implementation of an Erosion Control Plan approved by the City and County of Honolulu, Department of Public Works. Once constructed, the Board of Water Supply will maintain the reservoir and its surroundings, including vegetation.

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

Very truly yours,



KAZU HAYASHIDA
Manager and Chief Engineer


cc: Engineering Concepts, Inc.

BT



DEPARTMENT OF THE NAVY
 COMMANDER
 NAVAL BASE PEARL HARBOR
 BOX 110
 PEARL HARBOR, HAWAII 96860-5020

BOARD OF WATER SUPPLY
 CITY AND COUNTY OF HONOLULU

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December 7, 1994

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 23 MAY 1994

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MAY 26 1994
 ENGINEERING CONCEPTS

Mr. Kazu Hayashida
 City and County of Honolulu
 Board of Water Supply
 630 South Beretania Street
 Honolulu, HI 96843


Dear Mr. Hayashida:

Subj: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE KAILUA
 272 RESERVOIR, KAILUA, OAHU, HAWAII

Thank you for the opportunity to review the Draft
 Environmental Impact Statement (DEIS) for the Kailua 272
 Reservoir, Kailua, Oahu, Hawaii.

The Navy has no comments to offer at this time and
 appreciates the opportunity to participate in your review process.

The Navy's point of contact is Mr. Stanford Yuen at
 474-0439.

Sincerely,

 W. D. CLAUSSEN
 Commander, CEO, U.S. Navy
 Deputy ACOS Facilities and Environment
 By direction of the Commander

Copy to:
 Mr. Barry Usagawa
 City and County of Honolulu
 Board of Water Supply
 630 South Beretania Street
 Honolulu, HI 96843

Mr. Kenneth Ishizaki
 Engineering Concepts, Inc.
 250 Ward Avenue, Suite 206
 Honolulu, HI 96814

Commander M. D. Clausen
 Naval Base Pearl Harbor
 Department of the Navy
 P. O. Box 110
 Pearl Harbor, Hawaii 96860-5020

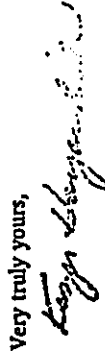
Dear Commander Clausen:

Subject: Your Letter of May 23, 1994 Regarding the Draft Environmental Impact
 Statement (DEIS) for the Board of Water Supply's Proposed Kailua 272
 Reservoir at Puu O Ehu, Kailua, Hawaii. TMK: 4-2-03: 16, Portions 9 and 17

Thank you for your letter regarding the DEIS for the proposed reservoir project. We
 appreciate your efforts in reviewing the document.

We acknowledge that you have no comments to offer at this time.

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

Very truly yours,


KAZU HAYASHIDA
 Manager and Chief Engineer

cc: Engineering Concepts, Inc.



United States Department of the Interior

U.S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
677 Ala Moana Blvd., Suite 415
Honolulu, Hawaii 96813

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MAY 4 1994

ENGINEERING CONCEPTS

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



COPY

May 3, 1994

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

Dear Mr. Hayashida:

Subject: Kailua 272 Reservoir, Draft Environmental Impact
Statement (DEIS), Kailua, Oahu, Hawaii

We are in receipt of the subject DEIS. We have reviewed the subject DEIS and
we have no concerns at this time.

Thank you for allowing us to review this DEIS.

We are returning the DEIS to your office for your future use.

Sincerely,

William Meyer
William Meyer
District Chief

Enclosure

cc: Mr. Barry Usagawa
City and County of Honolulu
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Mr. Kenneth Ishizaki
Engineering Concepts, Inc.
250 Ward Avenue, Suite 206
Honolulu, Hawaii 96814

December 7, 1994

Mr. William Meyer, District Chief
Water Resources Division
U. S. Geological Survey
677 Ala Moana Boulevard, Suite 415
Honolulu, Hawaii 96813

Dear Mr. Meyer:

Subject: Your Letter of May 3, 1994 Regarding the Draft Environmental Impact
Statement (DEIS) for the Board of Water Supply's Proposed Kailua 272
Reservoir at Puu O Ehu, Kailua, Hawaii. TMK: 4-2-03:16, Portions 9 and 17

Thank you for your letter regarding the DEIS for the proposed reservoir project. We
appreciate your efforts in reviewing the document.

We acknowledge that you have no comments to offer at this time.

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

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

941900



HOUSE OF REPRESENTATIVES
THE SEVENTEENTH LEGISLATURE
STATE OF HAWAII
STATE CAPITOL
HONOLULU, HAWAII 96813

RECEIVED
OFFICE OF THE CLERK
JUL 19 10 09 AM '94

Joseph M. Souki
Honorable
Jackie Young
Honorable
Tom Ikaika
Honorable
Les Shalika, Jr.
Honorable
Peter K. Ayo

My
Dep
JUL 20 1994
JUL 25 1994 PE

- 14 - DWIGHT Y. TAKAMURE
- 24 - KEAY L. CHANG
- 34 - HARVEY S. TAJIRI
- 44 - ROBERT A. HELES
- 54 - YICHRUA ISRELL
- 64 - LARRY S. TAJIMOTO
- 74 - MICHAEL B. WHITE
- 84 - JOSEPH M. SOUKI
- 94 - RON NAKASONE
- 104 - DAVID MORIHARA
- 114 - AVERY B. CRUMBLEY
- 124 - PAULA IHRH-MORIKAWA
- 134 - EZRA B. KANOHU
- 144 - BERTHA C. KAWAKAWA
- 154 - DAVID D. STEGMAYER
- 164 - GENE WARD
- 174 - BARBARA MARUNOTO
- 184 - CALVIN K. Y. SAY
- 194 - LES SHALIKA, JR.
- 204 - DAVID M. HAGINO
- 214 - DUKE BANUKI
- 224 - MAZIE HIRIYONO
- 234 - BRIANT T. TANGUCHI
- 244 - JIM SHEN
- 254 - KENNETH T. HIRAKI
- 264 - ROD TALI
- 274 - SUZANNE N. J. CROW
- 284 - DENISE A. ABRAKAMI
- 294 - ERIQO S. ALCON
- 304 - ROMY M. CACHOLA
- 314 - NATHAN SUZUKI
- 324 - LENHARD J. PEPPER
- 334 - TOM OKASUURA
- 344 - DAVID Y. KEE
- 354 - NOKORU YONAMINE
- 364 - ROYAL TAKUINI
- 374 - JULIE R. DULDLAO
- 384 - SAM LEE
- 394 - RON HENOR
- 404 - ROBERT BURDA
- 414 - PAUL T. OSHIRO
- 424 - ANSELLE C. AMARAL
- 434 - HENRY HAALUJO PETERS
- 444 - PETER K. AYO
- 454 - ALEXANDER C. SANTIAGO
- 464 - D. LULUANI BEINE
- 474 - TERESA W. H. TOM
- 484 - MARSHALL K. KOE
- 494 - CYNTHIA THIELEN**
- 504 - DEVON A. T. NEKOBA
- 514 - JACKIE YOUNG

Minority Leader
Minority Floor Leader

July 16, 1994

Kazu Hayashida
Board of Water Supply
630 S. Beretania
Honolulu, HI 96813

Re: Comments on K 272 Reservoir Project, Kailua

Dear Mr. Hayashida:

Thank you for this opportunity to comment on the draft Environmental Impact Statement for K 272 Reservoir Project in Kailua.

I would like to raise the following concerns:

- 1) Is there a demonstrated need for the project? According to the draft, this 4 million gallon reservoir will bring the total capacity up to 10.3 million gallons. A current high use day by the resident of Kailua is estimated at 9.6 million gallons. How frequent are the high use days, and what is the need for fire fighting based on prior usage? Would a smaller project be more cost-effective and still serve our residents as well?
- 2) Will the concrete access road, the transmission lines, and the 185 foot reservoir negatively impact the aesthetics of Kailua's gateway? On a prominent ridgeline in Kailua that is visible from areas to the North, Northwest, and Southeast, will this reservoir noticeably interfere with the beauty of the area? If so, what steps are being taken to mitigate the impact?

3) What are the costs to the consumer and the taxpayer for this project, and is it cost-efficient? In my capacity as a Representative, I have received complaints of the increasing water

ills. Will this project add to this problem, and if it does, what will be the direct benefits to residents in the area?

4) Since the project requires excavating the ridge up to 50 feet in depth, how will either method of blasting or excavation impact the area? Will the area be subject to erosion and/or falling boulders?

I appreciate your attention to these concerns, and again thank you for this opportunity to comment on K 272.

I look forward to hearing from you.

Very truly yours,

Cynthia Thielen
Cynthia Thielen
Minority Floor Leader
49th District

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COPY

December 16, 1994

The Honorable Cynthia Thiele
State Representative, 49th District
House of Representatives
State Capitol
Honolulu, Hawaii 96813

Dear Representative Thiele:

Subject: Your Letter of July 16, 1994 Regarding the Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's (BWS) Proposed Kailua 272 Reservoir at Puu O Ehu, Kailua, Hawaii, TMK: 4-2-03: 16, Portions 9 and 17.

Thank you for your letter regarding the DEIS for the proposed reservoir project. We appreciate your efforts in reviewing the document and provide the following response to your comments:

1. The proposed 4.0 million gallon reservoir is needed to eliminate the current water storage deficit problem in Kailua.

Based on metered consumption, Kailua is presently short by approximately 3.3 million gallons of reservoir capacity, and the proposed reservoir project will provide that storage requirement especially during the summer months when water consumption is higher than normal. A smaller reservoir would not meet Kailua's minimum storage requirement and therefore, is not cost effective because another reservoir would still be required.

Adequate water storage capacity provides the necessary volume and pressure for fire protection during maximum day demands. With standard storage, our pumps would have to provide supplemental water during fires. However, since the sources serving Kailua are located as far away as Punaluu, main breaks would disrupt water service and reduce the level of fire protection.

2. We are also concerned about the aesthetic impact of the reservoir on the Puu O Ehu ridge. Visual impact mitigation will be expanded as one of the main focal points of the Final EIS. The Puu O Ehu ridge remains our preferred site based on a comprehensive analysis of alternative sites and options to address the storage deficit. We are investigating the construction of berms against a retaining wall high enough to screen the reservoir from affected views. The berms will allow a revised low profile landscaping plan to match the adjacent hillside. The visual impact analysis is

The Honorable Cynthia Thiele
Page 2
December 16, 1994

being coordinated with the City Planning Department, the Department of Land Utilization, the State Office of Conservation and Environmental Affairs, and various community groups. A photographic representation is being developed to show the proposed reservoir on the ridge. The construction of this project will require a Special Management Area Permit (SMAP) and a Conservation District Use Application, which will further ensure that mitigation measures on the visual impact will be adequately addressed. Approval of the SMAP will be based on the visual impact mitigation plan's consistency with the Development Plan provisions for Koolauoko to preserve views of the Puu O Ehu ridge.

3. The estimated construction cost of \$10,600,000 for the reservoir will be provided by our water system facilities charges account and other revenues. Kailua residents will directly benefit from this project, through more reliable water service and improved fire protection. The construction of this project will not require an increase in our water rate.

As you know, our water bill also includes the sewer charges, and this has increased significantly over the past years.

4. All excavation procedures must be in accordance with BWS standards and subject to agency approval processes in the form of grading and erosion control permits. If blasting is proposed, the contractor must adhere to specific BWS procedures to minimize damaging vibration. Charges will be small and localized. A thorough survey of the pre-existing conditions prior to construction and a monitoring program during blasting will be conducted.

We hope to work further with the community in addressing all concerns regarding the impacts of this project.

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

Very truly yours,

KAZU HAYASHIDA
For Manager and Chief Engineer

✓ cc: Engineering Concepts, Inc.

OTHER LIAISON
EXECUTIVE OFFICER



STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
Room 104, Old Federal Building
315 Merchant Street
Honolulu, Hawaii 96813
Telephone 597-5211

JOHN WAHLE
COMMISSIONER

JOHN WAHLE
Commissioner
MUIF HABNEBANN
Director
JACK LOGSDON
Director
FRANKIE L. CHAMBERS
Deputy Director
TAKUHI YOSHIMURA
Deputy Director

RECEIVED

MAY 4 1994

ENGINEERING CONCEPTS

DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM

Central Post Office, 210 South King Street, 15th Floor, Honolulu, Hawaii 96813
Mailing Address: 705 South King Street, Honolulu, Hawaii 96813 Telephone: (808) 548-2400 Fax: (808) 548-3377



April 29, 1994

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

Dear Mr. Hayashida:

The Department of Business, Economic Development & Tourism is pleased to submit the enclosed comments on the Draft Environmental Impact Statement for the Kailua 272 Reservoir.

The comments were provided by the Land Use Commission. Questions regarding these comments may be directed to Eather Ueda, LUC Executive Officer, at 687-3826.

Thank you for the opportunity to comment.

Sincerely,

Mufi Habnebann
Mufi Habnebann

Enclosure
cc: Mr. Barry Usagawa
Mr. Kenneth Ishizaki

April 28, 1994

SUBJECT: Director's Referral No. 94-141-K
Draft Environmental Impact Statement (EIS) for the
Kailua 272 Reservoir, Kailua, Oahu, Hawaii

We have reviewed the subject draft EIS and have the following comments to offer:

We confirm that a Boundary Interpretation No. 92-12 was prepared for TMK: 4-2-01:1 and 4-2-03:17, Kailua, Koolauoko, Oahu. Based on the boundary interpretation, and the maps contained in the draft EIS, we confirm the Urban/Conservation designation of the proposed reservoir.

On page 5-1 of the draft EIS, we suggest clarification of the 4th paragraph which states "principal uses in these designations include public utilities, and the proposed reservoir is consistent with existing land use designations". Additional information should be provided regarding the existing Conservation subzone and County zoning designations to substantiate this statement.

We have no other comments to offer at this time.

COPY

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

December 7, 1994

JOHN WAIKHEE
Governor
JAMES HARRELMANN
Director
ALANNE SCHALTE
Deputy Director
RICK EGOTD
Deputy Director
TAKESHI YOSHINABA
Deputy Director

DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM

ENERGY DIVISION, 333 MERCHANT ST., 8th FL., HONOLULU, HAWAII 96813 PHONE: (808) 547-3000 FAX: (808) 547-3200

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MAY 4 1994

ENGINEERING CONCEPTS

May 3, 1994

City and County of Honolulu
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96813

Attention: Mr. Kazu Hayashida

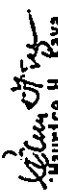
Dear Sir:

Subject: Draft Environmental Impact Statement (DEIS)
Kailua 272 Reservoir
Kailua, Oahu, Hawaii
Island of Oahu, District of Koolaupoko
Tax Map Key Numbers: 4-2-03:16, por. 9 and 17

This is to inform you that we have no comments on the subject Draft Environmental Impact Statement (DEIS). We are returning the DEIS with no comments.

Thank you for the opportunity to comment on the DEIS.

Sincerely,


Maurice H. Kaya
Energy Program Administrator

PHK/hkts108

cc: Director, OEQC
Board of Water Supply
Engineering Concepts, Inc.

Mr. Maurice H. Kaya
Energy Program Administrator
Energy Division
Department of Business, Economic
Development & Tourism
State of Hawaii
Honolulu, Hawaii 96813

Dear Mr. Kaya:


Subject: Your Letter of May 3, 1994 Regarding the Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's Proposed Kailua 272 Reservoir at Puu O Ehu, Kailua, Hawaii. TMK: 4-2-03: 16, Portions 9 and 17

Thank you for your letter regarding the DEIS for the proposed reservoir project. We appreciate your efforts in reviewing the document.

We acknowledge that you have no comments to offer at this time.

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

Very truly yours,



KAZU HAYASHIDA
Manager and Chief Engineer

cc: -Engineering Concepts, Inc.



JOHN WARRER
RECEIVED
MAJOR GENERAL EMERGENCY ENGINEER SUPPLY
HONOLULU, HAWAII 96816-4495
ROY C. PRICE, SR.
JAN 11 1996



STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
245 DAIKONG HEAD ROAD
HONOLULU, HAWAII 96816-4495

JUN 8, 1994

TO: Mr. Kazu Hayashida
Board of Water Supply
City and County of Honolulu

FROM: Roy C. Price, Sr.
Vice Director of Civil Defense

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE
KAILUA "272" RESERVOIR

We appreciate this opportunity to comment on the DEIS for the City and County of Honolulu, Board of Water Supply: Kailua "272" Reservoir, Kailua, Oahu, Hawaii; TMK 4-2-03:16, portions 9 and 17.

State Civil Defense does not have any negative comments specifically directed at this DEIS. However, our specific needs and commentary for the safety and welfare of the population in the area were addressed in a letter dated May 19, 1993, subject "ENVIRONMENTAL ASSESSMENT (EA) FOR THE KAILUA 272 RESERVOIR. Additionally, the following considerations need to be addressed: 1) Compliance with dam safety requirements for the sub-mission and approval of an Emergency Preparedness Plan, if applicable. 2) Structures should be designed and constructed in accordance with the current building codes for wind and earthquake. With the project elevation ranging up to approximately 300 feet above mean sea level and a maximum slope of up to 50 percent, the impact of terrain amplified winds must be considered in any project site design and construction.

Our State Civil Defense planners and technicians are available to discuss this further if there is a requirement. Please have your staff call Mr. Mel Nishihara of my staff at 734-2161.

Enc.
c: Mr. Barry Usagawa
Board of Water Supply
Mr. Kenneth Ishizaki
Engineering Concepts, Inc.

941515



BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

K. if Mgr
Res Dep
JAN 9 8AM '96

January 10, 1996

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JAN 11 1996
ENGINEERING CONCEPTS

Mr. Roy C. Price, Sr.
Vice Director of Civil Defense
Department of Defense
State of Hawaii
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

Dear Mr. Price:

Subject: Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's Proposed Kailua 272 Reservoir at Puu O Ehu, Kailua, Hawaii, TMK: 4-2-03:16, Portions 9 and 17

Thank you for your letter regarding the DEIS for the proposed reservoir project. We provide the following responses to your comments:

1. The proposed reservoir will be an enclosed, reinforced concrete tank structure; therefore, dam safety requirements should not be applicable.
2. The proposed reservoir will be designed and constructed in accordance with applicable building codes for wind and earthquake loads. The reservoir will be structurally designed for Category 3 earthquake loads, which is one level of stringency above county standards for buildings on Oahu.

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

Very truly yours,

Barry Usagawa
RAYMOND H. SATO
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

d

ENGINEERING DIVISION TEL No. 808-527-6195

Feb 1.96 8:52 No.001 P.09



RECEIVED
BOARD OF WATER SUPPLY
JUN 17 11 09 AM '94

941607
PE
JOHN C. LEHIN, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 272
HONOLULU, HAWAII 96843

In Reply, Please Refer to:

June 13, 1994

91-248/epo

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

Dear Mr. Hayashida:

Subject: Draft Environmental Impact Statement
Kaliua 272 Reservoir
Kaliua, Oahu
TRK: 4-2-03: 16, par. 9 & 17

Thank you for allowing us to review and comment on the subject project.
We do not have any comments to offer at this time.

Very truly yours,

John C. Lehin
JOHN C. LEHIN, M.D.
Director of Health

C: Mr. Barry Usagawa, City & County of Honolulu
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.

Handwritten note: ... L.P. Planning

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



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RECEIVED

January 10, 1996

JAN 11 1996

ENGINEERING CONCEPTS

Mr. Michael D. Wilson, Chairperson
Department of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Wilson:

Subject: Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's
Proposed Kailua 272 Reservoir at Puu O Ehu, Kailua, Hawaii, TMK: 4-2-03: 16,
Portions 9 and 17

Thank you for your letter regarding the DEIS for the proposed reservoir project. We provide the following responses to your comments:

1. The Final EIS will include a discussion of the project location within the General "G" subzone of the Conservation District, including conformance to the subzone objectives.
2. The concerns expressed by the Office of Conservation and Environmental Affairs will be addressed during the Conservation District Use Application process.
3. We note the Division of Aquatic Resources' comment that there should be no detrimental impact on surface water biological resources with implementation of the proposed mitigation measures.
4. We acknowledge that the Division of Land Management has no objections provided that all required Federal, State and County permits are obtained prior to initiating the proposed project.

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

Very truly yours,

RAYMOND H. SATO
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

ENGINEERING DIVISION TEL No. 808-527-6195

Feb 1 1996 8:52 No. 001 P.02

RECEIVED
BOARD OF WATER SUPPLY
FEB 17 10 30 AM '94



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

May 12, 1994

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

Dear Mr. Hayashida:

SUBJECT: Draft Environmental Impact Statement (DEIS) for the Kailua 272
Reservoir
Kailua, Ko'olaupoko, O'ahu
TMK: 4-2-3: 16, por. 9 & 17

Thank you for the opportunity to review this DEIS, which correctly reflects on page 3-8
our determination that this project will have "no effect" on historic sites.

Sincerely,

DON HIBBARD, Administrator
State Historic Preservation Division

TD/jl

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



COPY

December 7, 1994

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

Dear Mr. Hibbard:

Subject: Your Letter of May 12, 1994 Regarding the Draft Environmental Impact
Statement (DEIS) for the Board of Water Supply's Proposed Kailua 272
Reservoir at Puu O Ehu, Kailua, Hawaii, TMK: 4-2-03: 16, Portions 9
and 17

LOG NO: 11487
DOC NO: 9405TU08

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Thank you for reviewing the DEIS for the proposed reservoir project.

We acknowledge that the proposed project will have no effect on any historic sites.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

JOHN WAREE
DIRECTOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
881 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

REX D. JOHNSON
DIRECTOR
DEPARTMENT OF TRANSPORTATION
KAWAII HALL
OLEWIALE OMAOAO
JOYCE T. OMBRE
CALVIN M. TSUDA

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ENGINEERING CONCEPTS

STP 8.5949

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

 COPY

December 7, 1994

Mr. Rex D. Johnson, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Johnson:

Subject: Your Letter of April 27, 1994 Regarding the Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's Proposed Kailua 272 Reservoir at Puu O Ehu, Kailua, Hawaii. TMK: 4-2-03: 16, Portions 9 and 12

Thank you for your letter regarding the DEIS for the proposed reservoir project. We acknowledge that the proposed reservoir project will not affect the state highway facilities. We will contact you to discuss your comments on our construction plans regarding connection requirements for our proposed drain system.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

April 27, 1994

Mr. Kazu Hayashida, Manager & Chief Engineer
City and County of Honolulu
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96834

Dear Mr. Hayashida:

Subject: DEIS for Kailua 272 Reservoir;
TMK: 4-2-03:16, por. 9 and 17

Your proposal to construct the subject reservoir is not anticipated to affect the state highway facilities. Plans for construction work within our right-of-way, however, must be submitted to the Highways Division for their review and approval.

Thank you for this opportunity to comment.

Sincerely,

Rex D. Johnson
Director of Transportation

c: OEQC
Board of Water Supply (B. Usagawa)
Engineering Concepts (K. Ishizaki)
HWY-P

ENGINEERING DIVISION TEL No. 808-527-6195

Feb 1, 1996 8:52 No. 001 P. 03

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STATE OF HAWAII
DEPARTMENT OF BUDGET AND FINANCE
HOUSING FINANCE AND DEVELOPMENT CORPORATION
677 QUEEN STREET, SUITE 300
HONOLULU, HAWAII 96813
TEL (808) 527-6195

NO PRINT NITER TO
941367/3144

May 23, 1994

Mr. Kazu Hayashida
City and County of Honolulu
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96813

Dear Mr. Hayashida:

Re: Draft EIS for the Kailua 272 Reservoir

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

Thank you for the opportunity to comment.

Sincerely,

JOSEPH K. CONANT
Executive Director

cc: Engineering Concepts, Inc.
ORQC (with enclosure)



BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY



December 7, 1994

Mr. Joseph K. Conant
Executive Director
Housing Finance and Development Corporation
Department of Budget and Finance
State of Hawaii
677 Queen Street, Suite 300
Honolulu, Hawaii 96813

Dear Mr. Conant:

Subject: Your Letter of May 23, 1994 Regarding the Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's Proposed Kailua 272 Reservoir at Puu O Ehu, Kailua, Hawaii. TMs: 4-2-93: 16, Portions 9 and 17

Thank you for your letter regarding the DEIS for the proposed reservoir project. We appreciate your efforts in reviewing the document.

We acknowledge that you have no comments to offer at this time.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

JOHN WARE
City Clerk



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
228 SOUTH KING STREET
FOURTH FLOOR
HONOLULU, HAWAII 96813
TELEPHONE 528-1416
FACSIMILE 528-1415

BRUCE S. ANDERSON, Ph.D.
Interim Director

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JUL 22 1994

ENGINEERING CONCEPTS

July 11, 1994

To: Mr. Kazu Hayashida
Board of Water Supply

From: *for* Bruce S. Anderson, Ph.D., Interim Director
Office of Environmental Quality Control

Bruce S. Anderson

Subject: Draft Environmental Impact Statement for the Kailua 272
Reservoir, Koolaupoko, TMK: 4-2-03:16, Por. 9 and 17

Thank you for allowing us to review the proposed subject
document.

We do not have any comments to offer on the proposed subject
document.

BSA/JT:kk

c: *v*Engineering Concepts, Inc.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



COPY

December 7, 1994

Bruce S. Anderson, Ph.D.
Interim Director
Office of Environmental Quality Control
220 South King Street, 4th Floor
Honolulu, Hawaii 96813

Dear Dr. Anderson:

Subject: Your Letter of July 11, 1994 Regarding the Draft Environmental Impact
Statement (DEIS) for the Board of Water Supply's Proposed Kailua 272
Reservoir at Puu O Ehu, Kailua, Hawaii. TMK: 4-2-03:16, Portions 9 and 17

Thank you for your letter regarding the DEIS for the proposed reservoir project. We
appreciate your efforts in reviewing the document.

We acknowledge that you have no comments to offer at this time.

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

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: *v*Engineering Concepts, Inc.

ENGINEERING DIVISION TEL No. 808-527-6155 Jun '94 13:19 No. 000 F. 04

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STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
111 KAPOLAHU BOULEVARD, SUITE 520
HONOLULU, HAWAII 96813-5110
PHONE (808) 584-1143
FAX (808) 584-1145

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June 06, 1993

Mr. Kazu Hayashida
City and County of Honolulu
Board of Water Supply
630 South Beretania Street
Honolulu, HI 96843

Dear Mr. Hayashida:

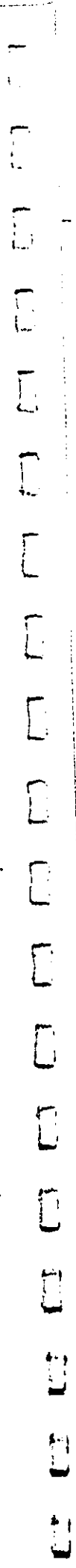
Thank you for the opportunity to review the Draft Environmental Impact Assessment (DEIA) concerning the development of the Kailua 272 Reservoir at Kailua, District of Oahu.

We find the DEIA sufficient and have no objections to the applicant's proposal to construct the reservoir. Please contact me or Linda Delaney, Land and Natural Resource Officer, at 594-1938, should you have any questions on this matter.

Sincerely yours,

Patricia K. Carpenter
Patricia K. Carpenter
Administrator

LH:lm



COPY

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



University of Hawai'i at Mānoa

Environmental Center
A Unit of Water Resources Research Center
Crawford 317 • 2550 Campus Road • Honolulu, Hawaii 96822
Telephone: (808) 956-7301 • Facsimile: (808) 956-3880



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ENGINEERING CONCEPTS

June 7, 1994
RE:0648

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

Dear Mr. Hayashida:

Draft Environmental Impact Statement (EIS)
Kailua 272 Reservoir
Kailua, Oahu

The Honolulu Board of Water Supply proposes to construct a 4.0 million gallon reinforced concrete reservoir on Puu O Ehu ridge, south of the existing Kailua 275 reservoir site. The tank will be circular, 85 feet in diameter and 22 feet in height. Elevations of the spillway and base pad will be 272 and 252 feet, respectively. The proposed reservoir is intended to provide additional storage capacity to the Board of Water Supply's Windward Low Service system.

The Environmental Center has reviewed the Draft EIS with the assistance of Paul Ekern, Emeritus, and Heather Keovil of the Environmental Center.

In general, the Draft EIS appears to adequately address concerns related to the project. However, we note that as recently reported in the Honolulu Advertiser, the federal government plans to require the addition of chlorine to the water supply. When will that regulation be implemented, and will the level of chlorine in the reservoir be tested? This issue should be discussed in the Final EIS.

Thank you for the opportunity to review this document.

Sincerely,

John T. Harrison
Environmental Coordinator

cc: OEQC
Barry Usagawa, BWS ✓
Engineering Concepts, Inc. ✓
Roger Fujioka
Paul Ekern
Heather Keovil An Equal Opportunity/Affirmative Action Institution

December 7, 1994

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

Dear Mr. Harrison:

Subject: Your Letter of June 7, 1994 Regarding the Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's Proposed Kailua 272 Reservoir at Puu O Ehu, Kailua, Hawaii. TMM: 4-2-03: 16, Portions 9 and 17

Thank you for your letter regarding the DEIS for the proposed reservoir project. We have the following response to your concerns:

1. It is anticipated that the federal government will issue a final rule on groundwater disinfection in the summer of 1997.
2. The Board of Water Supply will implement the groundwater disinfection rule, as applicable, including monitoring of residual chlorine levels in the reservoir.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: ✓ Engineering Concepts, Inc.

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CITY COUNCIL
CITY AND COUNTY OF HONOLULU
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HONOLULU, HAWAII 96813-3085 / TELEPHONE 833-4000



STEVE HOLMES
Councilmember
(808) 547-7002

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MAY 19 1994

May 12, 1994

Mr. Kazu Hayashida
Board of Water Supply
630 S. Beretania Street
Honolulu, Hawai'i 96843

Comments on the Draft Environmental Impact Statement for Kailua 272' Reservoir
TMK 4-2-03: 16, POR. 9 and 17

Dear Mr. Hayashida:

Thank you for providing my office with a copy of the Draft Environmental Impact Statement (DEIS) for the Kailua 272' Reservoir project. This document in conjunction with the presentation given to the Kailua Neighborhood Board last year clarifies many issues surrounding the project. However, I still have a few concerns.

On page 1-8, the only item listed under the heading of "UNRESOLVED ISSUES" is the method of excavation. The way this paragraph is worded makes it appear that Engineering Concepts must consider the advantages and disadvantages of using blasting or excavation equipment rather than the contractor making this decision. I would like this section to be more clearly worded in order to specify that the contractor hired through the City's normal bidding process would decide on the method of excavation and that blasting is likely.

I am also under the impression that the construction for this project will be at the same time the City and Army Corps of Engineers are working on the Kawai Nui Marsh Flood Control Project. Though traffic patterns and road usage are discussed in this DEIS, I would like the EIS to take into account what impact the heavy truck equipment will have on the neighboring communities considering that both projects will be constructed at the same time. Maybe additional traffic mitigation plans could be implemented for the traffic generated by the numerous heavy trucks.

It appears that your department has made tremendous efforts to keep the abutting property owners and the Kailua Neighborhood Board informed. I applaud your work and understand that it will continue throughout the length of this project.

Page Two
Mr. Kazu Hayashida
May 12, 1994

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for this project. Should you have any questions or comments, please contact me or April Coloretti, my Community Aide, at 527-5813.

Sincerely,

STEVE HOLMES
Councilmember, District II

SH:ac

cc: Engineering Concepts, attn: Kenneth Ishizaki
Board of Water Supply, attn: Barry Usagawa
Office of Environmental Quality Control

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

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BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



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

The Honorable Steve Holmes
Page 2
December 16, 1994

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ENGINEERING CONCEPTS


December 16, 1994

We plan to work further with the community to address the various concerns about the impacts that this project may have.

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

The Honorable Steve Holmes
Councilmember, District II
City Council
City and County of Honolulu
Honolulu, Hawaii 96813-3065

Very truly yours,


KAZU HAYASHIDA
Manager and Chief Engineer

Dear Councilmember Holmes:

Subject: Your Letter of May 12, 1994 Regarding the Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's (BWS) Proposed Kailua 272 Reservoir at Puu O Ehu, Kailua, Hawaii, TMK: 4-2-03: 16, Portions 9 and 17

✓cc: Engineering Concepts, Inc.

Thank you for your letter regarding the DEIS for the proposed reservoir project. We provide the following response to your concerns:

1. The Final EIS will be revised to specify that the contractor hired through the City's normal bidding process will decide on the method of excavation and that blasting is likely. If blasting is required, the contractor must adhere to BWS specifications to prevent damaging vibration. Charges will be small and localized. A thorough site survey of adjacent structures will be conducted prior to any blasting work to document and monitor any adverse effects.
2. The visual impact and alternative analysis sections of the EIS are being expanded to incorporate the recommendations obtained in the DEIS process. We are investigating a design revision to construct earthen berms high enough to screen the reservoir from affected views. The berms will allow low profile landscaping to blend with the existing vegetation and minimize the visibility of graffiti. We are developing a photographic representation showing the proposed reservoir with the mitigating berms and uniform landscaping as part of the Final EIS.
3. If the Kailua reservoir construction schedule overlaps the Kawai Nui Marsh Flood Control project, the traffic control plans and proposed mitigation will be coordinated with the Corps of Engineers, the State Department of Transportation and BWS.

COPY



BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

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MAY 5 1994

ENGINEERING CONCEPTS

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
3375 KONAFA STREET, SUITE 4422
HONOLULU, HAWAII 96819-1869



FRANK JASI
81108

December 7, 1994

April 26, 1994

RICHARD SETO-MOOK
Acting Fire Chief

TO: MR. RICHARD R. SETO-MOOK, FIRE CHIEF
FIRE DEPARTMENT

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

SUBJECT: YOUR MEMORANDUM OF APRIL 26, 1994 REGARDING THE DRAFT
ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE BOARD
OF WATER SUPPLY'S PROPOSED KAILUA 272 RESERVOIR,
TMK: 4-2-03: 16, PORTIONS 9 AND 17

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

FROM: RICHARD R. SETO-MOOK, ACTING FIRE CHIEF

SUBJECT: KAILUA 272 RESERVOIR
KAILUA, OAHU, HAWAII
TMK: 4-2-03:16, POR. 9 & 17

We have reviewed the application for the above subject request and have no objections to the proposal.

Thank you for your memorandum regarding the DEIS for the proposed reservoir project. We appreciate your efforts in reviewing the document.

Should you have any questions, please call Assistant Chief Atilio Leonard of our Administrative Services Bureau at 831-7775.

We acknowledge that you have no objections to the proposed project.

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

RICHARD R. SETO-MOOK
Acting Fire Chief

AKL:my

Copy to: Board of Water Supply (Barry Usagawa)
Engineering Concepts, Inc. (Kenneth Ishizaki)

Environmental Impact Statement attached.

cc: Engineering Concepts, Inc.

941990

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BD OF WATER SUPPLY AND COUNTY OF HONOLULU
PLANNING DEPARTMENT
450 SOUTH KING STREET
HONOLULU, HAWAII 96813

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FRANK P. PAHI
SECRET

Kazu Hayashida, Manager and Chief Engineer
July 25, 1994
Page 2

JUL 27 1994
ROBIN FOSTER
CHIEF PLANNING OFFICER
ROLAND D. LIBBY, JR.
DEPUTY CHIEF PLANNING OFFICER

LW 7/94-3534

July 25, 1994

Robin Foster

ROBIN FOSTER
Chief Planning Officer

RF:js

MEMORANDUM

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

FROM: ROBIN FOSTER, CHIEF PLANNING OFFICER
PLANNING DEPARTMENT

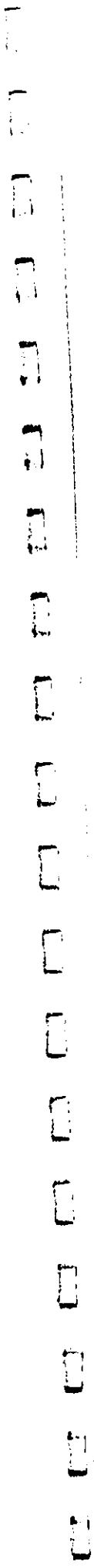
SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
FOR THE PROPOSED KAILUA 272 RESERVOIR, OAHU
TAX MAP KEY: 4-2-03; 16. PORTION 9 AND 17

We have reviewed the subject DEIS and would like to reiterate our concern over the proposed project's visual impact on Puu O Ehu. As noted in our memo dated August 23, 1993, Puu O Ehu is an important visual resource within Kailua and is extremely prominent from several locations including Kailua Road, Hamakua Road and Kalamianole Highway.

The Final Environmental Impact Statement (FEIS) should provide more detailed information on the likely visual impacts. An accurately scaled drawing showing the longitudinal profile of the entire Puu and the proposed alteration to the land form should be included in the FEIS. We recommend that two additional simulated views be included in the FEIS: one from the intersection of Hamakua Street and Kailua Road, and the other along Kailua Road near the Methodist Church looking makai.

We recommend that the mitigative measures proposed to minimize the visual impact be further investigated. The proposed landscaping, assuming it can be established in rock, will contrast with the existing vegetation and will grow above the natural ridgeline. We suggest also that alternate shapes and/or surface treatments which would better blend with the hill top be considered for the tank; e.g., simulated stone veneer to match existing rock outcroppings could be used to modify the structure's appearance.

The FEIS should also explain in greater detail why the proposed project is the only viable alternative. Should you have any questions, please contact Lin Hong of our staff at extension 4485.





COPY

December 16, 1994

TO: ROBIN FOSTER, CHIEF PLANNING OFFICER
PLANNING DEPARTMENT

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY *Kazu Hayashida*

SUBJECT: YOUR MEMORANDUM OF JULY 25, 1994 REGARDING THE DRAFT
ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE BOARD
OF WATER SUPPLY'S PROPOSED KAILUA 272 RESERVOIR AT PUU O EHU,
KAILUA, HAWAII. TMK: 4-2-03: 16, PORTIONS 9 AND 17

Thank you for your memorandum regarding the DEIS for our proposed reservoir project. We have the following responses to your concerns:

1. The visual impact analysis section of the Final EIS will be expanded to incorporate the helpful suggestions obtained in the DEIS process to mitigate adverse impact to the aesthetic value of the Puu O Ehu ridge. The mitigation plan must be consistent with the Development Plan's General and Special Provisions for Koolapoko for the preservation of views of the Puu O Ehu ridge. Public views of the ridge will be maintained by a proposed design revision that will replace the maintenance road around the reservoir with berms against a retaining wall high enough to screen the reservoir from affected views. The berms will allow low profile landscaping matching the adjacent hillside and minimize the visibility of graffiti. Surface treatments and alternate reservoir shapes will not be necessary. A photographic representation is being developed showing various affected views of the reservoir on the ridge with the mitigating berms and uniform landscaping as recommended in your letter.
2. The Puu O Ehu ridge is still our preferred site to other alternative locations based on an analysis of construction cost, elevation, operational efficiency and proximity to Kailua Town. The analysis evaluated the community's suggestion for alternative sites and other options to address the area's storage deficit. The final EIS will provide a full discussion of these important issues.

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

cc: Engineering Concepts, Inc.

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • 808/523-4433

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DONALD A. CLEGG
DIRECTOR
LORETTA K. CHIE
DEPUTY DIRECTOR

94-03636 (AC)

July 7, 1994

*File in
K-11
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MEMORANDUM

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

M 11 AM

FROM: DONALD A. CLEGG, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

SUBJECT: KAILUA 272 RESERVOIR. TAX MAP KEY 4-2-03: 16, POR. 9 & 7

Thank you for providing the Department of Land Utilization the opportunity to comment on the above-referenced project. As stated in the Draft Environmental Impact Statement (DEIS), the project will require a Special Management Area Use Permit (SMP) prior to construction. Our department's review of the application will focus on Section 25-3.2 Review Guidelines of Chapter 25, Revised Ordinances of Honolulu, (ROH). In order to assure that the Final DEIS is acceptable under the provisions of Chapter 25, ROH, the DEIS should address how the proposal is consistent with the Development Plan Special Provisions for Koolaupoko. Specifically, the DEIS should describe the project's consistency with the preservation of Puu O Ehu ridge.

The DEIS should provide a more detailed visual impact study. The photographs included in the draft document do not provide a scaled depiction of the visual effect of the tank. In addition, the reproduction of the photographs for the document is of poor quality for analyzing visual impacts.

The DEIS should discuss the alternative of refurbishing the abandoned sites, and replacing the demolished tanks with equivalent sized tanks.

Should you have any questions, please contact Mr. Art Challacombe of our staff at 523-4107.

Donald A. Clegg

DONALD A. CLEGG
Director of Land Utilization

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BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

ENGINEERING DIVISION TEL No. 808-527-6195 Feb 1, 96 8:52 No. 001 P. 04

DEPARTMENT OF WASTEWATER MANAGEMENT
CITY AND COUNTY OF HONOLULU

STATE OF HAWAII
HONOLULU, HAWAII 96813



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BOARD OF WATER SUPPLY
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901265
DEPARTMENT OF WASTEWATER MANAGEMENT
CITY AND COUNTY OF HONOLULU

December 7, 1994

TO: MR. FELIX LIMTIACO, DIRECTOR
DEPARTMENT OF WASTEWATER MANAGEMENT

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

SUBJECT: YOUR MEMORANDUM OF MAY 12, 1994 REGARDING THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE BOARD OF WATER SUPPLY'S PROPOSED KAILUA 272 RESERVOIR, TMK: 4-2-03:16, PORTIONS 9 AND 17

MPP 94-167
RE

May 12, 1994

MEMORANDUM

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

FROM: KENNETH M. RAPPOLT, DIRECTOR
DEPARTMENT OF WASTEWATER MANAGEMENT

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
KAILUA 272 RESERVOIR
KAILUA, OAHU, HAWAII
TMK: 4-2-03:16, POR. 9 & 17

We have reviewed the draft environmental impact statement and offer the following:

- (1) The subject reservoir would not require services of our wastewater facilities.
- (2) We have neither existing facilities nor future facilities planned for in the vicinity of the proposed project.

Should you have any questions, please contact Thomas Tamanaha at Extension 4671.

KENNETH M. RAPPOLT
Director

Thank you for your memorandum regarding the DEIS for the proposed reservoir project. We appreciate your efforts in reviewing the document.

We acknowledge that you have no objections to the proposed project as it will not impact any existing or proposed wastewater facilities in the vicinity.

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

cc: ~~Engineering Concepts, Inc.~~

ENGINEERING DIVISION TEL No. 808-527-6195 Feb 1, 96 8:52 No. 001 P. 05

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80 OF WATER SUPPLY AND COUNTY OF HONOLULU

DEPARTMENT OF PARKS AND RECREATION
808 SOUTH KING STREET
HONOLULU, HAWAII 96813

MAY 19 11 56 AM '94



941308

WALTER H. OZAWA
DIRECTOR
ALLENANCE IN
REPRESENTATION

May 17, 1994

MEMORANDUM

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

FROM: WALTER H. OZAWA, DIRECTOR

SUBJECT: DRAFT EIS FOR THE KAILUA 272 RESERVOIR
THK: 4-2-03116, Pgs. 9 and 17

The proposed action will not have any impact on existing or proposed recreation facilities in the Kailua area.

Thank you for the opportunity to review the draft EIS.

Steven Amelin
WALTER H. OZAWA, Director

WHO:s1
cc: Barry Usagawa, BWS
Engineering Concepts, Inc.
Kenneth Ishizaki
Office of Environmental Quality Control

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



COPY

December 7, 1994

TO: MS. DONA HANAIKE, DIRECTOR
DEPARTMENT OF PARKS AND RECREATION

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

SUBJECT: YOUR MEMORANDUM OF MAY 17, 1994 REGARDING THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE BOARD OF WATER SUPPLY'S PROPOSED KAILUA 272 RESERVOIR, TMK: 4-2-03: 16, PORTIONS 9 AND 17

Thank you for your memorandum regarding the DEIS for the proposed reservoir project. We appreciate your efforts in reviewing the document.

We acknowledge that you have no objections to the proposed project as it will not have any impact on existing or proposed recreation facilities in the Kailua area. If you have any questions, please contact Barry Usagawa at 527-5235.

cc: Engineering Concepts, Inc.
SM:rk
cc: K. Hayashida
B. Usagawa
94-1308
P199-94

ENGINEERING DIVISION TEL No. 808-527-6195

Jan 11, 96 8:40 No. 001 P.03

DEPARTMENT OF PUBLIC WORKS
BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

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KENNETH E. SPRAGUE
DIRECTOR AND CHIEF ENGINEER

Status (By)
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AUS 11 AM

ENV 94-127

May 13, 1994

MEMORANDUM

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

FROM: KENNETH E. SPRAGUE, DIRECTOR AND CHIEF ENGINEER *(Signature)*

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
KAILUA 272 RESERVOIR
THK 4-2-93: 16, FOR 9 AND 17

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

1. The municipal storm sewer on Kailua Road belongs to the State Department of Transportation (DOT). Accordingly, any connection to their system requires a permit (license).
 2. The discharge of nonstorm water may require a permit too.
- Should you have any questions, please contact Mr. Alex Ho, Environmental Engineer, at Local 4150.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY



December 7, 1994

TO: KENNETH E. SPRAGUE
DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY *(Signature)*

SUBJECT: YOUR MEMORANDUM OF MAY 13, 1994 REGARDING THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE BOARD OF WATER SUPPLY'S PROPOSED KAILUA 272 RESERVOIR, THK 4-2-93: 16, PORTIONS 9 AND 17

Thank you for your memorandum regarding the DEIS for the proposed reservoir project. We appreciate your efforts in reviewing the document.

We have the following response to your concerns:

1. We understand the municipal storm sewer on Kailua Road belongs to the State Department of Transportation. Accordingly, a permit to connect to their system will be required.
2. A permit to discharge effluent from our hydratesting activity into the State storm sewer will be required.

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

cc: Engineering Concepts, Inc.

(Handwritten mark)

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
PACIFIC CENTER PLAZA
711 KAPOLAHANE BOULEVARD SUITE 1100
HONOLULU, HAWAII 96812



FRANK F. FASI
MAYOR

RECEIVED
MAY 26 1994
ENGINEERING CONCEPTS

JOSEPH M. MAGALDI, JR.
DIRECTOR
ANAR BAPPAL
DEPUTY DIRECTOR

TE-1795
PL94.1.130

May 24, 1994

MEMORANDUM

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

ATTENTION: BARRY USAGAWA

FROM: JOSEPH M. MAGALDI, JR., DIRECTOR

SUBJECT: KAILUA 272 RESERVOIR
DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
TMK: 4-2-03: 16, PORTION OF 9 AND 17

This is in response to the DEIS submitted to us for review by the Office of Environmental Quality Control.

Based on our review, we have no comments or objections to the project at this time.

Should you have any questions, please contact Lance Watanabe of my staff at local 4199.

JOSEPH M. MAGALDI, JR.

cc: Office of Environmental Quality Control
Engineering Concepts, Inc.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



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DEC 14 1994
ENGINEERING CONCEPTS

December 7, 1994

TO: MR. JOSEPH M. MAGALDI, JR., DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

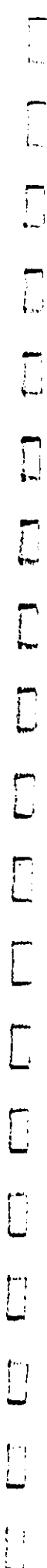
FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF MAY 24, 1994 REGARDING THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE BOARD OF WATER SUPPLY'S PROPOSED KAILUA 272 RESERVOIR, TMK: 4-2-03: 16, PORTIONS 9 AND 17

Thank you for your memorandum regarding the DEIS for the proposed reservoir project. We appreciate your efforts in reviewing the document.

We acknowledge that you have no comments or objections to the proposed project. If you have any questions, please contact Barry Usagawa at 527-5235.

cc: -Engineering Concepts, Inc.



May 17, 1994

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

RE: Comments on the Draft EIS, Kailua 272 Reservoir

Dear Mr. Hayashida,

Thank you for the opportunity to comment on the Kailua 272 Reservoir proposal. The Kailua Neighborhood Board requested that the Environmental Committee [EC] evaluate the Draft Environmental Impact Statement [EIS].

The June 7th deadline for comments on the Draft EIS necessitates that we act quickly. The BWS and its contractors may respond in writing to the Environmental Committee's concerns as set forward in this letter. We also encourage you to have a representative at the Kailua Neighborhood Board meeting to respond to our concerns.

Our conclusion at this time is to propose a resolution to the Kailua Neighborhood Board, June 2, 1994 meeting, which will request a waiver by the Board of Water Supply for the requirement of construction of Kailua 272 Reservoir.

The proposal's points of justification are:

- (1) To supply Kailua with water during an extended power outage,
- (2) To have an adequate supply of fire fighting water in event of a major fire, and
- (3) To provide for Kailua's future needs.

The Environmental Committee believes that these objectives could be better served by:

- (1) Using permanently installed, emergency generators at major wells which would provide long term water supply in case of a major catastrophe, such as a hurricane, and be more cost effective,
- (2) Recognition that during major fires, helicopters use water from Kailua's lakes, channels and ocean, and that Kailua's new Fire Department's tank trucks can pump from any body of water, and
- (3) Recognition that our per capita water consumption rate is decreasing. This is largely due to the Board of Water Supply's successful educational campaign on water conservation and measures taken to limit individual water consumption. [We question the accuracy of the EIS statement on page 4-1.]

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ENGINEERING CONCERNS

The EC recommends that Waimanalo's water requirements are served by a reservoir in Waimanalo to supply the three million gallons currently being allocated from Kailua's reservoirs.

The heart of our concern is:

- The project is expensive (\$10,600,000) and unnecessary.
- The tank, measuring 22 feet high and 185 feet in diameter, will be an eyesore on the Pu'u o Ehu ridge line which is a prominent, important viewplane strongly protected by Kailua residents. Graffitti on the tank would vilify Kailua Town and residents.

We do not seek mitigation but rather no project. Prior to this conclusion, the committee did discuss mitigation options.

- (1) Increase the size of a stable berm on the Kailua Town side of the proposed tank. The steep topographic slope angle may make this a difficult option.
- (2) An EC member believes that there are many old water reservoirs in Kailua which could be refurbished rather than building a new reservoir.
- (3) There are less obtrusive sites in Kailua for water tanks. The tank site east of Koolau Boys Home may be such a location. Relocate Reservoir 272.
- (4) Bury Reservoir 272 or locate it on the back side of Pu'u O Ehu, away from Kailua Town. A cursory review of the map suggests that by moving the tank about 1000 feet southeast along the ridge, the ridge could be excavated from the back side while maintaining the required elevation and concealing the tank from Kailua Town.
- (5) Use simulated moss rock covering, such as is proposed for the Kailua levee flood wall surface (although, we doubt this will dissuade graffitti).

The Environmental Committee finds that the Draft EIS is incomplete in its present form. The method of excavation cannot be left to the choice of the contractor but must be clearly defined in the Draft EIS (RE: Chapter 6, page 6-1, Unresolved Issues). The necessity of defining excavation method is due to safety reasons, past serious rock slides from the ridge, and the large amount of material to be removed (50,000 cubic yards).

It is doubtful that major fires would occur simultaneously in both Waimanalo and Kailua. The total water requirements may be miscalculated.

Could an earthquake cause the tank to rupture? The tank may pose a safety hazard to the people in the proposed



KAILUA NEIGHBORHOOD BOARD NO. 31
P.O. BOX 87 • KAILUA, HAWAII 96741

retirement home.

Questions of a resident living near the proposed tank are: How will their water pressure be affected, and will there be hydrant access for fire protection?

Public notices given in OEOC Bulletin #8, page 12, published on April 23, 1994, and OEOC Bulletin #9, page 8 & 9, published on May 8, 1994 were in error by listing the proposed tank diameter as 85 feet instead of 185 feet. The local newspaper repeated this error. The diameter error would affect public response to the project.

Please feel free to telephone me to discuss the Draft EIS. The "Unresolved Issue" in Chapter 6, and the public notice errors are sufficient cause to extend the Draft EIS comment period, which will allow for a less rushed evaluation of the other issues. EC members would be available to meet with the BWS and your consultants at your office.

We compliment the Draft EIS document prepared by Engineering Concepts, Incorporated, as being comprehensive and easy to read. It greatly facilitates contributions by Kailua Community members. Thank you for your attention to our concerns.

Respectfully submitted,

Ronald Jackson

Ronald Jackson
Chairperson - Environmental Committee
Kailua Neighborhood Board
178 N. Kalaheo Avenue
Kailua, Hawaii 96734
Phone: (808) 261-0146

cc: Kailua Neighborhood Board members
Waimanalo Neighborhood Board
Planning Committee, Kailua Urban Design Group
Lani-Kailua Outdoor Circle
Hawaii's Thousand Friends
Sun Press
✓ Kenneth Ishizaki, Engineering Concepts, Inc.

MINUTES OF REGULAR MEETING
JULY 7, 1994
KAILUA RECREATION CENTER

CALL TO ORDER: Chair Ron Jackson called the meeting to order at 7:00 p.m. A quorum was present.

MEMBERS PRESENT: Dorothyrose Babineau, Larry Bartley, Terry Carroll, Michael Compton, George Gonzalez, Ron Jackson, Juanita Schlitz, Laura H. Thielens, Rip Remicke, Knud Lindgard, Michael T. Barker, William Gomez, Mick Houtman, Norman Reid, Thomas Clifford, and Christy Kawabata.

MEMBERS ABSENT: Debbi Glanstein, Harold Falk, Mick Houtman, and Donna Wong.

GUESTS: Councilmember Steve Holmes, Representative Cynthia Thielens, Dale F. Leslie, Harry and Paula Swaida, Will Hoover (Honolulu Advertiser), Isadora Tai (Councilmember Felix's staff), Guy Jennings, Lt. Milt Olmos (HFD), Kailua Station, Pat Sivigny (MCB Hawaii), Councilmember John Henry Felix, Marty Conboy, Dexter Liu (Department of Parks and Recreation), Opt. Richard Marciel and Dodd Balock (HFD, Kailua Station), Eloise Agular (Sun Press), Jim Hovr (DPR-Water Safety), Barry Usagawa (Board of Water Supply, BWS), Paula Loucks (Mayor's Representative), Wanda Yamane (BWS), G. Uyeshiro, Paul Chang (Neighborhood Commission), Brenda Lumeng, Bob Bourke, Eve G. Anderson, Ursula Retherford, Denise DeCosta (BWS), and Catherine Ann Walker (Neighborhood Commission office staff).

Chair Ron Jackson discussed the procedures of receiving agenda items from the Committee chairs. Board member Norman Reid has been asked to expand his elected post as Secretary to include community outreach, communication with Kailua individuals, and organizations to increase the Board's effectiveness as representatives.

Vice Chair Thielens is to Chair a new committee which will combine Parks and Recreation and Transportation and will meet on the second Monday of every month at Kalaheo Beach Park.

Board member Schlitz was wished Happy Birthday from the Board.

Secretary Reid discussed the time frame in which he would like the minutes and agenda to be completed.

ELECTED OFFICIALS' REPORTS

COMMUNITY REPORTS

- A. Honolulu Police Department - Lt. Milt Olmos reported that for the month of June, the Kailua area statistics showed that there were 43 burglaries (37 resident, 6 business/school), 137 thefts - 10 shoplifting, 44 thefts



Kailua's Neighborhood Board System-Established 1973

Board member Bartley said that it should not make a difference. In this case, that the variance would be an "after the fact" variance. Board member Barker spoke in favor of the variance regarding the possibility of improvement in parking.

Board member Compton withdrew his previous motion which was seconded by Board member Ranicke.

Board member Theilen stated that it should be recorded that the Board does not make a habit of supporting "after the fact" variances.

Board member Bartley moved and Gonsalves seconded that the Board state no opposition to the variance. The motion passed 15-1-0.
By: Lindgard.

Without objection, the agenda was taken out of order.

ELECTED OFFICIALS

Councilmember John Henry Felix - Councilmember Felix distributed his monthly report and discussed the following: 1) Kailua Satellite City Hall, reopened on June 23; 2) Graffiti Buster Task Force; hotline number 529-3222; 3) Voter Registration Drive; 4) Royal Hawaiian Country Club Sign; 5) Child Care Programs; 6) Waste Disposal Policy; 7) Increase of Cash Bus Fares; 8) Bill 81, relating to gifts over the amount of \$200.

Councilmember Felix informed the Board that he endorses Council Bill 13, but does not support Council Bill 61.

The City will remove large appliances, furniture, metal and wood items free of charge. Residents may call the Refuse Division at 527-5358.

Bill 45 relates to raising the adult single bus fare to one dollar. Felix encouraged residents to testify at the hearing for Bill 45 when it goes before the Budget Committee on July 27.

Councilmember Felix commented that he and Councilmember Holmes would continue to see that the Charter Amendment issues are moved along.

Councilmember Felix announced that the bikeway funding for Keolu Drive had been approved.

C. Environmental Protection

1. Resolution on the Kailua 272' Reservoir - Board member Compton informed the Board of the contents of a lengthy committee meeting where the four million gallon reservoir was discussed. Compton recognized the Board members at this time. Discussion ensued about the location and expense of the project.

Personnel from the Board of Water Supply (BWS) explained their reasons for the location and the necessity of the dimensions

of the tank.

The Board viewed a Kailua Service Area map which showed the locations of existing and demolished or abandoned tanks. A plan view was also inspected.

A response letter to Chair Jackson from Kazu Hayashida, Manager and Chief Engineer for the BWS, was distributed to Board members which addressed concerns regarding the Draft Environmental Impact Statement.

Members from the BWS explained the benefits of having better water service from a large capacity tank, and said that it was not targeting accommodation of future developments.

The BWS intends to purchase the privately-owned land, and the funding for the project will be generated from fees rather than from taxpayers' money. Barry Usagawa, of the Environmental Unit, stated that they intended to work with the Kailua Urban Design Task Force.

Some Board members expressed concerns for the visual impact of the large structure on that particular location. Board members also debated the probability of natural disasters, and the areas which would be in the path of possible flooding.

Board member Gonsalves was in support of the storage tank because of the ensured water supply, and future cost increases.

Board member Compton summarized the committee's decisions regarding the visual impact of the location.

Denise DeCosta, Community Relations Division for BWS, suggested that the Board take time to work with the BWS to address the concerns.

Compton moved that the Kailua Neighborhood Board oppose the construction of a four million gallon 272' water reservoir on the top of Kua'o Pui Ridge, overlooking Kailua. Further, the Kailua Neighborhood Board will send a letter to the Board of Water Supply stating our position. The motion failed 7-6-2. Ayes: Lindgard, Rablman, Bartley, Compton, Jackson, Reid, and Schlitz. Nay: Thomas, Barker, Gonsalves, Conas, Thieleen, Ranicke. Carroll and Kawabata abstained.

ELECTED OFFICIALS

Mayor's Representative - Paula Loomis was available for concerns.

Councilmember Steve Holmes - The monthly report was circulated and highlighted the following: 1) Koolai Street Meters; 2) Capital Improvement Projects; 3) July activities hosted by the Department

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July 7, 1994

Mr. Ronald Jackson
Kailua Neighborhood Board
178 North Kalanui Avenue
Kailua, Hawaii 96734

Mr. Ronald Jackson
Page 2
July 7, 1994

Visual Impact Mitigation

1. We acknowledge that Puu O Ehu is an important scenic resource. We will be coordinating the landscape plan with the Outdoor Circle and the Kailua Neighborhood Board.
2. This project must also be approved by the City Planning Department, the Department of Land Utilization and the State Office of Conservation and Environmental Affairs, prior to construction. Visual impact will be thoroughly addressed, not only through the agency review process, but also through appropriate public hearings.

Excavation Procedures

1. All excavation proposals must be in accordance with BWS standards and subject to the approval processes of county and state agencies.
2. The Final EIS will expand on this issue with the inclusion of BWS blasting criteria and specifications which the contractor must adhere to if blasting is proposed.

Reservoir Alternatives

1. Permanent emergency generators at major well stations are not a feasible alternative since they will not accommodate transmission main breaks and are costly to maintain and purchase.
2. The construction of a reservoir in Waimanalo will not solve Kailua's storage deficit. Three million gallons of storage capacity at the Pohakupu Reservoir is already committed for regional operational requirements which is necessary to move water to areas south of Kailua including Waimanalo and Hawaii Kai. It is not available for Kailua.
3. The Puu O Ehu site remains the preferred alternative because of cost effectiveness, sufficient soil stability, quantity of excavation, operational efficiency and proximity to the Kailua Town demand center. Other alternative sites will significantly increase the cost of the project because longer pipelines will be required.

Dear Mr. Jackson:

Subject: Your Letter of May 17, 1994 Regarding the Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's (BWS) Proposed Kailua 272 Reservoir at Puu O Ehu, Kailua, Hawaii

Thank you for your letter regarding the DEIS for the proposed reservoir project. Your concerns have been addressed in Mayor Fasi's response of May 27, 1994 to Mr. Michael Compton, at the Kailua Neighborhood Board meeting on June 2, 1994 and at the Environmental Committee meeting of June 14, 1994.

We provide the following response to your letter:

Project Necessity

1. The additional storage capacity is required to meet the maximum daily demand as determined by a 12-month moving average of metered consumption for the Kailua area.
2. Kailua is presently deficient by approximately 3.3 million gallons (mg) of storage capacity and this reservoir will eliminate that storage deficit.
3. The additional capacity will ensure that adequate fire protection will be provided to the residents. Also, in cases of prolonged power outages, the additional storage will ensure that more water will be available to the residents.
4. Additional storage will stabilize transmission main pressures minimizing main breaks which cause a disruption of water service. The windward water system in 1993, experienced 71 water main breaks due to fluctuating line pressures, age and corrosion.

COPY

Mr. Ronald Jackson
Page 3
July 7, 1994

Project Cost

The estimated construction cost of \$10,600,000 is already one-third the cost of our current Capital Improvement Program budget. The first alternative site would increase construction costs by approximately \$6,000,000 because the excavation required is four times greater than the Puu O Ehu site. Additional funding is not feasible because it would limit our ability to provide water system improvements to other communities and would not be efficient use of limited available funds.

Other Concerns

1. It is unlikely that an earthquake would rupture the reservoir. The reservoir is structurally designed for Category 3 earthquakes loads which is one level of stringency above county standards for buildings on Oahu.
2. The proposed reservoir will improve flows and pressures in the surrounding area and the new fire hydrants installed in the Old Kukanono Community will be accessible.
3. The comment deadline in the Office of Environmental Quality Control Bulletin was extended another 45 days to July 23, 1994, due to the error in the publication.

We hope to work with the community in addressing all concerns regarding the impacts of this project. If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,



For
KAZUO HAYASHIDA
Manager and Chief Engineer

cc: Councilmember Steve Holmes
Oydoor Circle (Ms. Susan Spangler)
Engineering Concepts, Inc.

ENGINEERING DIVISION TEL No. 808-527-6195

Feb 1, 96 8:52 No. 001 P. 06

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

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BOARD OF WATER SUPPLY

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December 7, 1994

William A. Bonnet
Manager
Environmental Department

May 17, 1994

Mr. Kazu Hayashida
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Mr. William A. Bonnet, Manager
Environmental Department
Hawaiian Electric Company
P. O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Mr. Bonnet:

Subject: Your Letter of May 17, 1994 Regarding the Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's Proposed Kailua 272 Reservoir at Puu O Ehu, Kailua, Hawaii. TMK: 4-2-03: 16, Portions 9 and 17

Dear Mr. Hayashida:

Subject: Draft Environmental Impact Statement (EIS) for the Kailua 272 Reservoir Kailua, Oahu, Hawaii

Thank you for the opportunity to comment on your March 1994 Draft EIS for the construction of the Kailua 272 Reservoir, as proposed by the Board of Water Supply of the City and County of Honolulu. We have reviewed the DEIS and have no comments at this time on the proposed project. HECO shall reserve further comments pertaining to the protection of existing power lines bordering and servicing the project area until construction plans are finalized. Again, thank you for the opportunity to comment on this consultation.

Thank you for your letter regarding the DEIS for the proposed reservoir project. We appreciate your efforts in reviewing the document.

We acknowledge that you have no comments to offer at this time.

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

Very truly yours,

Sincerely,

William A. Bonnet

KAZU HAYASHIDA
Manager and Chief Engineer

cc: -Engineering Concepts, Inc.



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ENGINEERING DIVISION TEL No. 808-527-6195

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BOARD OF WATER SUPPLY
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Mr. 23 Mr. PC

KAILUA URBAN DESIGN TASK FORCE
P.O. BOX 1866
KAILUA, HAWAII 96734
808-266-1800

July 20, 1994

Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Attention: Kazu Hayashida

Re: Kailua 272 Reservoir
THK 4-2-03, 16 Portions 9 & 17
District Koolaupoko

Dear Mr. Hayashida,

This letter is in response to your request for comments regarding the above referenced project.

At the July general meeting of the Kailua Urban Design Task Force the proposed water tank project was discussed and the following resolution was adopted by the task force:

That although there may be a need for a new water storage facility (water tank) based on the current water usage, the proposed location on the top of the ridge at the entrance to Kailua Town is unacceptable for aesthetic reasons and is contrary to the prime directive of the Kailua Urban Design Task Force. We recommend to the Board of Water Supply that they investigate other locations or alternatives, such as refurbishing existing abandoned storage tanks in the Kailua area.

We trust that the concerns of the Kailua Urban Design Task Force will be taken into consideration and that this letter will become part of the public record regarding this proposed project.

Very truly yours,
KAILUA URBAN DESIGN TASK FORCE

[Signature]
Jamie A. Osborne
Chairman

cc: Barry Usagawa, Board of Water Supply

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU



COPY

December 7, 1994

Mr. Jamie A. Osborne, Chairman
Kailua Urban Design Task Force
P. O. Box 1866
Kailua, Hawaii 96734

Dear Mr. Osborne:

Subject: Your Letter of July 20, 1994 Regarding the Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's Proposed Kailua 272 Reservoir at Puu O Ehu, Kailua, Hawaii THK 4-2-03-16, Portions 9 and 17

Thank you for your letter regarding the DEIS for the proposed reservoir project. We provide the following response to your concerns:

1. We share your concern about the aesthetic impact of a reservoir atop the Puu O Ehu ridge. However, we feel that the visual impact can be mitigated utilizing the constructive input received in the DEIS process. The Puu O Ehu ridge is still our preferred site to other locations based on an analysis of construction cost, elevation, operational efficiency and proximity to Kailua Town. The analysis evaluated the helpful suggestions of the Kailua community both for alternative sites and other options to address the area's storage deficit. The final EIS will provide a full discussion of these important issues.
2. At the expense of our maintenance roadway around the reservoir, we are investigating the construction of berms against a retaining wall high enough to screen the reservoir from affected views. The berms will allow a revised landscaping plan to include shrubbing to match the adjacent hillside. We welcome your input on the preferred planting plan. We will be providing a photographic representation showing the proposed reservoir with the mitigating berms and uniform landscaping as part of the final EIS.

We hope to work with the community in addressing all concerns regarding the impacts of this project.

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

Very truly yours,
[Signature]

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Concepts, Inc.



COPY



COPY

May 24, 1995

Mr. Paul Remington
Kailua Urban Design Task Force
P. O. Box 1496
Kailua, Hawaii 96734

Dear Mr. Remington:

Subject: Your Comments on the Draft Environmental Impact Statement (DEIS) for the Proposed Kailua 272 Reservoir, TMK: 4-2-03: 16, Por. 9 and 17

Thank you for your comments regarding the proposed reservoir project and for participating in our field trip to the reservoir sites. We are finalizing our final EIS and have already incorporated many of your points which are highlighted below:

1. Need for the Reservoir:

We have stated that the Kailua storage capacity is deficient by 3.3 million gallons (mg), based on 1990 metered consumption. The construction of a 4.0 mg reservoir will bring the Kailua storage capacity up to Board of Water Supply (BWS) water system standards. The 4.0 mg is the smallest standard size reservoir that meets minimum standards. Large reservoir sizes increase or decrease in 1.0 mg increments.

The existing Pohakupu Booster Station on Kalaiananole Highway and 3.0 mg of storage capacity from the 6.0 mg Pohakupu reservoir is already committed to regional operational requirements, to provide water to Waimanalo. Any excess water will be moved toward Hawaii Kai. This 3.0 mg capacity is not available for Kailua's storage needs. The construction of a reservoir in Waimanalo will not alleviate Kailua's storage deficit because of this existing regional storage commitment.

2. Location of the Reservoir:

Alternative reservoir locations are very limited due to structural and water system operational constraints. The Puu O Ehu site remains the preferred alternative because of cost effectiveness, soil stability, quantity of excavation, system operational efficiency and proximity to the Kailua Town demand center.

Burying the reservoir reduces our ability to maintain sanitary control creating water quality problems. Chlorine content would have to be increased creating taste and odor problems as well as disinfection by-products which would require expensive treatment under the expanded Safe Drinking Water Act.

Mr. Paul Remington
Page 2
May 24, 1995

The existing Pohakupu 1.0 mg reservoir is fully functional and it is estimated that with regular maintenance, it would be functional beyond 20 years. To demolish a functional reservoir prior to reaching its life expectancy is not cost effective nor preferable at this time.

3. Views of the Reservoir:

The Final EIS has significantly expanded the visual mitigation analysis based on one year of agency and community input on various visual concerns. The access road is not expected to have a significant visual impact once mitigated by low profile landscaping.

Landscape maintenance of over 200 BWS facilities is a difficult task. Realizing this, we have identified a list of highly visible facilities which must be maintained to higher standards than other facilities. This list is periodically reviewed to equally address all communities. The Pohakupu 6.0 mg reservoir site is not on the priority list because it is adequately screened by the hillside from all angles. The Kapaa Reservoir is highly visible and will be repainted shortly.

The Final EIS will be available to the Kailua community within a few months. We hope to work with the Kailua community groups on specific landscape and painting schemes. The reservoir project benefits the community by upgrading the existing substandard water system to BWS standards providing reliable water service for domestic consumption and fire protection. We feel the proposed mitigative measures will minimize the impacts to a mutually acceptable level of cost and benefit.

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

Very truly yours,

RAYMOND H. SATO
Manager and Chief Engineer

✓ cc: Engineering Concepts, Inc.

941930

K.H. Mar
JUL 22 8 51 AM '94
PE



THE OUTDOOR CIRCLE

1110 University Ave., #406 • Honolulu, HI 96813
Phone: 808-943-9638 Fax: 808-955-7364

RECEIVED
808-943-9638 SUPPLY

JUL 21 5 03 AM '94

Established 1912
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BRANCHES

- OAHU
 - Ewa Beach
 - Kaneohe
 - Lani-Kailua
 - North Shore
- HAWAII
 - Iliho
 - Kona
 - Puu
 - Waimea
- KAUAI
- MAUI
- MOLOKAI

GARDEN CIRCLES

- Hawaii Kai
- Kaneohe
- Lani-Kai
- Waialeale-Kahala

July 18, 1994

Mr. Kazu Hayashida, Director
Board of Water Supply
City & County of Honolulu
630 South Beretania Street
Honolulu, HI 96813

Re: Kailua 272 Reservoir; TMK 4-2-03:16, por. 9 and 17

Dear Mr. Hayashida:

This letter is to confirm the positions of both The Outdoor Circle and the Lani-Kailua Outdoor Circle regarding the above-referenced reservoir.

The Circle strongly disagrees with the Board of Water Supply's decision to place the concrete reservoir on Puu O Ehu ridge line, south of the existing Kailua 272 Reservoir site. This tank, having a circular container measuring 185 feet in diameter, will destroy the magnificent views of the mountains. At the Kailua Neighborhood Board meeting, sketches of the view from Kailua were presented. These sketches are misleading, showing just the tip of the structure above the hillside. No renderings from the town side were presented.

We understand it is your intention to plant trees at the base of the tank. The Circle has serious doubts about the effectiveness of such landscaping as a means to camouflage the reservoir. Also, trees will not keep the reservoir from being covered in graffiti. Painting messages on these tanks is a favorite pastime of school children on the mainland, and we have no reason to believe that the same will not happen here.

Surely there are less obtrusive sites in Kailua for water tanks. Hawai'i's unspoiled land is a precious commodity. We should be doing everything we can to preserve, not destroy it.

If you would like to discuss this further, please feel free to contact me at the number listed above.

Yours for the beauty of Hawai'i,

Susan Bright Spangler
Susan Bright Spangler
President

cc: Lani-Kailua Outdoor Circle
Kenneth Ishizaki, Engineering Concepts, Inc.

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THE OUTDOOR CIRCLE

1110 University Ave., #406 • Honolulu, HI 96813
Phone: 808-943-9638 Fax: 808-955-7364

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Established 1912
A Non-profit Organization

BRANCHES

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GARDEN CIRCLES

- Hawaii Kai
- Kaneohe
- Lani-Kai
- Waialeale-Kahala

June 8, 1994

Mr. Kazu Hayashida, Director
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, HI 96813

Dear Mr. Hayashida:

The Outdoor Circle has been serving the community for over 80 years. Acting as its "conscience", our mission is to "keep Hawai'i clean, green, and beautiful". One way to beautify our environment is by protecting view planes.

The Circle strongly disagrees with the Board of Water Supply's recent decision to place a 272 foot-high water tank on Kailua's ridge line. From Kailua and Kaneohe and even to Tantalus, the proposed tank will impinge on the otherwise magnificent views.

Through Steve Mechler, its Landscape and Planting Committee Chair, The Outdoor Circle would like to help the Board of Water Supply locate a less conspicuous site for the water tank. Steve, a landscape architect, is also a resident of Kaneohe. Because of increasing population and subsequent development, he is aware that Hawai'i's unspoiled land is a precious commodity. Understanding the need for a water reservoir, it is our opinion that the tank can be better concealed within the ridgeline, thus maintaining priceless vistas.

Please let The Circle know if this offer is a viable alternative toward finding a solution satisfactory to all.

Yours for the beauty of Hawai'i,

Susan Bright Spangler
Susan Bright Spangler
President

cc: Jeremy Harris
Mary George
Cynthia Theillen
Jackie Young
Steve Holmes
Steve Mechler



COPY

December 16, 1994

Ms. Susan Bright Spangler, President
The Outdoor Circle
1110 University Avenue, #406
Honolulu, Hawaii 96826

Dear Ms. Spangler:

Subject: Your Letters of June 8 and July 18, 1994 Regarding the Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's Proposed Kailua 272 Reservoir at Puu O Ehu, Kailua, Hawaii. TMK: 4-2-03: 16, Portion 2 and 17


Thank you for your letters regarding the DEIS for the proposed reservoir project. We provide the following response to your concerns:

1. We share your concern about the aesthetic impact of a reservoir atop the Puu O Ehu ridge. However, we feel that the visual impact can be mitigated utilizing the constructive input received in the DEIS process. The Puu O Ehu ridge is still our preferred site to other locations based on an analysis of construction cost, elevation, operational efficiency and proximity to Kailua Town. The analysis evaluated the helpful suggestions of the Kailua community both for alternative sites and other options to address the area's storage deficit. The final EIS will provide a full discussion of these important issues.
2. At the expense of our maintenance roadway around the reservoir, we are investigating the construction of berms against a retaining wall high enough to screen the reservoir from affected views. The berms will allow a low profile landscaping plan to blend with the adjacent hillside and minimize the visibility of graffiti. We welcome your input on the preferred planting plan. We will be providing an improved photographic representation showing the proposed reservoir from various affected views with the mitigating berms and uniform landscaping as part of the final EIS.

We hope to work further with the community in addressing all concerns regarding the impacts of this project.

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

Very truly yours,


KAZU HAYASHIDA
For Manager and Chief Engineer

cc: Mr. Steve Mechler
Engineering Concepts, Inc.

RECEIVED DECEMBER 20 1994

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY



August 26, 1994

KANEHOHE RANCH

The Estates of Harold K.L. Castle and Alice H. Castle

Castle Junction
1199 Auloa Road
Kailua, Hawaii 96734-4606
Telephone (808) 266-1400

Trustees:
James C. Castle
James C. McIntosh
Hawaiian Trust Company, Limited
President and Chief Executive Officer
Randolph G. Moore

May 12, 1994

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MAY 14 1994

ENGINEERING CONCEPTS

Mr. Kazu Hayashida
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Mr. Randolph G. Moore
Kaneohe Ranch
Castle Junction
1199 Auloa Road
Kailua, Hawaii 96734-4606

Dear Mr. Hayashida:

Dear Mr. Moore:

Subject: Draft Environmental Impact Statement
Kailua 272 Reservoir
TMK 4-2-3:16, portions 9 and 17

Subject: Your Letter of May 12, 1994 Regarding the Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's Proposed Kailua 272 Reservoir, TMK: 4-2-03:16, Portions 9 and 17

We have only one comment after reviewing the Draft Environmental Impact Statement dated March 1994 prepared by Engineering Concepts, Inc. for the Kailua 272 Reservoir.

Thank you for your comments regarding the DEIS for the proposed Kailua 272 Reservoir.

We understand your concerns regarding the noise impacts of the installation of a solar-powered 121 decibel siren at our proposed reservoir site for the State Civil Defense. We agreed to install the siren to benefit the Kailua community and because there is an adequate buffer zone of a 250-foot radius in which there are no residential structures. The Kailua Gateway development's proposed location was taken into account in the assessment of the 250-foot buffer zone requirement. Enclosed are maps indicating the location of the proposed reservoir from the retirement community. We will ensure that the buffer zone is maintained during installation of the siren; however, if this is not acceptable, we would be open to further discussions.

We wish to point out that we plan to develop a retirement community on our property at the base of the hill below the proposed reservoir and trust you will consider the effect of such a siren on the residents of that facility.

if there are any questions, please contact Barry Usagawa at 527-5235.

Sincerely,

Very truly yours,

Randolph G. Moore

Randolph G. Moore

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

copies to:

✓ Engineering Concepts, Inc.

Mr. Barry Usagawa, BWS
Mr. Kenneth Ishizaki, Engineering Concepts, Inc., 250 Ward Avenue, Suite 206, Honolulu 96814

Enclosures

RECEIVED
BD OF WATER SUPPLY

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03 June 1994

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


Reference: Kailua 272 Reservoir

Attention: Mr. Kazu Hayashida:

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PC
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4. I look forward to your response and appreciate your efforts to improve our community. As you are probably aware, we (Cann's and Jacob's) are the sole users of the access road to the reservoir and as such have the most to gain as well as the most to endure from the construction. The road users association and the developer of the Jacob's home, Stuart Featheran, based in part on your proposal, have not taken any steps to repair the severe erosion on the side of the access road, which accelerated after your survey work. So we actually look forward to the construction and understand that progress has its costs.

Sincerely,


Donald and Martha Cann
4005G Kailua Road
Kailua, HI 96734

1. Thank you very much for giving us the opportunity to comment on the EIS for the proposed Reservoir (272) that adjoins our property. Since we are one of two houses that are served by the access road and since both of us (Jacob's and Cann) have small children we want to ensure safety and that there will be NO blockage of the access road during the construction. In addition, when the Water Company did the digging for the Reservoir Survey, all the dirt and rock came down the driveway to our house. I'd like to ask you to protect against this happening this time and to take immediate steps to clean it up if it does.

2. Since you will be putting in a new water line, we would like a fire hydrant placed at the top of our drive (This will serve both homes). The best location is on the left side going up the access road just past our driveway. The new water connection and meter for our home (Cann) should be right as the line exits the reservoir and crosses the access road, immediately above our house and on the down slope of the access road. The Jacob's meter/connection should be after the water line crosses our common driveway on the downslope toward the Jacobs house and immediately above. It appears these items are already being installed, but this is verification as to where we would like them located.

3. We support the installation of the reservoir and both my neighbor (Jacobs) and myself have appeared before the Kailua Neighborhood board to state that fact. We have no objection to the planned method of construction or blasting (as necessary). However, we (the Cann's) have a LARGE rock formation (probably 100 tons or more) immediately above our home which we have made into a water fall. If this would come loose or break as a result of blasting it could do millions of dollars in damage and could prove fatal since it is immediately above our bedroom. Request that you conduct an engineering study and take whatever steps necessary to reinforce the formation prior to any blasting or other ground disturbing actions during construction.

BT



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December 16, 1994

Mr. and Mrs. Donald Cann
1005-G Kailua Road
Kailua, Hawaii 96734

Dear Mr. and Mrs. Cann:

Subject: Your Letter of June 3, 1994 Regarding the Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's (BWS) Proposed Kailua 272 Reservoir at Puu O Ehu, Kailua, Hawaii, TMK: 4-2-03: 16, Portions 9 and 17

Thank you for your letter regarding the DEIS for the proposed reservoir project. We appreciate your efforts in reviewing the document and provide the following response to your comments:

1. We share your concern for safety and accessibility along the access road during construction. An erosion control plan, approved by the City and County Department of Public Works, will be prepared by the design consultant and implemented by the contractor to minimize erosion during construction. Typical erosion control measures include placement of sand bags uphill of the driveways to control surface runoff and immediate revegetation of large graded areas. The contractor will be required to provide continuous access on both the private and BWS access roads. Should temporary blockage of the access roads be necessary, the contractor will be required to inform you in advance to minimize any inconvenience.
2. The water meters currently serving the two lots are located along Kailua Road and can remain. However, if you prefer the meters be relocated to the driveway frontage, a service lateral could be provided from the proposed fire hydrant. The installation and reconnection of private property piping up to the property line would be the responsibility of the property owner.
3. We understand your concern over potential damage to the waterfall/rock formation on your property as well as other structural damage due to blasting. If blasting is required, the contractor must adhere to specific BWS procedures to minimize vibration. Charges will be small and localized. A

Mr. and Mrs. Donald Cann
Page 2
December 16, 1994

thorough survey of the pre-existing conditions prior to construction and a monitoring program during blasting will be conducted. The contractor will be informed of the situation and will be required to take all necessary precautions to maintain structural stability of the rock formation.

The reservoir will benefit the entire Kailua community and we thank you for your continued support.

If there are any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

May 10, 1994
Page 2

Justifying this tank for fire fighting is even less likely. Kailua already has 9.6 MG of water storage. The EA mentions 3 MG of this is "planned" for Wi'iamani, however the chance of a major fire in both places is innumerable small. In fact the only recent major fire in Kailua did not use water from the hydrant system at all. When the Kalaheo hillside caught fire, the fire helicopters filled up using inland water and from the sea. Kailua is surrounded by water. Many people also have swimming pools, which provide another source of water. I spoke with Chief Maibews of the City and County Fire Department and he said the Kailua trucks can pump from almost any body of water. Large numbers of expensive tanks may be required in a desert (like Texas), but all parts of Kailua have adequate access to fire fighting water. Between the ocean, two inland lakes, pools and 9.6 million gallons in tanks, there is sufficient water in Kailua for fire fighting without this tank.

I appreciate your department's efforts to improve the safety of life in Kailua, but I think it is time to rethink our predisposition to building more tanks. We can provide equal or greater safety for the public with emergency power for our well pumps instead of this tank. We should learn from other's misfortunes and provide emergency power for our water supply pumps. We should also avoid any permanent scars above Kailua and desecration to these sacred mountains. I would appreciate the courtesy of a personal reply. You can call me at 263-3501 if you have any questions.

Sincerely,



Michael B. Compton

cc: Mr. Kenneth Ishizaki
Mr. Barry Usagawa
Councilman Steve Holms
Councilman John-Henry Felix
Major Frank Fasi

May 27, 1994

Mr. Michael B. Compton
854 Akumu Street
Kailua, Hawaii 96734

Dear Mr. Compton:

Subject: Your Letter of May 16, 1994, Regarding the Board of Water Supply's
Proposed Kailua 272' Reservoir

Thank you for your concerns regarding the Board of Water Supply's (BWS) proposed Kailua 272' Reservoir project.

Let me assure you that the need to protect and preserve Oahu's historic areas and visual beauty is a concern that I share with you.

The impact to the Puu O Ehu Ridge due to the construction of this project is planned to be mitigated as discussed in the BWS Draft Environmental Impact Statement (EIS) dated March, 1994. The archaeological report indicates that the field survey and historical research did not identify any historic sites that would be impacted by this project. This is probably due to the steepness of terrain and the lack of a natural water source. Historical research did identify Puu O Ehu, the highest point of the ridge, as an important reference point within the Kailua area. This high point, however, is about 1,500 feet southeast of the reservoir site which we believe is sufficiently distant to avoid any adverse impact on the general appearance of the ridge.

We agree that the Puu O Ehu ridge is an important scenic resource from several view angles. Visual impact mitigation is one of the main focal points of the Draft EIS because of the possible impact to public views. Visual impact will be minimized as much as possible by landscaping and earth tone paint to blend in with the existing hillside. The landscape plan proposes Monkey Pod trees along the access road and Formosan Koa surrounding the reservoir. However, these trees will take time to grow and develop an adequate screening canopy. The Visual Impact Analysis is being coordinated with the City Planning Department and the State Office of Conservation

ENGINEERING DIVISION TEL No. 808-527-6195

Jun 20, 94 13:33 No. 005 P. 02

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MR. & MRS. RICHARD B. RIEGELS
1005-B Kailua Road
Kailua, Hawaii 96734
(808) 261-7078

June 15, 1994

Mr. Kazu Hayashida
Head of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96813

Subject: Proposed Kailua 272 Reservoir

Dear Mr. Hayashida,

I have reviewed the draft EIS prepared for the subject project. In addition to those concerns that I originally expressed to you regarding this project, (my letter dated May 7, 1993 which was incorporated into the draft EIS) I would like to make the following comment.

In their memo to you of May 19, 1993, the Office of the Director of Civil Defense, State of Hawaii, requested that BWS purchase and install a 121 db siren warning device with the project site. The rationale for the installation of a siren at this location is questionable. I believe that the primary use of these sirens is to alert residences in low lying areas of the threat of tsunami although I am sure that the CD people would dispute this narrow purpose statement. Never-the-less, I feel that this site is inappropriate. The immediate neighborhood is sparsely populated, far removed from the shoreline and elevated above any flood threat. The area surrounding the proposed reservoir site is used primarily for the grazing of cattle and banding of horses. The cost / benefit ratio of this location appears to be extremely low unless the siren is so loud that its reach extends into the denser residential areas of Kailua, Puuhale and Enchanted Lake. The noise generated by a high volume siren would be highly disturbing to these animals as well as to the residents of our rural neighborhood.

We have been willing to accept the proposed project due to the knowledge that the completed installation will not have a negative long-term effect on our neighborhood. The imposition of an high volume siren into our neighborhood is not in keeping with the BWS representation regarding this project. We suggest that the Office of Civil Defense look elsewhere for their site, preferable closer to the beach where such sirens are truly useful.

Sincerely,

Richard B. Riegels

cc: Roy C. Price, Vice Director of Civil Defense

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU



COPY

December 7, 1994

Mr. & Mrs. Richard B. Riegels
1005-B Kailua Road
Kailua, Hawaii 96734

Dear Mr. and Mrs. Riegels:

Subject: Your Letter of June 15, 1994 Regarding the Draft Environmental Impact Statement (DEIS) for the Board of Water Supply's Proposed Kailua 272 Reservoir at Pau O Ehu, Kailua, Hawaii. IMK: 4-2-03: 16, Portions 9 and 17

Thank you for your comments regarding the DEIS for the proposed reservoir project.

We understand your concern regarding the noise impacts of the installation of a solar-powered 121 decibel siren for the State Civil Defense at our proposed reservoir site. We agreed to accommodate space for the installation of the siren to provide adequate warning to the Kailua community in the event of attack, hurricanes, floods and tsunamis. According to the State, the siren warning system is designed to fill the dead spots in siren coverage so that everyone is notified that a potential disaster is imminent. We will ensure that the required buffer zone of a 250-foot radius in which there are no residential structures is maintained. We are willing to discuss this further.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Concepts, Inc.
State Civil Defense

P-76/95

Honolulu Board of Water Supply

HERBERT MINAKAMI, P & E

DENISE DE COSTA, Community Relations

REQUEST FOR INFORMATION FROM KAILUA ^{date}
N/B MEMBER REGARDING RESERVOIR PROJECT

2-9-95

KAILUA RESERVOIR 272

to
from
subject

1. Kailua road side is shed rocks which are unstable
2. EIS pg 1-3 speaks to "base of basaltic rock" is conjectural rather than real & its existence as not yet been demonstrated.
3. What is life expectancy of water tanks? Why so many 4 out of 8 abandoned & demolished? What is life expectancy of 272?
4. How will BWS address failure of subsoil & vulnerability to earthquake since 4 million odd gallons is approximately 200 lbs? Especially immediately above high school?
5. What are construction hours? Noise, traffic impact on high school?
6. A Kailua resident attended a meeting about 2+ years ago at the Municipal Office building where it was stated that the primary function of this reservoir was to provide a water supply for a series of townhouses & possibly other structures to be built along this ridge.
6. Why doesn't BWS construct a reservoir much nearer to the Koolaus where the rainfall is much greater?

Ms. Donna Wong, a member of the Kailua Neighborhood Board, submitted the attached list to me to obtain responses from our department. We request that a response be prepared by your division for Manager's signature, and sent directly to Ms. Wong with a copy to the chair of the Kailua Neighborhood Board.

Regarding question #6, although Ms. Wong does not identify the resident who claims to have heard this statement made, nor does she identify the person making the statement, we would appreciate clarification from P & E whether this is correct.

Community Relations was previously informed that the reservoir project was primarily to meet existing needs of Kailua area, to bring their storage system up to standards, and was not intended to provide storage for the proposed Kaneohe Ranch townhouse project.

Has there been a change in policy re: the purpose for the Kailua reservoir project? We need to be informed as soon as possible, because we have been working with the Board for over four years to let them know (1) about demolition of the previously existing tank(s) and (2) about plans to construct the replacement tank.

Ms. Wong's address is: 1525 Uluhau St., Kailua, HI 96734.

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March 22, 1995

Ms. Donna Wong
Page 2
March 22, 1995

Ms. Donna Wong
1525 Uluhau Street
Kailua, Hawaii, 96734

Dear Ms. Wong:

Subject: Your Request Regarding the Board of Water Supply's (BWS) Proposed
Kailua 272' Reservoir Project. TMK: 4-2

Thank you for your inquiry regarding the proposed reservoir project. We provide the following response to your questions.

1. Kailua Road side is shed rocks which are unstable.

We are aware of the shed rocks on the portion of the ridge adjacent to Kailua Road. The instability is restricted to this area where loose rocks are visible above the existing vegetation. Similar rocks are not present on the rest of the ridge and the shed rocks are a considerable distance away from the project site. The contractor will be required to assess the slide potential prior to any excavation or blasting and submit a mitigation report which would include stabilization measures and a pre-blast survey documenting existing conditions.

2. Has the existence of basaltic rock been demonstrated.

As part of the reservoir feasibility study, soil borings were conducted indicating the presence of stable basaltic rock under the base of the reservoir.

3. What is the life expectancy of water tanks? Why have so many tanks in Kailua been abandoned or demolished?

The life expectancy of reinforced concrete reservoirs extend past 50 years with proper maintenance. As indicated in the Environmental Impact Statement (EIS), two reservoirs, the Lanikai 230' and the Kailua Heights 230' were abandoned because the spillway elevations were not compatible with the new reservoirs and did not provide adequate pressure to the residences in the upper fringes of the Lanikai and Kailua Heights water systems.

The Kailua 272' 0.3 million gallon (mg) concrete reservoir on the Puu O Ehu Ridge was too small for the Kailua demand and was abandoned when the adjacent Kailua 275' 1.5 mg. steel tank and 8-inch pipelines were demolished due to age.

4. How will BWS address failure of subsoil and vulnerability to earthquakes especially because of the proximity of the Kailua High School.

BWS reinforced concrete reservoirs are designed and built to more stringent earthquake standards than the building standard for Oahu. The soil investigations and reports indicate that the underlying soil is stable. In addition, the weight of the water filled reservoir will be much less than the weight of the overlying soil that will be excavated. Therefore, we can say that the Kailua High School as well as the adjacent homes are safe.

5. What are the construction hours and is noise and traffic impacts on the high school addressed?

The normal construction hours are from 7:00 am to 3:30 pm which can be adjusted when the Street Use Permit is obtained from the State Department of Transportation. Heavy equipment and blasting can be restricted to off-peak hours to avoid inconvenience to motorists, residents and the high school. The construction plans include a traffic control plan to minimize construction traffic hazards. A noise permit requiring the use of noise abatement equipment must be obtained from the Department of Health prior to the start of construction. The construction impacts are thoroughly addressed in the EIS.

6. Reference to a statement that the primary function of this reservoir was to provide water supply for a series of townhouses and possibly other structures to be built along this ridge.

Water storage for townhouses or other developments along the ridge was never a consideration in planning for the reservoir. We have stated both in the EIS and at numerous neighborhood board meetings that this reservoir is to address the existing water storage deficit in the Kailua area. We have determined this deficit to be in the range of 3.3 mg based on actual water consumption data in 1992, but since standard reservoir sizes for large reservoirs are set in increments of 1.0 mg, a 4.0 mg reservoir is being proposed.

All proposed developments have to comply with our water commitment policy as stated in our Rules and Regulations. The availability of water for proposed developments are evaluated on a first come, first serve basis and determined when formalized plans in the form of construction plans and building permits are submitted for our review and approval. To date, we have not received any construction plans nor building permits for any large townhouse development in the vicinity of this ridge.

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Ms. Donna Wong
Page 3
March 22, 1995

7. Why doesn't BWS construct a reservoir much nearer to the Koolau's where the rainfall is much greater?

The location criteria for the selection of this reservoir site was discussed in the EIS. It is based on a strict combination of elevation, soil stability and proximity to large transmission mains and water demand centers. Alternative sites were very minimal. The water that will fill this reservoir is solely from groundwater sources because of consistent water quality and sanitary control. The direct capture of rainfall into a reservoir is more applicable to an open type reservoir for irrigation systems and is not preferable for Oahu's safe drinking water system.

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

Very truly yours,

Handwritten signature of Raymond H. Sato in black ink.

RAYMOND H. SATO
Manager and Chief Engineer

cc: Engineering Concepts, Inc.

RECEIVED BY THE BOARD OF WATER SUPPLY

SOILS FEASIBILITY STUDY
KAILUA 272 RESERVOIR
BOARD OF WATER SUPPLY
KAILUA, OAHU, HAWAII

for

ENGINEERING CONCEPTS, INC.

W.O. 92-2225
April 17, 1992

ERNEST K. HIRATA & ASSOCIATES, INC.

Soils and Foundation Engineering



ERNEST K. HIRATA & ASSOCIATES, INC.

Soils and Foundation Engineering

99-1433 Koaha Place • Aiea, Hawaii 96701-3279
Phone (808)486-0787 • FAX (808) 486-0870

ERNEST K. HIRATA P.E.
PAUL S. MORIMOTO P.E.
DAVID M. KITAMURA P.E.
JUNG K. KIM P.E.

April 17, 1992
W.O. 92-2225

Mr. Kenneth Ishizaki
Engineering Concepts, Inc.
250 Ward Avenue, Suite 206
Honolulu, Hawaii 96814

Dear Mr. Ishizaki,

**Re: SOILS FEASIBILITY STUDY
KAILUA 272 RESERVOIR
BOARD OF WATER SUPPLY
KAILUA, OAHU, HAWAII**

This report presents the results of our soils feasibility study performed for the proposed Kailua 272 Reservoir. Our work scope for this study included the following:

- A visual reconnaissance of the site and its vicinity, to observe existing conditions which may affect the project. The general location of the project site is shown on the enclosed Location Map, Plate 1. A project Site Plan is shown on Plate 2.
- A review of available soils information pertinent to the site and the proposed project.
- Preparation of this report presenting the expected soil conditions, and our preliminary geotechnical opinions regarding possible foundation types for support of the reservoir, excavatability of material, cut slope gradients, and site grading.

As indicated in the General Conditions of our contract, preliminary recommendations presented in this report will require substantiation with exploratory borings, laboratory testing, and engineering analysis. This phase of work will be performed at a later date.

PROJECT CONSIDERATIONS

Information concerning the proposed project was furnished by personnel from your staff.

The project consists of a construction feasibility study for a 4 million gallon water reservoir. The reservoir will be of reinforced concrete construction, with a concrete roof and floor slab. The structure will be approximately 190 feet in diameter, and extend about 20 feet in height. Preliminary plans indicate a floor elevation of 252.0 and a spillway elevation of 272.0. The project also includes a 12 foot wide access road off an existing A.C. paved roadway.

Excavations in the tank area will range from approximately 8 to 48 feet in depth.

SITE CONDITIONS

The project site is located east of Kailua Road and northeast of Kailua High School. An existing water tank is located about 250 feet to the north.

The proposed reservoir site is situated along a ridgeline which generally extends in a northwest - southeast direction. The slopes extend downward toward the northeast and southwest at gradients on the order of 1½:1 to 2:1 (horizontal to vertical). Slight to moderate vegetation covers the slopes which are presently used as pasture lands. No evidence of slope movement was observed, and the slopes appeared to be stable.

SOIL CONDITIONS

The Soil Survey, prepared by the U.S. Department of Agriculture, Soil Conservation Service, identifies the near surface soils in the project area as Papaa clay. The clay is formed in colluvium and residuum derived from basalt. Papaa clay is usually very dark brown in color, and has a sticky and plastic consistency. The Soil Survey gives Papaa clay a Unified Soil Classification of CH which may indicate a high expansion potential.

The Soil Survey also indicates that a thin layer of reddish brown and gray silty clay loam underlies the surface clay. The loam generally exhibits moderate shrink-swell potentials. Below the silty clay loam, the soils transition to weathered rock and rock.

The soil exposed along the slopes generally confirm the Soil Survey. The surface soil was visually classified as dark brown silty clay. Isolated areas also exposed mottled orange brown clayey silt.

Rock outcrops were observed in numerous areas, particularly along the western slopes. A relatively consistent basalt stratum or ledge was observed along the western slope face, about 75 feet below the ridgeline. The basalt was fractured, but only slightly weathered.

PRELIMINARY RECOMMENDATIONS

Based on our research and visual reconnaissance, the following preliminary recommendations are presented.

1. Assuming a reservoir floor elevation of 252, foundations for the structure are expected to rest on basalt.
2. Continuous wall footings or a mat foundation may be used for support of the reservoir. A preliminary bearing value of 8000 pounds per square foot may be used for sizing foundations.
3. Pneumatic equipment will probably be required for excavations into the basalt stratum. It is our opinion that blasting will not be allowed due to the proximity of residences on the south facing slopes.
4. Cut slope gradients of 2:1 (horizontal to vertical) may be used for slopes exposing the surface soils. The thickness of surface soil is expected to be on the order of 4 feet. Cut slopes exposing basalt may be designed using gradients on the order of 1/2:1 to 3/4:1, depending on the amount of weathering and fracturing.
5. The surface clay may be highly expansive, and require removal prior to placement of structural fill.

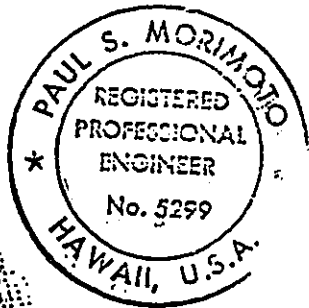
LIMITATIONS

As indicated earlier, the preliminary recommendations presented in this report will require substantiation with exploratory borings, laboratory testing, and engineering analysis. This

phase of work should be performed at a later date.

Our preliminary recommendations are based upon the site materials observed, the preliminary design information made available, the data obtained from our site reconnaissance, and our experience and engineering judgement. The recommendations are professional opinions which we have strived to develop in a manner consistent with that level of care, skill, and competence ordinarily exercised by members of the profession in good standing, currently practicing under similar conditions. No other warranty is expressed or implied.

We appreciate this opportunity to be of service. Should you have any questions concerning this report, please feel free to call on us.



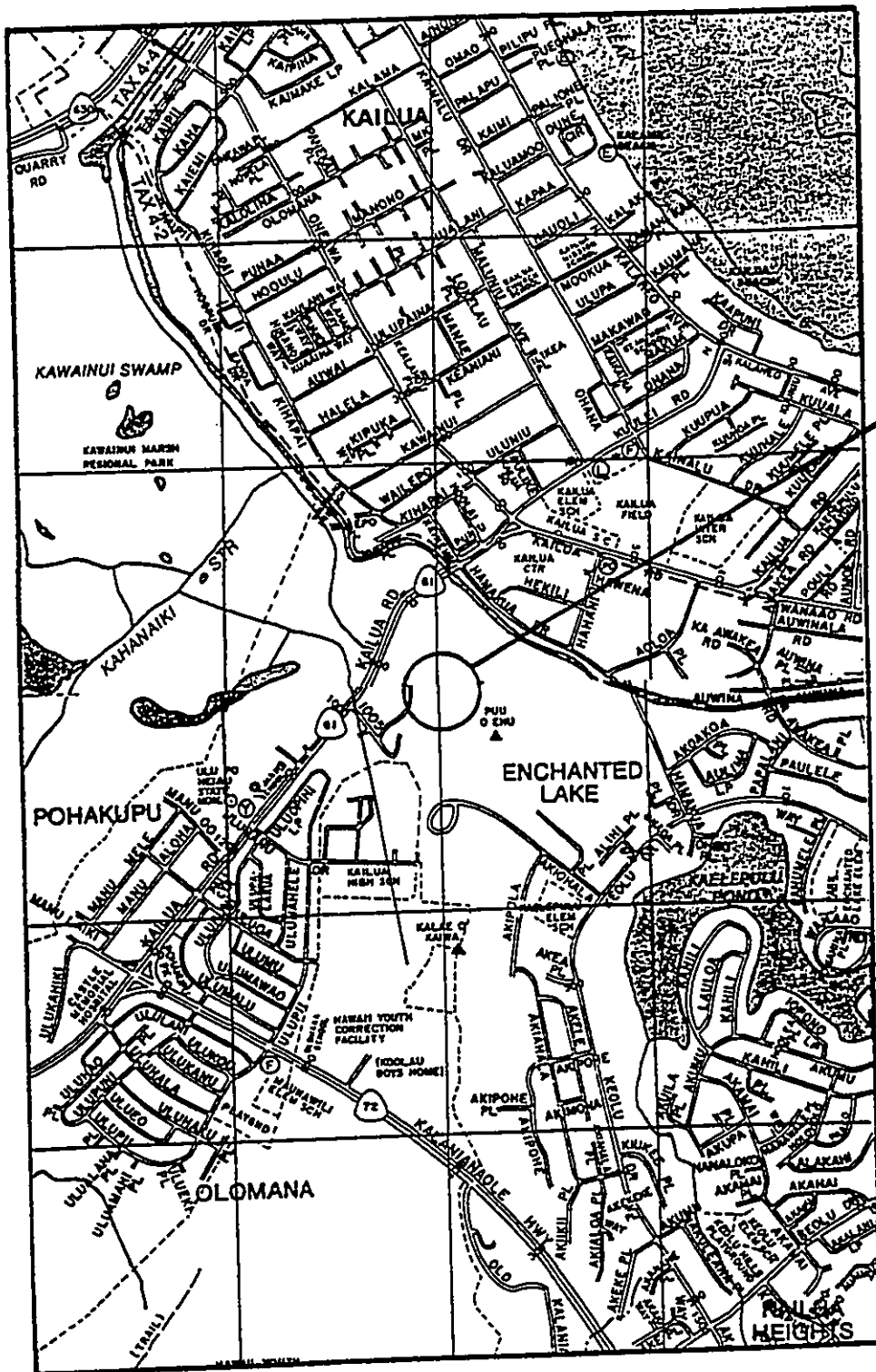
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Enc: Location Plan
Site Plan

Very truly yours,

Ernest K. Hirata & Associates, Inc.

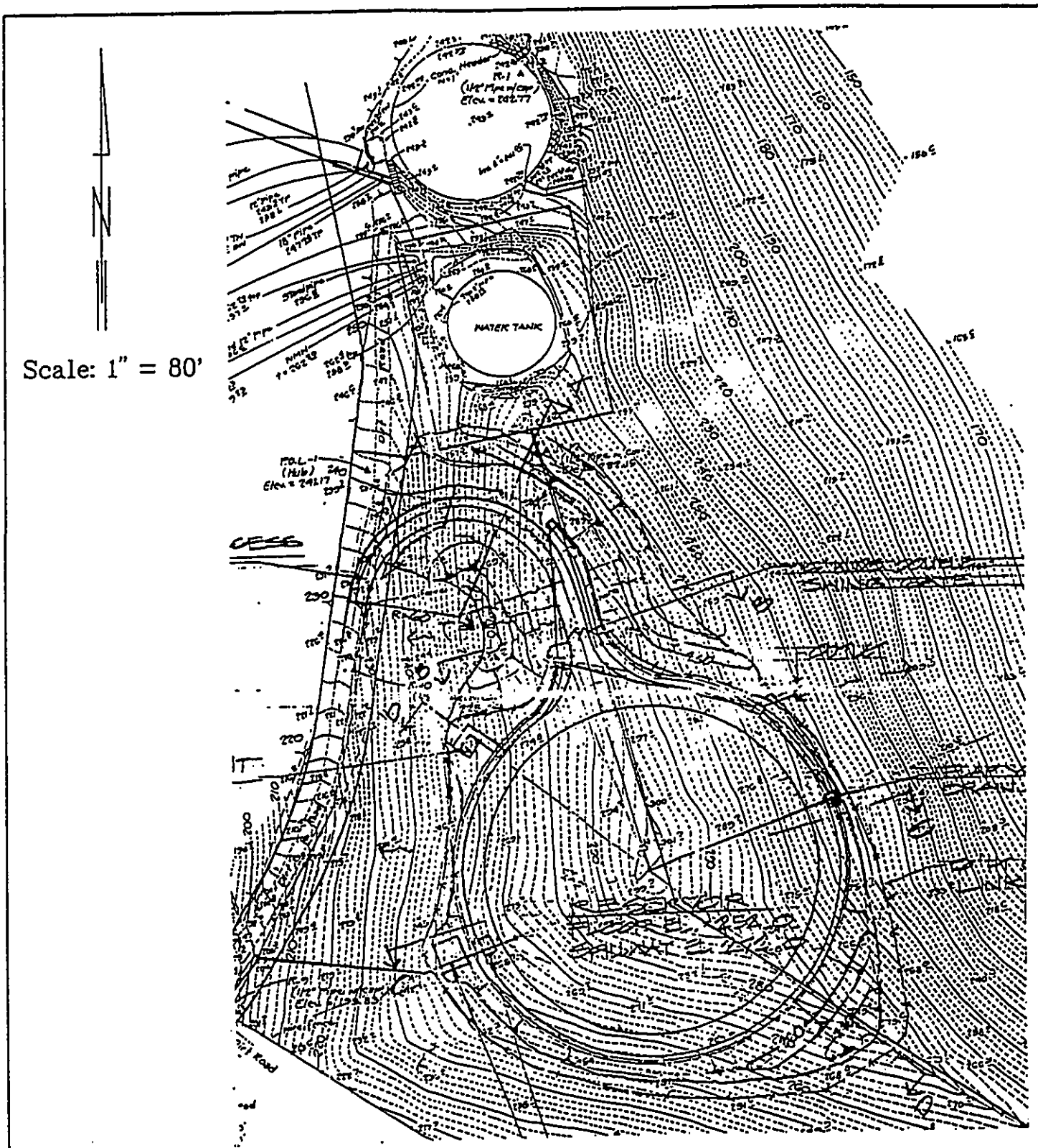
Paul S. Morimoto
Paul S. Morimoto, P.E.



PROJECT SITE

Reference: Bryan's Sectional Maps

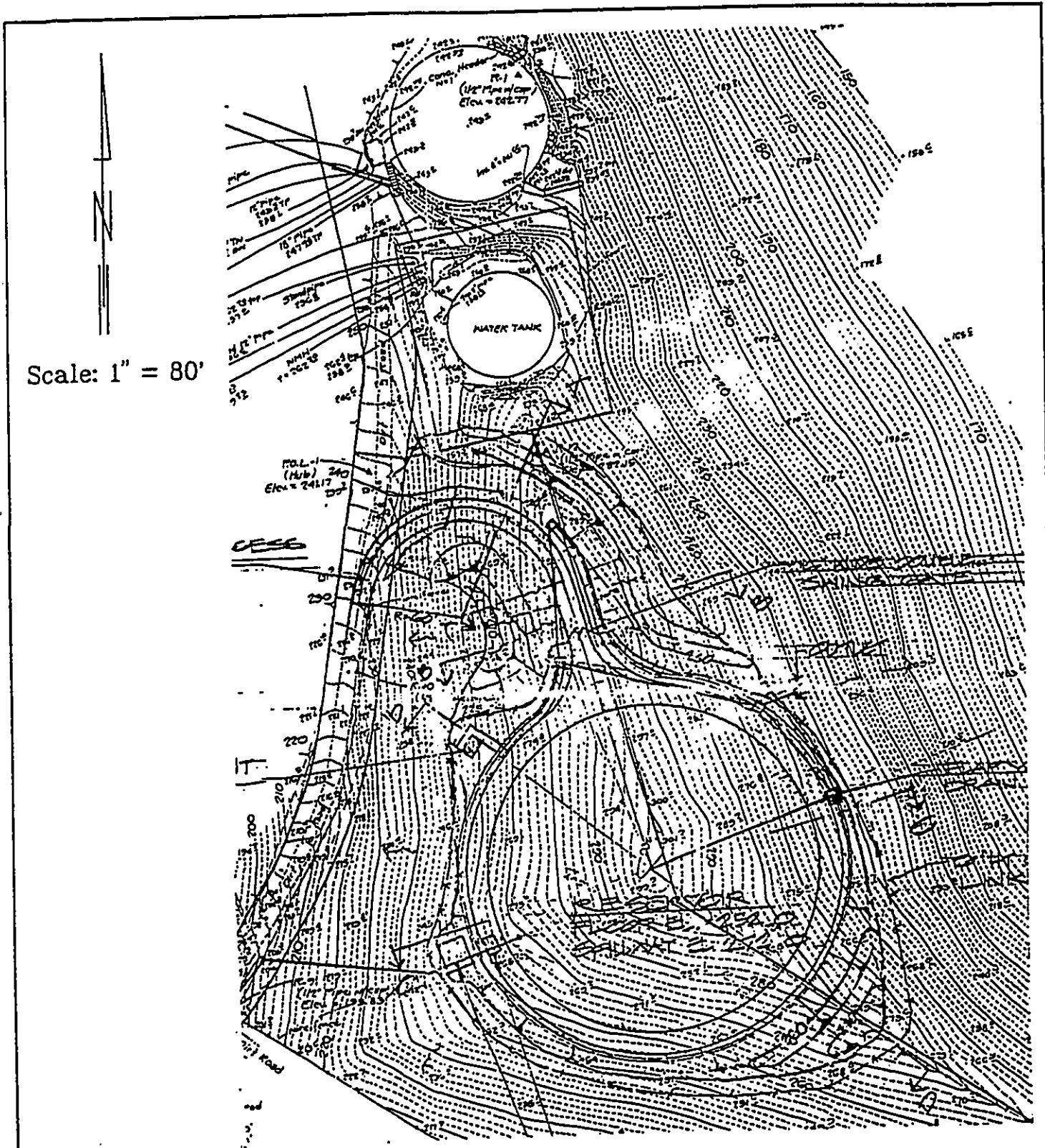
W.O. 92-2225	Kailua 272 Reservoir
Ernest K. Hirata & Associates, Inc.	LOCATION MAP



Reference: Preliminary Site Layout Plan
 provided by Engineering Concepts, Inc.

W.O. 92-2225	Kailua 272 Reservoir
Ernest K. Hirata & Associates, Inc.	SITE PLAN

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Reference: Preliminary Site Layout Plan
provided by Engineering Concepts, Inc.

W.O. 92-2225	Kailua 272 Reservoir
Ernest K. Hirata & Associates, Inc.	SITE PLAN

APPENDIX D
BOTANICAL SURVEY

BOTANICAL SURVEY
KAILUA "272" RESERVOIR
KO'OLAU POKO DISTRICT, ISLAND OF O'AHU

by

Winona P. Char
CHAR & ASSOCIATES
Botanical Consultants
Honolulu, Hawai'i

Prepared for: ENGINEERING CONCEPTS, INC.

March 1992

BOTANICAL SURVEY
KAILUA "272" RESERVOIR
KO'OLAU POKO DISTRICT, ISLAND OF O'AHU

INTRODUCTION

The proposed Kailua "272" Reservoir project site consists of one 4.0 MG reservoir, influent-effluent pipes, and access road located to the south of an existing Board of Water Supply reservoir on Pu'u O Ehu, Kailua. Vegetation on the site consists of koa-haole shrubland and open, grassy scrub. The site is used for grazing cattle and horses; a fenceline runs down the middle of the proposed project site.

Field studies to assess the botanical resources found on the project site were conducted on 20 March 1992. The primary objectives of the survey were to: 1) describe the general vegetation; 2) inventory the vascular flora; and 3) search for threatened and endangered plants protected by Federal and State endangered species laws.

SURVEY METHODS

Prior to undertaking the field studies, a search was made of the pertinent literature to familiarize the principal investigator with other botanical studies conducted in the general area. Topographic survey maps and a black and white aerial orthophotoquad (1 = 200') were examined to determine vegetation cover patterns, terrain characteristics, access, boundaries, and reference points. The metes and bounds of the reservoir and access road were surveyed and flagged prior to our field studies.

A walk-through survey method was used. Notes were made on plant associations and distribution, substrate types, topography, exposure, drainage, etc. Plant identifications were made in the field; plants which could not be positively identified were collected for later identification in the herbarium and for comparison with the most recent taxonomic literature.

The species recorded are indicative of the season ("rainy" vs. "dry") and the environmental conditions at the time of the survey. A survey taken at a different time of the year and under varying environmental conditions would no doubt yield slight variations in the species list list, especially of the weedy, annual plants.

DESCRIPTION OF THE VEGETATION

Tall, mostly single-stemmed koa-haole shrubs (Leucaena leucocephala), 12 to 18 ft. tall, are found on the slopes along the proposed access road and on portions of the proposed reservoir site. As the shrubs approach the summit of the ridge or pu'u, they become shorter and windswept. In places, the koa-haole shrubs have been cut back so that they are 3 to 4 ft. tall; this practice allows the cattle and horses to reach the koa-haole shoots. Green panic-grass (Panicum maximum var. trichoglume) forms a somewhat short, dense mat, up to a foot tall, under the koa-haole shrubs. There are few other species associated with the thick mats of grass. Only where there are rocky outcroppings or on steeper areas where the grass cover thins out is there a weedy mixture of different species; these include comb hyptis (Hyptis pectinata), lantana (Lantana camara), virgate mimosa (Desmanthus virgatus), maile hohono (Ageratum conyzoides), and false mallow (Malvastrum coromandelianum). Occasionally, plants of the blue potato vine (Solanum seaforthianum) can be observed scrambling up and over the koa-haole shrubs, especially near the existing water tank.

Along the top of the ridge, where there is a fenceline, the vegetation is open and grassy with scattered smaller shrubs such as 'uhaloa (Waltheria indica), klu (Acacia farnesiana), Cuba jute (Sida rhombifolia), and indigo (Indigofera suffruticosa). Certain areas along the ridgetop have been heavily grazed and 40 to 50% of the area may be exposed soil. Also the more weedy species such as sourgrass (Digitaria insularis), swollen finger grass (Chloris barbata), spiny amaranth (Amaranthus spinosus), and prickly cucumber (Cucumis dipsaceus) occur in these areas.

DISCUSSION AND RECOMMENDATIONS

The land for the proposed reservoir and access road is presently used for grazing cattle and horses. The vegetation consists of koa-haole shrubland on the slopes and an open, grassy scrub on the top of the ridge. Introduced or alien species are the dominant components of the vegetation on the project site. Of a total of 56 species inventoried during the field studies, 53 (94%) are introduced species; 1 (2%) is questionably of early Polynesian introduction; and 2 (4%) are probably indigenous, that is, they are native to the Hawaiian Islands and elsewhere. No species native only to the Hawaiian Islands, i.e. endemic, occur on the site. A list of all the vascular plants inventoried on the site can be found at the end of this report. None are officially listed threatened or endangered plants (U.S. Fish and Wildlife Service 1989); nor are any proposed or candidate for such status (U.S. Fish and Wildlife Service 1990). A recent botanical survey (Char 1991) conducted for the adjacent Kailua Gateway project recorded similar findings.

Given the findings above, there is little of botanical interest or concern on the proposed Kailua "272" Reservoir site. The species found on the subject property occur throughout the Hawaiian Islands in similar environmental habitats. The proposed

project is not expected to have a significant negative impact on the botanical resources and there are no botanical reasons to impose any restrictions, conditions, or impediments to the reservoir project.

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Wagner, W. L., D. R. Herbst, and S. H. Sohmer. 1990. Manual of the flowering plants of Hawai'i. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu. Bishop Museum Special Publication 83.

PLANT SPECIES LIST -- Kailua "272" Reservoir

A checklist of all those vascular plant species inventoried during the survey is presented below. The plants are divided into three groups: Ferns, Monocots, and Dicots. The taxonomy and nomenclature of the Ferns follow Lamoureux (1984); the flowering plants, Monocots and Dicots, are in accordance with Wagner et al. (1990) for the most part.

For each species, the following information is provided:

1. Scientific name with author citation.
2. Common English and/or Hawaiian name, when known.
3. Biogeographic status. The following symbols are used:
 - I = indigenous = native to the Hawaiian Islands and elsewhere throughout the Pacific
 - P = Polynesian = plants originally of Polynesian introduction prior to Western contact (1778); not native
 - X = introduced or alien = all those plants introduced intentionally or accidentally by humans after Western contact; not native.

<u>Scientific name</u>	<u>Common name</u>	<u>Status</u>
FERNS		
NEPHROLEPIDACEAE (Sword Fern Family)		
Nephrolepis multiflora (Roxb.) Jarrett ex Morton	hairy sword fern	X
FLOWERING PLANTS		
MONOCOTS		
COMMELINACEAE (Spiderwort Family)		
Commelina benghalensis L.	hairy honohono	X
POACEAE (Grass Family)		
Chloris barbata (L.) Sw.	swollen finger grass, mau'ulei	X
Digitaria insularis (L.) Mez ex Ekman	sour grass	X
Eleusine indica (L.) Gaertn.	wire grass	X
Melinis minutiflora P. Beauv.	molassesgrass	X
Panicum maximum Jacq. var. maximum	Guinea grass	X
Panicum maximum var. trichoglume Eyles ex Robyns	green panicgrass	X
DICOTS		
AMARANTHACEAE (Amaranthus Family)		
Amaranthus spinosus L.	spiny amaranth, pakai kuku	X
Amaranthus viridis L.	slender amaranth, pakai	X
ANACARDIACEAE (Mango Family)		
Schinus terebinthifolius Raddi	Christmas berry	X
ASTERACEAE (Sunflower Family)		
Ageratum conyzoides L.	maile hohono	X
Bidens pilosa L.	Spanish needle, beggar's tick, ki	X
Calyptocarpus vialis Less.	hierba del cabello	X
Conyza bonariensis (L.) Cronq.	hairy horseweed, lani wela	X
Emilia fosbergii Nicolson	red pualele	X
Pluchea indica (L.) Less.	Indian fleabane	X
Pluchea symphytifolia (Mill.) Gillis	sourbush	X
Sonchus oleraceus L.	sowthistle, pualele	X
Tridax procumbens L.	coatbuttons	X

<u>Scientific name</u>	<u>Common name</u>	<u>Status</u>
BIGNONIACEAE (Bignonia Family) Spathodea campanulata P. Beauv.	African tulip tree	X
CASUARINACEAE (Ironwood Family) Casuarina equisetifolia L.	common ironwood	X
CLUSIACEAE (Mangosteen Family) Clusia rosea Jacq.	autograph tree, copey	X
CONVOLVULACEAE (Morning-glory Family) Ipomoea obscura (L.) Ker-Gawl.	field bindweed	X
CUCURBITACEAE (Squash Family) Coccinia grandis (L.) Voigt	coccinia	X
Cucumis dipsaceus Ehrenb. ex Spach	prickly cucumber	X
EUPHORBIACEAE (Spurge Family) Chamaesyce hirta (L.) Millsp.	hairy spurge	X
Chamaesyce hypericifolia (L.) Millsp.	graceful spurge	X
Chamaesyce prostrata (Aiton) Small	prostrate spurge	X
Phyllanthus debilis Klein ex Willd.	niruri	X
FABACEAE (Pea Family) Acacia farnesiana (L.) Willd.	klu	X
Chamaecrista nictitans (L.) Moench	partridge pea, lauki	X
Crotalaria incana L.	fuzzy rattlepod, kukaehoki	X
Desmanthus virgatus (L.) Willd.	virgate mimosa	X
Desmodium tortuosum (Sw.) DC.	Florida beggarweed	X
Indigofera spicata Forssk.	indigo, 'iniko	X
Indigofera suffruticosa Mill.		X
Leucaena leucocephala (Lam.) de Wit	koa-haole	X
Macroptilium atropurpureum (DC.) Urb.	cowpea, wild bush- bean	X
Mimosa pudica var. unijuga (Duchass. & Walp.) Griseb.	sensitive plant, sleeping grass, puahilahila	X

<u>Scientific name</u>	<u>Common name</u>	<u>Status</u>
LAMIACEAE (Mint Family) Hyptis pectinata (L.) Poit.	comb hyptis	X
MALVACEAE (Mallow Family) Malvastrum coromandelianum (L.) Garcke	false mallow	X
Sida rhombifolia L.	Cuba jute	X
MORACEAE (Mulberry Family) Ficus microcarpa L. f.	Chinese banyan	X
MYRTACEAE (Myrtle Family) Syzygium cumini (L.) Skeels	Java plum, palama	X
OXALIDACEAE (Wood Sorrel Family) Oxalis corniculata L.	yellow wood sorrel	P?
PASSIFLORACEAE (Passion Flower Family) Passiflora suberosa L.	huehue haole	X
RUBIACEAE (Coffee Family) Spermacoce assurgens Ruiz & Pav.	buttonweed	X
SOLANACEAE (Nightshade Family) Solanum americanum Mill.	popolo	I?
Solanum seafortianum Andr.	blue potato vine	X
Lycopersicon pimpinellifolium (Jusl.) Mill.	current tomato	X
STERCULIACEAE (Cacao Family) Waltheria indica L.	'uhaloa, hi'aloa, kanakaloa	I?
URTICACEAE (Nettle Family) Pilea microphylla (L.) Liemb.	artillary plant	X
VERBENACEAE (Verbena Family) Citharexylum caudatum L.	fiddlewood	X
Stachytarpheta jamaicensis (L.) Vahl	Jamaica vervain, owi, oi	X
Stachytarpheta urticifolia (Salisb.) Sims	nettle-leaved vervain, owi, oi	X

APPENDIX E

ARCHAEOLOGICAL INVENTORY SURVEY

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**Archaeological Inventory Survey of
Kailua 272 Reservoir and Access Road
Kailua, Ahupua'a of Kailua, Island of O'ahu**

TMK 4-2-03:16

by

Hallett H. Hammatt, Ph.D.
Michael Pfeiffer, B.A.
Victoria S. Creed, Ph.D.

for

Engineering Concepts, Inc.

Cultural Surveys Hawaii
April 1992

Abstract

In February of 1992 Cultural Surveys Hawaii, with the aim of locating any archaeological sites and/or remains, undertook field survey and historical research for the proposed Kailua 272 Reservoir. The research done at the request of Engineering Concepts, Inc., consisted of a surface survey and brief historic background study of the project parcel (TMK 4-2-03:46). The project parcel is located on the spine of a steeply sloping ridgeline west of Kailua Town. No archaeological sites were observed during the survey and historic research indicated that there was probably never any significant utilization (i.e., agricultural or habitation) along the ridgeline. However, the historic research did indicate that Puu o Ehu, the high point of the ridge, some 1,500 feet southeast of the project area, was an important point of reference within the Kailua area.

Based on the absence of archaeological sites within the project area no further research is warranted.

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Introduction	1
Project Area Description	1
Natural and Cultural Background	4
Traditional Land Use	5
Kamehameha Conquers O'ahu (ca. 1795)	5
The Mahele Period (ca. 1850s)	6
Ranching	7
Previous Archaeological Research	7
Survey Results	8
Summary and Significance	9
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Introduction

In February of 1992 Cultural Surveys Hawaii conducted archaeological survey and historical research on a parcel of land located in Kailua, O'ahu (TMK 4-2-03) for the proposed Kailua 272 Reservoir and access road. The purpose of the research, done at the request of Engineering Concepts Inc., was to determine the presence or absence of any archaeological sites in the project area. No archaeological sites were observed during the survey and the background research also indicated that the project area probably never contained archaeologically significant sites. The absence of archaeological sites is due to the terrain in which the project area is situated.

Project Area Description

The area of land to be impacted by the Kailua 272 Reservoir is located on an eroding ridgeline behind Kailua Town above Hamakua Drive. The ridge, located on the southwestern edge of Kailua Town has an existing access road that runs up to two structures, an abandoned reservoir and a remnant platform of an old reservoir. The existing reservoir serves as an excellent reference point for the project area as it can be easily seen from Kailua Town. The vegetation within the project area includes *koa haole* (*Leucaena leucocephala*), California grass (*Brachiaria mutica*), and various introduced species of weeds. Cattle grazing within the project area is evidence by a fence running along the top of the ridgeline that separates the project area into two pastures. Rainfall averages 40 inches per year. Soils within the project area are part of the Papaa series, specifically Papaa clay on 20 to 35 percent slopes (PyE) which is characterized as being suitable for pasture usage because of the difficulty in working

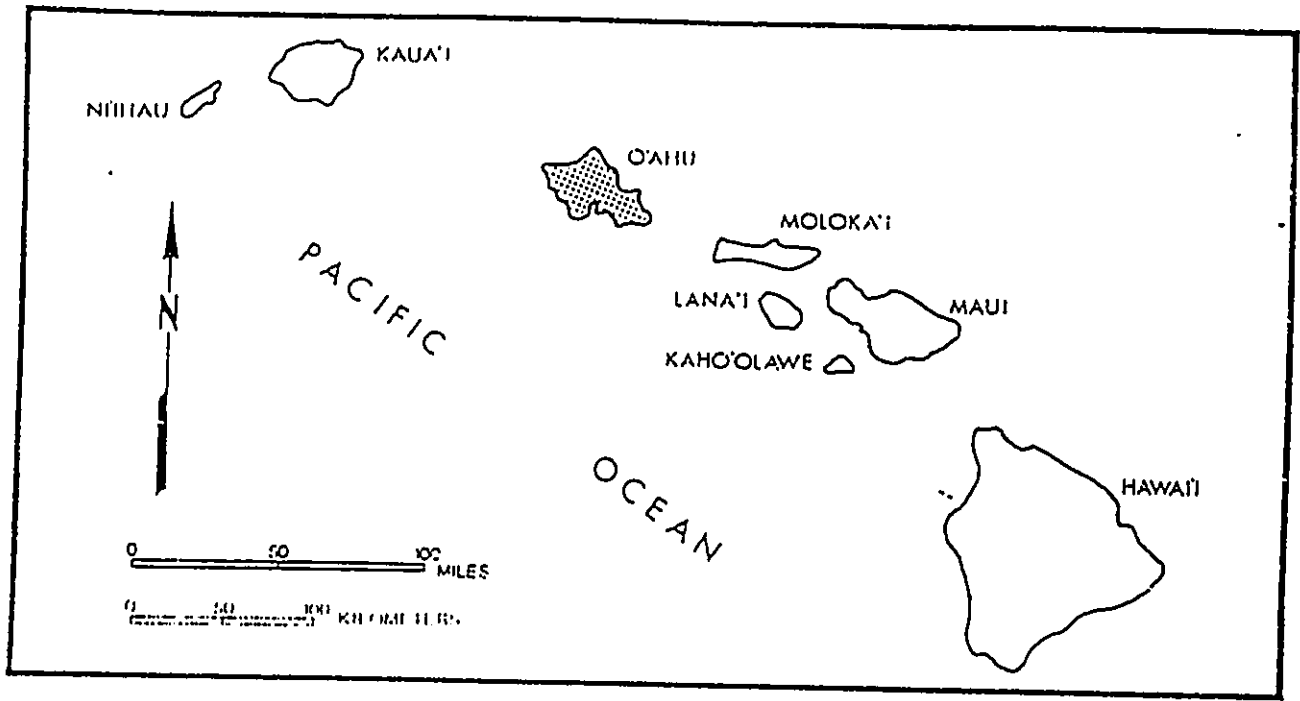


Fig. 1 State of Hawai'i

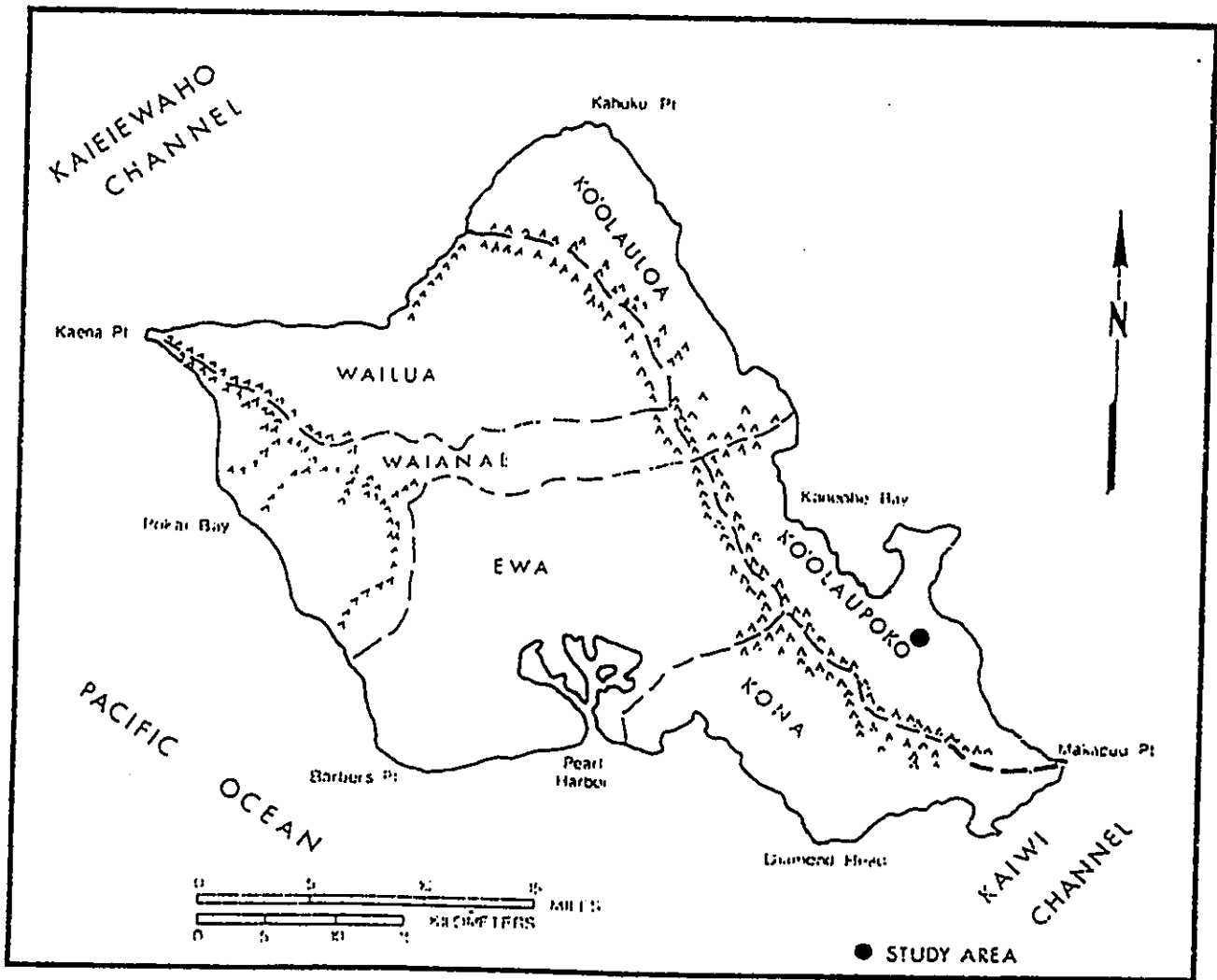


Fig. 2 O'ahu Island Location Map

on the slopes and the moderate to severe erosional hazard (Foote et al, 1973).

In general, the project area is characterized by the relatively steep slope, thin grass and *koa haole* vegetation, and exposed patches of highly weathered soil. The vegetation and terrain type allowed for excellent ground visibility during the survey.

Natural and Cultural Background

The *ahupua'a* of Kailua, in which the project area is situated, extends from the top of the Ko'olau Ridge down to the shore along two high ridges. Kailua, formerly contained two ocean embayments which give the *ahupua'a* its name: Kai-lua — two seas (Pukui, Elbert and Mookini 1979). Kawainui Marsh and Ka'elepulu Pond, now Enchanted Lake are the remains of these two embayments.

The *Ahupua'a* of Kailua is in the center of the extinct Ko'olau Volcano which is "about 8 miles long by 4 miles wide and extends from near Waimanalo at the SE to NW of Kāne'ohe and from the eastern base of the Ko'olau Range on the SW to inshore of the Mokulua islands to the east" (MacDonald and Abbott). There were two series of lava flows here: one the Kailua volcanic series and the other the Ko'olau series making up the greater part of the Ko'olau Range. A dense volcanic plug, 5+ km. wide and 1.6 km. deep, lies beneath Kawainui Marsh (Adams and Furumoto, 1965). This plug may contribute to its ability to retain water in the marsh. The geologist Harold T. Stearns believes O'ahu has been stable for the last several hundred thousand years, but notes that throughout the Pleistocene the Marsh area was periodically submerged and exposed. In fact, well logs show that valleys have been drowned to at least 1,200 feet and may still be submerged 1,800 feet below an

original shallow water platform, while abrasions on cliffs several hundred feet above sea level show signs of ocean action. There are many indications the ocean has, in the past, receded to about 300 feet below the present stand and risen almost that amount above the present sea level (Stearns, 1978).

Traditional Land Use

Kailua was important to early planters as we know from the tales that come from the geneologies and legendary history. Also as the social system became more structured, it became important to rulers who needed to feed great numbers of people in their courts as well as the visitors to their court. Kailua was also known to be an area of refuge for those who sought sanctuary up until the time when Kamehameha conquered the island of O'ahu at which time all the ancient *pu'uhonua* (place of refuge) on O'ahu were abolished.

Windward rains, numerous springs, fish ponds, extensive *lo'i* (wetland terraces) where taro flourished (root stock could also be supplied to other areas in times of need), rich upland forests for foraging, and the natural beauty of this area made this *ahupua'a* (land district from mountain to ocean) a desirable locale for settlement through time.

Kamehameha Conquers O'ahu (ca. 1795)

Traditional accounts indicate that after Kamehameha conquered O'ahu, he came to help the residents of Waimānalo and Maunawili clear Kawainui and he encouraged all to participate in such tasks. His mother's family came from the Kailua, on O'ahu and he would have known of its reputation for plentiful food and fish resources. By helping the windward

people, he could hope to win over the planters as well as provide his army with needed supplies.

The Mahele Period (ca. 1850s)

With the growing influence of Europeans and Americans in the islands there was great concern by King Kamehameha III and various chiefs that the land would be taken over by the foreigners who considered land to be a possession rather than a trust as Hawaiians did. To retain power for the kingdom and for Hawaiians, King Kamehameha III appointed a Land Commission for Quiet Titles in 1842. During the *Mahele*, first all of the land was acknowledged as belonging to the king and then the king selected which pieces he wanted to keep for himself, which he would give to his chiefs and his family, and then which lands might be sold. Among the first selections of land for himself, Kamehameha III took the *'lele* of Kawailoa in Kailua, which includes a portion of land from Kalaniana'ole Highway near the new Olomana Fire Station up to the peak of Olomana, and another parcel of land at the Kailua Town side of Lanikai. Kamehameha III next divided up the 73 *'ili* of the *ahupua'a* and their *lele* among 29 chiefs or *konoiki*. Additionally, in Kailua 130 different persons claimed *kuleana* lands, but only the 29 received title back to the lands they lay claim to. What land remained after these first two divisions was then given to Kamehameha III's wife, Queen Kalama and to Victoria Kamamalu, sister of Kamehameha IV and V. The project area appears to have been part of the *'ili* of Kawainui, which was part of a Land Commission Award (LCA 4452:12) to Queen Kalama. However, perusal of historic maps does not make actual *'ili* boundaries clear. It would appear that the ridgeline on which the project area is

situated was viewed as waste land and was more of a dividing line between 'ili.

Ranching

Ranching in the general Kailua area was dominated by Kaneohe Ranch. Kaneohe Ranch included the lands of Queen Kalama of both Kailua and Kaneohe *ahupua'a*. Harold K. Castle purchased Kaneohe Ranch in 1917 from Mrs. Nanny Rice who had inherited from her father, C.C. Harris. Active grazing continues in the project area as evidenced by the fence line and condition of the pasture itself.

Previous Archaeological Research

There has been no archaeological research specific to the project area. However, major research associated with Kawainui Marsh details legendary, traditional, historic and archaeological accounts concerning Kailua in general with specific references to the 'ili of Kawainui.

The research includes *Archaeological Excavations in Kawainui Marsh, Island of O'ahu, Honolulu* (Allen-Wheeler, 1981); *Land Use and Landform Change in Kawainui Marsh, O'ahu: Geoarchaeological and Historical Investigations 1981* A Brief History of the Hawaiian People (Allen, in press); *A Cultural Resources Study for the City and County of Honolulu's Permit Request: Kawainui Marsh Sewerline (O'ahu), Archaeological Reconnaissance and Pre-1850 Literature Search* (Cordy, 1977); *Ho'ona'auao No Kawainui: Educating about Kawainui* (Drigot, 1982); *Sediment Coring in Kawainui Marsh, Kailua, O'ahu, Ko'olaupoko* (Hammatt et al., 1990); *Brief History of Kawainui Fishpond and*

Associated Sites (Kelly and Clark, 1989); *Sediment Coring in Kawainui Marsh, Kailua, O'ahu, Ko'olaupoko* (Hammatt et al. (1990); *Terrigenous and Carbonate Clastic Facies in a Transgressive Sequence Over Volcanic Terrain and Local Relative Sea Level Changes and the Evolution of Coastal Environments, Windward O'ahu, Hawai'i* (Kraft, in progress). *Geoarchaeological Analysis of Field Remnants, Kawainui Marsh, Kailua, O'ahu* (Morgenstein, 1978); and *Archaeological Investigations at Kawainui Marsh, in the Kukanono Area, Kailua, O'ahu, TMK 4-2-13:38* (Neller, 1982).

The reader is referred to these reports for discussion of previous research as well as a detailed overview of historic background material.

Survey Results

Two archaeologists surveyed the entire project area on foot to determine the presence or absence of sites in the area. As expected no sites were located in the project area due to the extreme steepness of the ridgeline and the lack of any natural water source on the hill. There are numerous cattle trails running along the hill line that have exposed the underlying soil layers. The exposed areas along the cattle trails were carefully examined for subsurface deposits, but no cultural material was noted either along the trails, or on top of the ridge.

There are two large structures already present on the top of the ridge. These two structures (mentioned above) consist of a large stone and cement platform for an old reservoir, and an abandoned metal tank reservoir. The ridge top was graded for the two structures and it is not known if there were any archaeological sites in these two areas prior

to their construction. There is an existing access road that runs up to the two existing structures that will be used for the construction of the new reservoir.

Some 1,500 feet southeast of the project area is Pu'u o Ehu, a rock outcrop at the high point of the ridgeline. Puu o Ehu is the only location where Ka'elepulu and Kawainui ponds are both visible. Legendary accounts about the ponds relate that the *mo'o* guardian spirit of the ponds was called Hauwahine and that Puu o Ehu was sacred to Hauwahine and her companion (Pilahi Pahi Communication to Murial Seto, 1976).

Summary and Significance

The parcel of land to be impacted by the construction of the Kailua 272 Reservoir is on an eroding ridge that is now being utilized for cattle and horse grazing. The parcel contains no sites or site remnants and it is doubtful if the project area was ever intensively utilized prehistorically. The nearest significant feature, 1,500 ft. farther along the ridge at the highest point and having an excellent view of both Ka'elepulu Pond (now Enchanted Lake) and Kawainui Marsh, is Puu 'o Ehu. With the use of the existing access road and construction limited to the project area no adverse impacts to archaeological resources is foreseen. Based on the absence of archaeological sites within the project area no further work is deemed warranted.

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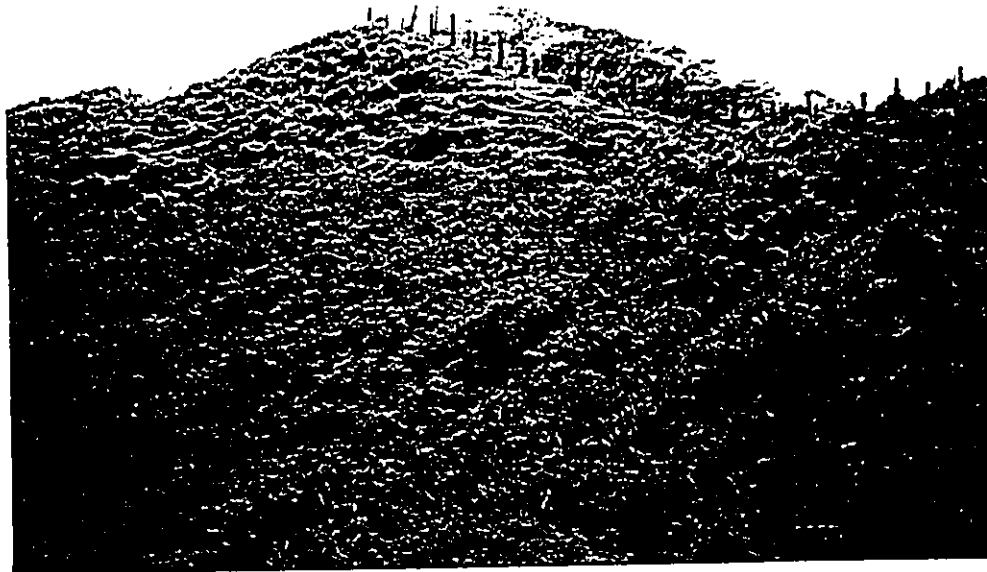


Fig. 4 Project Area Showing Ridgeline. View South

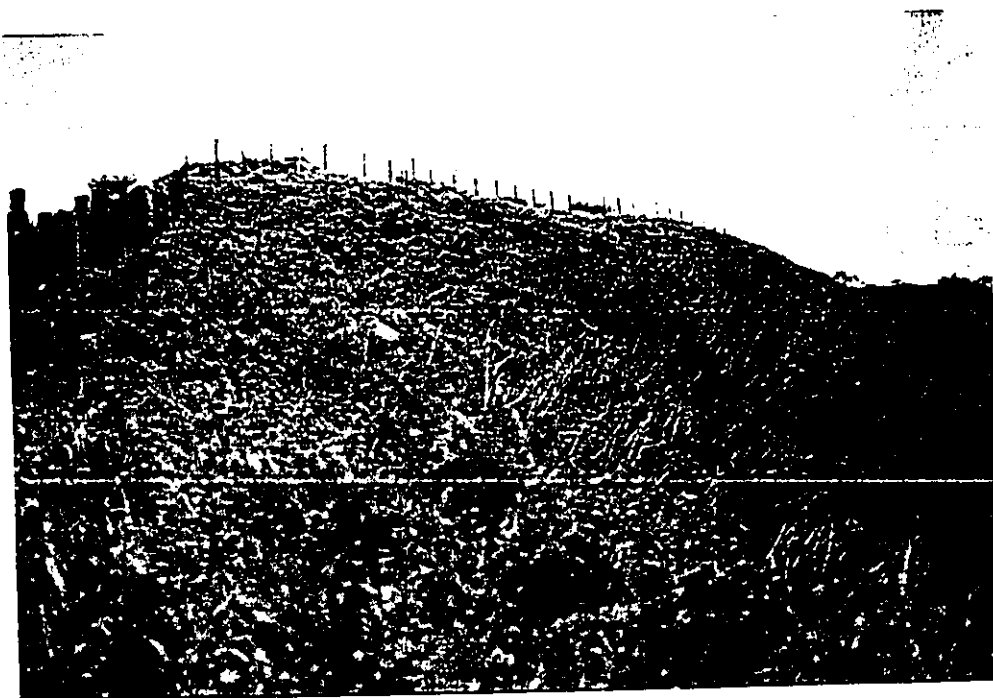


Fig. 5 Project Area Showing Ridgeline. View North



Fig. 6 View of Kawainui from Project Area. View North (Ulu Po Heiau in Left Center of Photo)



Fig. 7 View of Ka'elepulu from Project Area. View South