



EXECUTIVE CHAMBERS

HONOLULU

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GEORGE R. ARIYOSHI
GOVERNOR

February 19, 1985

Ms. Letitia N. Uyehara
Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Based on the recommendation of the Office of Environmental Quality Control, I am pleased to accept the supplemental environmental impact statement for the Waiahole Valley agricultural park and residential lots subdivision as satisfactory fulfillment of the requirements of Chapter 343, Hawaii Revised Statutes.

This environmental impact statement will be a useful tool in deciding whether this project should be allowed to proceed. My acceptance of the statement is an affirmation of its adequacy under applicable laws and does not constitute an endorsement of the proposal.

When the decision is made regarding this action, I expect the proposing agency to carefully weigh the societal benefits against the environmental impacts which will likely occur. This impact is adequately described in the statement, and, together with the comments made by reviewers, provides a useful analysis of alternatives to the proposed action.

With warm personal regards, I remain,

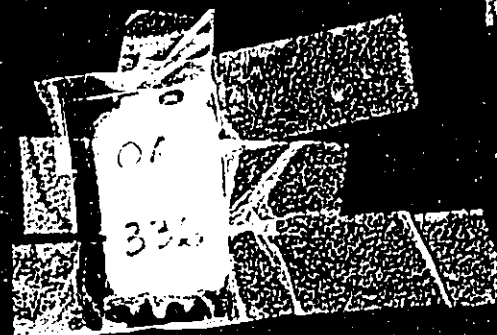
Yours very truly,

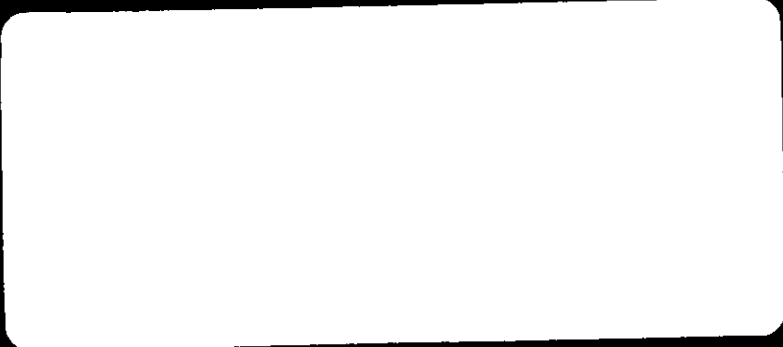

George R. Ariyoshi

cc: Mr. Russell Fukumoto

REVISED
ENVIRONMENTAL IMPACT STATEMENT
FOR THE
WAIHOLE VALLEY AGRICULTURAL PARK
AND
RESIDENTIAL LOTS SUBDIVISION
KOO LAUPUE DISTRICT, OAHU, HAWAII

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REVISED
ENVIRONMENTAL IMPACT STATEMENT
FOR THE
WAIAHOLE VALLEY AGRICULTURAL PARK
AND
RESIDENTIAL LOTS SUBDIVISION
KOOLAUPOKO DISTRICT, OAHU, HAWAII

Proposing Agency:


Hawaii Housing Authority
State of Hawaii

THIS STATEMENT WAS DEVELOPED IN ACCORDANCE WITH THE ENVIRONMENTAL IMPACT
STATEMENT REGULATIONS, STATE OF HAWAII, AND SUBMITTED PURSUANT TO:

CHAPTER 343
HAWAII REVISED STATUTES

January 14, 1985

DATE


EXECUTIVE DIRECTOR

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REVISED
ENVIRONMENTAL IMPACT STATEMENT
JANUARY 1985

PROJECT: Waiahole Valley Agricultural Park and Residential Lots Subdivision

LOCATION: Waiahole Valley, Koolaupoko, Oahu, Hawaii

PROPOSING AGENCY: Hawaii Housing Authority
State of Hawaii

ACCEPTING AUTHORITY: Governor
State of Hawaii

CONTACT: Hawaii Housing Authority (HHA)
P. O. Box 17907
Honolulu, Hawaii 96817
Telephone: 848-3272

- NOTE: The following special studies have been compiled into a separate volume:
1. Agricultural Feasibility and Environmental Impact (Frank S. Scott, Jr., 1981)
 2. Preliminary Engineering Report Covering Water Resources in Waiahole Valley (Russ Smith Corp., 1980)
 3. Economic Benefit-Cost Analysis (Environment Capital Managers, 1981)
 4. Flora and Fauna Survey of the Proposed Waiahole Agricultural Park (Kenneth M. Nagata, 1982)
 5. Waiahole Valley, Oahu: Archaeological Reconnaissance (Chiniago, Inc., 1982)
 6. Archaeological Resources in Waiahole Valley (Tomonari-Tuggle, 1983)

This volume is available at the public libraries, Hawaii Housing Authority, Department of Planning and Economic Development library, Municipal library, and the Office of Environmental Quality Control. The contents of these studies have been summarized and incorporated into appropriate sections of this EIS. This volume should be examined if further detail is desired.

PREFACE

The EIS Preparation Notice for this project was published on February 8, 1980. Since that time, details in the subdivision and water system design have undergone several changes prior to the submittal of the Draft EIS in June 1983. Since the release of the Draft EIS, the subdivision and water systems have undergone further changes. The submittal of this Revised EIS was therefore withheld until as near an accurate description of the proposed action was available and could be assessed for its impacts. During the interval since the preparation notice, several concerns relating especially to the subdivision, lease, and water system have been diminished due to a close working relationship with the Waiahole community.

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SUMMARY

1. Description of the Proposed Project

The proposed project involves the development of an agricultural park supplemented by a residential lot subdivision in Waiahole Valley on property acquired by the Hawaii Housing Authority from Elizabeth Loy McCandless Marks by quit claim deed on November 30, 1977. The proposed actions include the following:

a. Subdivision

- . Agricultural lots - 45 lots (379.4 acres); 36 lots are encumbered by existing tenancies and 9 additional tenancies have been made available.
- . Residential lots - 80 lots (40.0 acres); 47 lots are encumbered by existing tenancies and 33 are new additional lots. 22 of the 47 encumbered lots will remain in the agricultural land use district classification.
- . Commercial lots - 2 lots (0.8 acres); both are existing lots.
- . Open space - 5 lots (149 acres)
- . Reservoir and booster pump sites - 3 lots (3 acres)

b. Long-term agricultural and residential leases with preference to residents of record in Waiahole Valley as of March 1977. Agricultural leases include provisions for mandatory agricultural use of land.

c. Physical improvements

- . Roads - widening, paving, realignment, new roadways, resurfacing, and bridge replacement.
- . Drainage - roadside swales.
- . Water - a dual-use domestic and agricultural system that will utilize groundwater. Water supply will be increased by 1.1 mgd over the present supply through a pending reapportionment of an existing lease between the Waiahole Water Company and the state (DLNR).
- . Wastewater - acceptable disposal systems for new lots such as cesspools below BWS "no pass" line and closed vaults above the "no pass" line.
- . Electrical and communications - overhead electrical and telephone lines to serve all lessees and street lights along Waiahole Valley Road between the fork of the north and south branches and Kamehameha Highway.

Total estimated cost for the acquisition and development of Waiahole Valley is \$13,100,000. Construction is projected to start in 1985, with completion of improvements in 1986.

2. Relationship to Land Use Plans, Policies, and Controls

The proposed actions conform with the policies in the following plans:

State

- a. Hawaii State Plan
- b. State Functional Plans - Agriculture, Housing, Water
- c. Coastal Zone Management

County

- a. City and County General Plan
- b. Koolaupoko Development Plan (the predominance of agricultural use is consistent with the plan; however, the areas for residential lots will require an exemption)

The necessary permits and approvals include the following:

- a. Land Use Commission District Boundary Amendment - about 35.86 acres are proposed for various types of reclassification, including urban to agriculture, conservation to agriculture, agriculture to urban.
- b. Conservation District Use Application - water line and reservoir in conservation district.
- c. Corps of Engineers Permit - drainage discharge into stream and boulder riprap lining to prevent stream bank erosion.
- d. City and County Council approval of development plan exemptions to county controls including subdivision regulations, Comprehensive Zoning Code (CZC), Park Dedication Ordinance, and Special Management Area Permit (SMA).

Tenants whose lots adjoin Waiahole Stream opting to independently build and maintain their own irrigation system that drafts stream water will be required to submit the following permits:

- a. Corps of Engineers Permit - irrigation intake structure.
- b. Instream Use Permit - assurance that minimum instream flows will be maintained.

3. Environmental Setting

Physical-Biological Characteristics

Waiahole Valley is located on the windward side of Oahu. Its topography includes the near-vertical palis of the Koolau Range and the primary and secondary alluvial deposits of the valley floor. The rainfall pattern in the valley is orographic; the highest precipitation occurs near the top of the Koolau Range and correspondingly decreases with elevation. Stream flow consists of a combination of direct runoff and groundwater flow from the Koolau dike complex. Constructed early in this century, the Waiahole Ditch-tunnel system for transporting water to Leeward Oahu has significantly reduced the base stream flow entering Kaneohe Bay from Waiahole Valley.

There is a long history of agricultural use of Waiahole Valley. Several soil types usable for agriculture (Pearl Harbor, Hanalei, Waikane, and Alaaloa series) exist in the valley. The proposed project would include expansion of agricultural activity into areas not presently used but suitable for agriculture.

Due to past land uses, the native ecosystem has been replaced by introduced flora and fauna species. Remnants consisting of a few native flora can be found in the forest reserve. Other native fauna can be found in the stream because of the perennial flow characteristics. None of these native flora or fauna are considered endangered.

Cultural Characteristics

From the time of the early Hawaiians to the present, Waiahole has experienced peaks of intensive land use. During the late Hawaiian period, as many as 500 people lived in the valley. In the 1920's, Chinese rice farmers revived agriculture in Waiahole, although not as intensively as the Hawaiians. Settlement by the Hawaiians and Chinese concentrated in the coastal plain and along streams. Reconnaissance surveys have identified eight sites with potential significance. Two of these sites are among the six sites planned for salvaging prior to road construction. There is one site on the State Register of Historic Places located outside the project area.

Socioeconomic Characteristics

The population of Waiahole Valley has declined in the last 15 years from 453 people in 1962 to about 300 in 1977. Over 60 percent of the present population have resided in the valley for over 20 years. This long-term residency is reflected in the relatively older population of the valley compared to other parts of Oahu (median age of 31 for Waiahole population compared to 26 for Oahu). Predominant ethnic groups include Filipino, Japanese, and Hawaiian or part-Hawaiian. More than half of the households earn incomes less than the average household income for Oahu.

Sensitive Resources

Sensitive resources present within the project area that are unique, scarce, or irreplaceable are as follows:

- a. Perennial stream ecosystem
- b. Prime and unique agricultural lands
- c. Conservation land
- d. Archaeological resources

The marginal dike zone, which is a prime source of drinking water, is located outside of the project area. Also located outside of the project area but within Waiahole Valley are an endangered plant species and a registered archaeological site. Taro fields, which are considered as wetlands, are present in the project area but are not considered significant habitats for water fowl.

4. Impacts of the Proposed Action and Alternatives

A range of development scheme alternatives were considered for Waiahole Valley. These alternatives ranged from minimal development to the maximum allowed by existing zoning. Maximum development schemes enhance benefits to the general public (increased affordable housing, improved recreation opportunity, higher benefit-cost ratio) at the expense of several adverse impacts, such as loss of prime agricultural land, degradation of the rural character, increased traffic, and higher potential for incompatibilities to occur between agricultural and residential uses.

The proposed action, which embraces a minimal development concept, was selected because it best met the objectives for purchasing the valley and also resulted in the least adverse impacts (see Table S-1). Most of the adverse impacts are mitigable to acceptable levels. Those adverse impacts that are unavoidable are either negligible or are deliberate policy tradeoffs (see Table S-2). For example, a major tradeoff is the promotion of agriculture at the expense of limiting housing in the valley. There are no adverse effects to public health, safety, or welfare. Moreover, there are no irreversible commitments of resources. Therefore, adverse impacts are not significant.

Beneficial impacts include increased agricultural productivity, maintenance of environmental quality, and preservation of rural lifestyle. The direct cash inflow-outflow ratio for the overall project is 1.85:1.

Present plans for the water system can provide a significant benefit by increasing the quantity of irrigation water and improving the quality of the domestic water supply. This expected increase would be largely the result of a reapportionment of an existing lease between the Waiahole Water Company and the state (DLNR) as authorized under Section 171-37(3), HRS. The additional

TABLE S-1

SUMMARY OF IMPACTS OF THE PROPOSED ACTIONS

Impacts	PROPOSED ACTIONS									
	Subdivision	Lease Agreements	Water System	Wastewater System	Road Improvements	Drainage	Electrical/ Telephone	Agricultural Activity Fert/Pest.	Irrigation	
<u>Direct Impacts</u>										
Sensitive Resources										
Groundwater Quantity	N	N	+	-	N	0	N	-	0	
Quality	N	N	0	+	N	0	N	-	0	
Stream Quality	N	N	0	-	0	0	N	-	0	
Flow	N	N	+	0	0	0	N	N	0	
Agricultural Lands	+	+	+	0	-	0	N	+	+	
Conservation Lands	0	N	-	0	0	0	0	0	0	
Endangered Species	0	N	0	0	0	0	0	0	0	
Archaeological	0	N	0	0	-	0	0	N	0	
Public Health & Safety										
Flood Hazards	0	N	0	0	0	+	N	N	N	
Unstable Slopes & Soils	0	N	N	N	0	0	N	N	N	
Drinking Water Quality	N	N	+	0	N	0	N	0	N	
Sanitation	N	N	N	+	N	0	N	N	N	
Air Quality	-	N	N	+	-	N	N	-	N	
Noise	0	N	N	0	-	N	N	-	N	
Public Welfare										
Rural Lifestyle	+	+	+	+	+	0	0	N	+	
Sense of Community	+	+	N	N	N	N	N	N	N	
Affordable Housing	+	+	N	N	N	N	N	N	N	
Recreation	N	N	N	N	N	N	N	N	N	
Crime	N	N	N	N	N	N	0	N	N	
Fiscal										
Public Perspective (benefit-cost)	+	+	+	+	+	+	+	N	0	
Private Perspective										
Residents	N	+	+	+	N	N	0	N	0	
Farmers	N	+	+	+	N	N	0	0	+	
Secondary and Cumulative Impacts										
Growth	0	N	0	0	0	N	0	N	N	
Water Supply	0	N	+	0	N	N	N	N	0	
Transportation	0	N	N	N	0	N	N	N	N	
Kaneohe Bay Water Quality	0	N	0	0	0	0	N	0	0	

+ Beneficial Impact
 - Adverse Impact
 0 No Impact
 N No Applicable

TABLE S-2

SUMMARY OF MITIGATION MEASURES-UNAVOIDABLE ADVERSE IMPACTS

ADVERSE IMPACTS	MITIGATION MEASURE	UNAVOIDABLE	IMPLEMENTATION
Limited Number of Affordable Housing		X	(Policy tradeoff)
Potential Streamflow Reduction-Impact on stream fauna	Applicants will be subject to DLNR regulatory control		Specify as a permit condition in minimum streamflow permit (DLNR).
Waterline Construction in Conservation District	Restoration of disturbed-land areas; best management practice for erosion control		Specify as permit condition in Conservation District Use Permit (DLNR). Specify in construction contract (HHA).
Degradation of Stream, Ground-water & Kancamoch Bay Water Quality			Implementation of the following mandated through lease agreements:
1. Wastewater leachate		X	(Negligible)
2. Fertilizers	Select less mobile fertilizers; minimize application during rainy periods		Technical assistance (UH Cooperative Extension Service).
3. Pesticides	Application by certified operators and according to label instructions		Promote operator certification program (State Dept. of Agriculture, USDA Soil Conservation Service).
4. Drainage discharge		X	(Negligible)
5. Agricultural erosion	Information provided to farmers on best management practices		Technical assistance (USDA Soil Conservation Service).
Road Construction			
1. Loss of agricultural land from realignment		X	(Negligible)
2. Temporary inconvenience	Noise - compliance with noise regulations Dust - sprinkling as required Traffic - barriers, guards, detours, and other safeguards		Specify in construction contracts (HHA).
3. Potential archaeological resources	Qualified archaeologist hired to conduct pre-construction exploratory surveys and monitor construction		Excavation of impacted sites prior to construction and specify in construction contracts (HHA).
Street Lights - Rural Character		X	(Policy tradeoff for driver and pedestrian safety).

1.1 mgd that would be available due to the lease reapportionment would more than offset the proposed groundwater withdrawals and maintain an adequate instreamflow for taro farmers and native biota. Formal agreements have yet to be confirmed between Waiahole Water Company and the state regarding the lease reapportionment.

5. Unresolved Issues

Major concerns at the outset of this project included the provision of long-term leases, displacement of elderly and nonfarming residents, preservation of rural lifestyle, effects on streamflow, water cost, and potential effects on the Kaneohe Bay water quality. The proposed project favorably resolves each of these major issues (see Table S-3).

One major concern that remains is the formal reapportionment of Waiahole Water Company's water rights to 1.1 mgd. Readjustment of this lease to gain this additional quantity of water is necessary to meet water needs.

Other major concerns are the determination of which government agency or private association will operate and maintain this dual use water system and the assessment and collection of water fees. Although the DLNR is empowered to maintain agriculture park infrastructures, the DLNR presently has no mechanism for collecting domestic water fees to establish a revolving operation and maintenance fund for the water system. Such an action would likely require legislative amendment of DLNR statutes.

TABLE S-3

MAIAHOLE VALLEY AGRICULTURAL PARK EIS - MAJOR ISSUES

Issue	Affected Party	Resolved	Unresolved	Comments
Socioeconomic				
1. Lease Agreement	Existing and future residents/farmers	X		HHA has addressed these concerns in the lease agreements (see Chap 1).
- Long-Term				
- Rent				
- Lot Boundaries				
- Lease Priorities				
2. Water System	Farmers, especially taro farmers		X	There will be sufficient water available to farmers (see Chap 1). Development and maintenance water cost to farmers and procurement of Waiahole Water Co. lease resportionment remain unresolved. Rural lifestyle will be preserved (see Chap IV)
- Cost				
- Adequacy				
3. Rural/Agricultural Life-style	Residents/farmers; General public	X		Rural lifestyle will be preserved (see Chap IV)
- Population Density				
- Improvement Standards (road width, curb & gutter, etc.)				
4. Dislocation	Existing residents who are elderly or non-farming residents	X		Only one (voluntary) relocation has occurred.
5. Agricultural/Residential Compatibility	Neighboring farmers and resident	X		The land use plans minimize incompatibilities by clustering the residential area (see Chap IV).
- Noise				
- Odor				
- Pesticide Spraying				
6. Cost/Benefit of Public Funds	General public	X		Cost-benefit ratio is positive (see Chap IV).
Physical/Biological				
1. Water Quality (Streams & Kaneohe Bay)	General Public, residents/farmers	X		Cumulative impact to Kaneohe Bay is insignificant (see Chap IV).
- Wastewater Disposal				
- Fertilizer/Pesticide				
- Erosion				
2. Minimum Stream Flow	General public, taro farmers, biota	X		Taro farmers will benefit from enhanced streamflows (See Chap IV). Minimum flow to support aquatic fauna will be maintained (see Chap IV).
- Native Stream Fauna				
- Taro farmers				

CHAPTER I

PROJECT DESCRIPTION

In December 1977, the State of Hawaii, through the Hawaii Housing Authority, purchased 590 acres of land in Waiahole Valley. Adding to what it already owned, the state gained almost complete ownership of the valley (see Figure I-1). Except for the steep hillside at the back of the valley, almost all of the land has been in agriculture or affected by related activities. Subsequent to acquisition of this land and a study of alternative uses, the Hawaii Housing Authority (HHA) has determined that Waiahole Valley should remain in agricultural use with a minimum of disruption to its rural lifestyle. Development of a number of new residential lots will also be provided in accordance with HHA planning objectives.

PROJECT LOCATION

Waiahole Valley is located on the windward side of Oahu, between Kaalaea and Waikane Valleys, and extends from the Koolau Ridge to Kaneohe Bay (see Figure I-2). It is in the Koolaupoko judicial district.

The project site involves only a portion of Waiahole Valley--namely, those lands acquired from Elizabeth Marks and some state land that is required for roadways. The project boundaries are defined generally by Kamehameha Highway (makai), Waiahole-Waikane boundary (north), the forest reserve boundary (mauka), and Waiahole Homestead Road (south). Pockets of privately-owned parcels within the project boundaries are excluded from the proposed development plans (see Figure I-3). In total, the project area comprises about 590 acres, which is about 24 percent of the entire Waiahole Valley drainage basin. Other state lands are in the conservation district and are not suitable for development. Tax parcels within the project area are listed in Appendix A.

PROJECT OBJECTIVES

After studying alternative uses of Waiahole Valley, the state determined that the following objectives should guide the planning and development of Waiahole Valley.

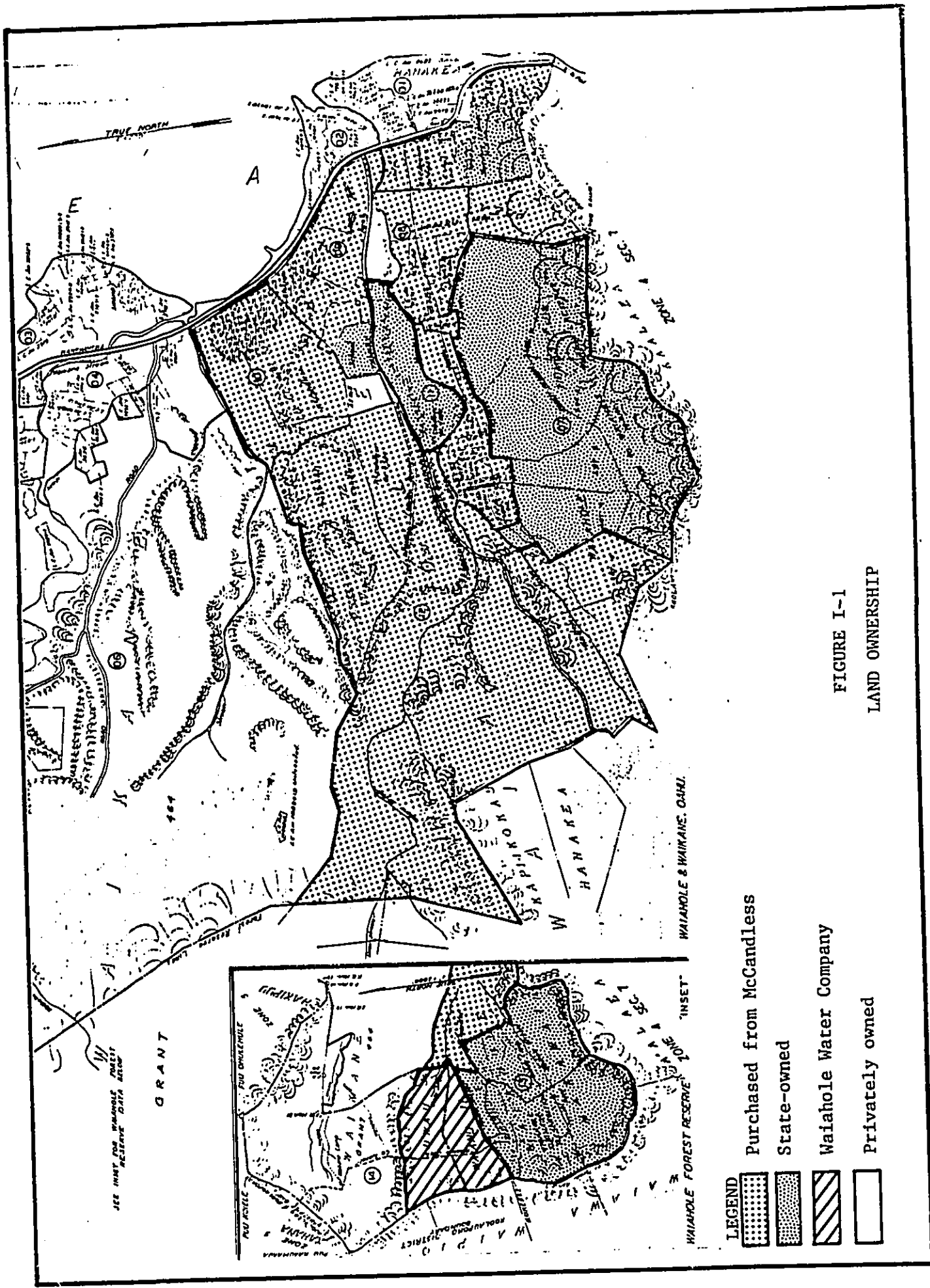


FIGURE I-1
LAND OWNERSHIP

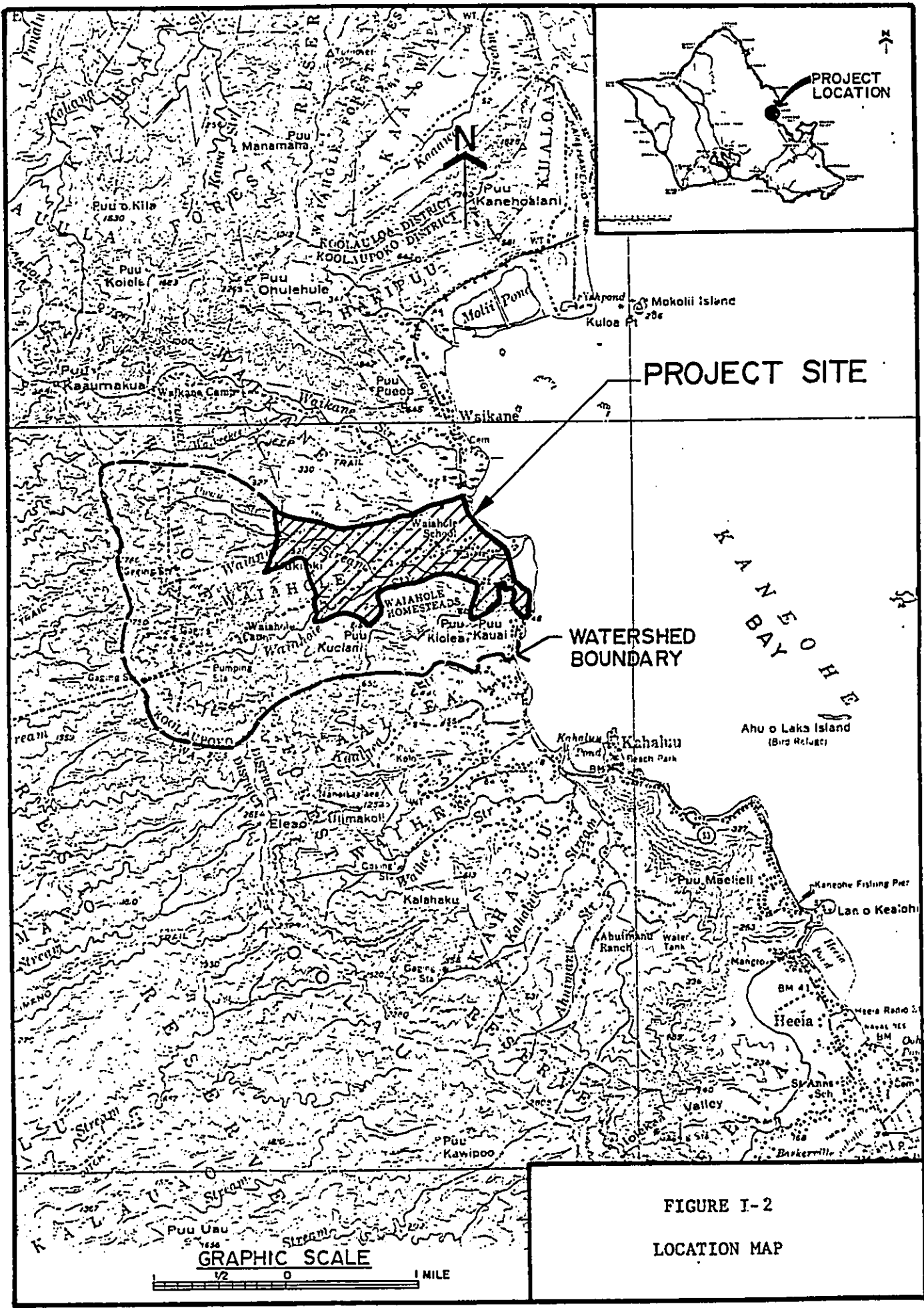
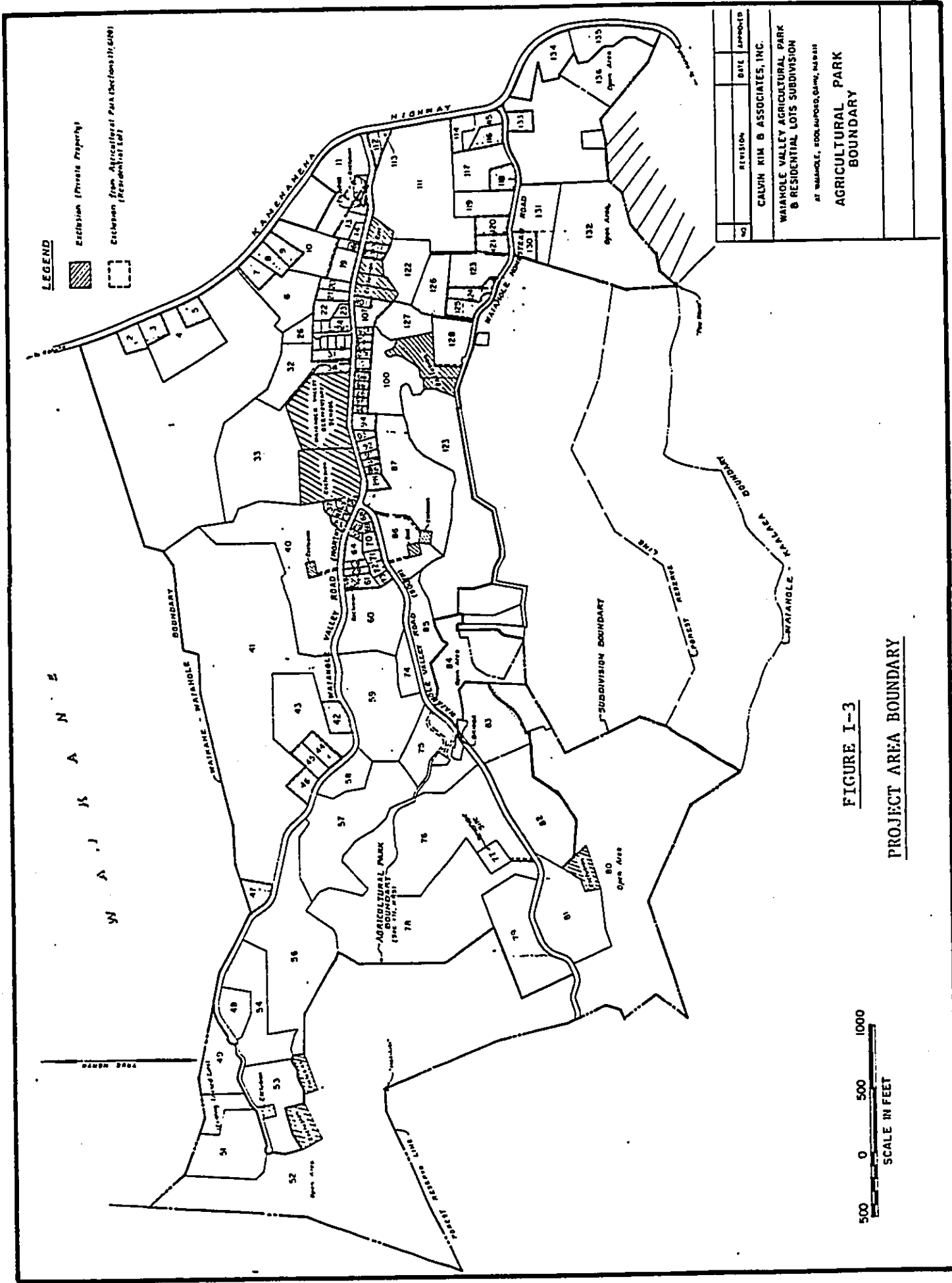


FIGURE I-2
LOCATION MAP



Land Use

1. To maximize agricultural potential and to promote diversified agriculture;
2. To preserve the integrity and lifestyle of the community;
3. To provide housing and housing improvements;
4. To conserve and develop water resources; and
5. To retain the open space provided by the valley as a deterrent to urban sprawl along the windward coast in keeping with both state and county planning objectives.

Leases

1. Provide reasonable long-term leases.
2. Minimize displacement or relocation of families by keeping intact, wherever possible, areas currently utilized for farming and residences and by offering leases to persons who were residents or had lineage to a residence as of March 1977.
3. Restrict leases for agricultural lands to persons who intend to use the land for agricultural purposes (i.e., derive a major portion of their total annual income from agricultural production); persons who are not engaged in agriculture shall be offered residential leases.

Improvements

1. Preserve the rural character by providing the minimum facilities required to support the agricultural operations and residential areas.
 - a. All lots shall be serviced by roadways; drainage systems will be provided to lots that do not already drain into the stream.
 - b. All residential and agricultural lots shall be serviced with electricity, telephone, and water that meets the safe drinking water standards contained in Chapter 20 of Title 11, Administrative Rules.

- c. Agricultural lots shall be serviced with irrigation water.
2. Encourage an open-stall market to facilitate marketing of agricultural produce.

Financial and Technical Assistance

1. Assist individuals in applying for financial aid to government programs for home construction or improvements.
2. Provide informational assistance to improve agricultural practice, distribution, and marketing by using services offered from the University of Hawaii's Agricultural Extension Service, the state Department of Agriculture, and the U.S. Department of Agriculture's Soil Conservation Service.

DESCRIPTION OF PROPOSED ACTION

The proposed action will primarily entail subdividing, leasing, and providing infrastructure improvements. Existing conditions are first described, followed by a description of the proposed action, in order to better illustrate the proposed changes.

Land Use and Subdivision

Existing Conditions. There are approximately 84 tenancies totaling about 265 acres. About 29 of these tenancies (11 acres) are in residential, residential/agricultural, or commercial use with areas less than 1 acre. The remaining 55 tenancies (254 acres) are in active or inactive agricultural use. In 1978, less than 70 percent of the 265 acres were in active crop or pasture use and the remainder was abandoned. The high percentage of inactive land was due to the uncertainty in month-to-month leases at that time. Although the existing boundaries established by Mrs. Elizabeth Marks have been accepted and respected by the residents for many years, they have not been officially registered with the state. In order for individual long-term leases to be made, the valley must be properly subdivided under the rules and regulations of the City and County of Honolulu and the subdivision recorded in the state Bureau of Conveyances.

Proposed Action. The state's objective of preserving the integrity of the Waiahole Valley community was an important factor in the establishment

of lot boundaries. The proposed boundaries generally follow the existing tenancy boundaries to minimize the disruption of existing fields, local irrigation systems, tractor roads, and access points. Some adjustments in boundaries, however, were necessitated by such factors as: (1) the re-alignment of roadways, (2) the creation of an access to otherwise land-locked tenancies and other private lands, (3) the resident's use of land beyond the tenancy boundary for yard area, storage, parking, gardens, and other similar uses, (4) the enlargement of small agricultural parcels to a minimum area of one acre, and (5) neighbor boundary disputes.

The proposed development plan has subdivided the land into agricultural, residential, and open space lots as shown on Figure I-4. Existing tenants are listed in Appendix A-1 and the lots encumbered by existing tenancies are cross-referenced in Appendix A-2.

Agricultural Lots. There will be 45 agricultural parcels (379.4 acres). Of the 45 agricultural parcels, 36 are encumbered by existing tenancies. Nine additional tenancies created from formerly vacant lands will be made available.

The City and County of Honolulu's Comprehensive Zoning Code requires a minimum lot size of two acres for restricted use agricultural AG-1 zoning. There are existing agricultural uses and existing residential uses in Waiahole Valley that are presently in AG-1 zoning. An exemption will be sought to reduce the minimum permissible lot size of two acres to one acre, which would allow the existing residential uses to remain (see Chapter II). Enlarging all existing residential-use tenancies to a minimum lot size of two acres would require taking substantial land from adjacent tenancies, require the deletion of a tenancy and the relocation of a family.

Residential Lots. There will be 80 residential lots (40.0 acres), of which 47 lots will be created around existing dwellings and 33 will be new residential lots. Of the 47 lots, 22 will remain in the agricultural classification, while the remainder are classified by the state for urban land use. The new Koolaupoko Development Plan has zoned these agricultural use, thus an exemption will be sought from the development plan. The proposed number of new residential lots (33) will have a minimum acreage of 7,500 square feet and an approximate density of 2.4 lots per acre. Most of

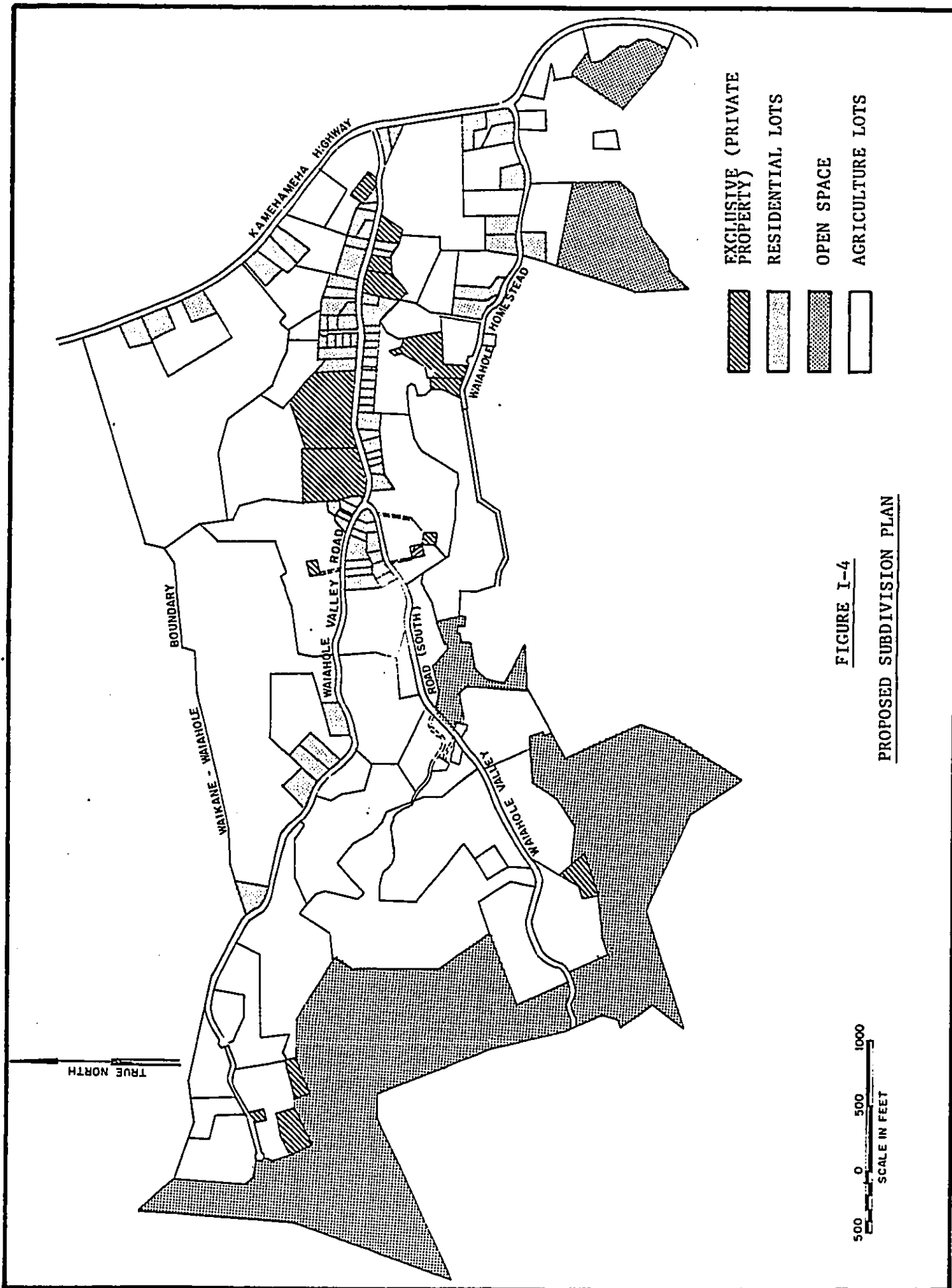


FIGURE I-4
PROPOSED SUBDIVISION PLAN

these lots will be centrally located in the Waiahole Valley Elementary School area. Some of the residential lots, however, will fall within the existing state Land Use Agricultural District and will have to be redesignated as urban. It is intended to cluster additional residential lots around the existing residential lots to minimize encroachment on any agricultural land. Because the land around the existing residential lots are considered prime agricultural land, some of the land will be traded-off to achieve this clustering to residential lots. This impact is discussed in Chapter IV.

Commercial Lots. There are two existing commercial lots (0.8 acres) for a poi factory and store. The state has classified these lots for urban land use and the county has zoned these lots as agricultural, therefore the same exemptions sought for residential lots will also be pursued.

Conservation or Open Space Lots. There will be five parcels in the conservation district that will be used for open space and a buffer to the forest reserve (149 acres). These parcels are located on marginal lands with steeper slopes and will not be leased.

Reservoir and Booster Pump Lots. There are two lots tentatively sited for the domestic and irrigation water supply system reservoirs and one lot for the booster pump station (3 acres).

Lease Agreements. The major lease stipulations include the lease term and rent, ownership of site improvements, speculative safeguards, and special requirements for the agricultural lots that are derived from the agricultural park law (Chapter 171, HRS). These provisions are highlighted below.

	<u>Residential</u>	<u>Agricultural</u>
Lease Terms & Rent	55-year lease, 4 terms: 1st term (15 yr) \$500/yr 2nd term (10 yr) \$650/yr 3rd term (15 yr) negotiated 4th term (15 yr) negotiated Minimum lot size is 7,500 sf; Additional charge for lots larger than 7,500 sf, add 3.5¢/sf for 1st and 2nd terms; additional charge to be renegotiated in 3rd and 4th terms	55-year lease, 3 terms: 1st term (25 yr) \$100/acre/yr plus 3% of 30% of lessee's gross farm income of pre- ceding calendar year (% portion waived for the first 2 yrs of the 55 lease for capital start-up cost); house site (7500 sf)-\$500/yr 2nd term (15 yr) negotiated 3rd term (15 yr) negotiated

Site Improvements Lessee owns improvements which must be portable, removable, or demolishable Same

Speculative Safeguards Lessee is not allowed to sublease, sell, or transfer lease; if termination of lease is desired, it must be turned back to HHA Same

Special Agricultural Requirements Not applicable

Water: The state shall provide the amount of water at least equal to the present requirements. Water rights are reserved by the state.

Ag Practice: Agriculture must comprise a significant portion of tenant's time and income, as defined:

- . 1/3 of time must be devoted to agriculture
 - . 1/2 of total annual income should be derived directly from leased property
 - . the arable portion of the land must be in continuous cultivation, except for the normal fallow period
- Livestock will be limited as follows:
- . no new pasture leases will be allowed--only small livestock such as pigs and chickens will be allowed
 - . stockproof fencing required around lot perimeter if there are livestock on the premises.

Special Provisions No new cesspools above the BWS "no pass" line will be allowed. New tenants will be required to install closed vaults or other approved wastewater system.

Farmers will be required to comply with all relevant regulations and recommendation of the Soil Conservation Service and the Department of Agriculture to minimize soil erosion and safeguard the valley soil and water from pesticide and fertilizer misuse.

The lessee must comply with all federal and state laws regarding environmental quality control.

The lessee must comply with all federal and state laws regarding environmental quality control.

Improvements

Minimal improvements are proposed to preserve the rural character.

Roads.

Existing Conditions. There are two existing roads in Waiahole Valley: Waiahole Valley Road, which forks into north and south branches, and Waiahole Homestead Road. Waiahole Valley Road has an existing right-of-way of approximately 40 feet, with a varying pavement width between 14 and 20 feet. The paved portion extends from Kamehameha Highway to almost one mile up the north branch. The remaining portion of the north branch and the entire south branch are uneven, potholed, gravel-dirt roads. The south branch extends approximately 5,000 feet past the forest reserve boundary to the Waiahole Water Company's Pumping Station. There are a few sharp blind curves on the north and south branches. Waiahole Homestead Road has a 30-foot right-of-way, with the road width varying from 10 to 15 feet. The road surface at the entrance from Kamehameha Highway is composed of well-graded soil, but the remaining portion consists of soil and exposed rock.

Proposed Action. Proposed road improvements will include the following:

1. Widening and paving. The right-of-way for Waiahole Valley Road and Waiahole Homestead Road will be expanded to 44 feet and 32 feet respectively. The existing paved length will be resurfaced, and new asphaltic concrete pavement will be provided for roadways where none presently exist. The pavement width for the roads within the subdivision boundary will be approximately 18 feet. The existing gravel Waiahole Valley Road (South branch) that extends 2,000 linear feet beyond the forest reserve line will be regraded and compacted.
2. Realignment. Waiahole Valley Road will be realigned in three major places: (1) near the Kamehameha Highway intersection where Waiahole Stream comes near the road; (2) at the north branch to eliminate a blind curve; and (3) at the south

branch over Waianu Stream in conjunction with the new bridge.

3. Maintenance road. At the end of the south fork of Waiahole Valley Road, about 5,000 linear feet of existing gravel road will be regraded and compacted. This will allow access for maintenance vehicles into the forest reserve. It will also provide access to remote lots located deep in the valley.
4. Bridge. A new concrete bridge will replace the existing timber trestle bridge at the south branch crossing of Waianu Stream.

The roads and the bridge will be maintained by the state (DLNR).

Drainage.

Existing Conditions. There are no drainage facilities in Waiahole Valley. Storm drainage is by overland flow to nearby streams, which discharge into Kaneohe Bay.

Proposed Action. Most of the drainage improvements will consist of roadside swales; where erosion is a problem, culverts will be utilized at gully crossings. The residential area along Waiahole Valley Road between Kamehameha Highway and the south branch intersection will be served by a drainage pipe system. The flood water from the drains and culverts will discharge into Waiahole Stream. The drainage system will result in a negligible increase in stream flow.

The banks of Waiahole Stream will be lined with boulder riprap from the poi factory to about 600 feet upstream for bank stabilization and protection. This will prevent undermining of the stream bank adjoining Waiahole Valley Road. Revetments will be placed under the new concrete Waianu Stream bridge to prevent the undermining of the bridge supports. The drainage improvement structures will not significantly alter the nature of the natural stream channel bottom, thus should not adversely effect diadromous species.

The swales and the bridge revetments will be cleared and maintained by the state (DLNR).

Water.

Existing Conditions. Various Waiahole Valley residents are presently served by two water systems: the Board of Water Supply (BWS) system and the McCandless system. The BWS system serves various residents along Kamehameha Highway and a few residents along Waiahole Valley Road from Kamehameha Highway to the school.

The McCandless system refers to a water rights agreement between the McCandless Estate and Waiahole Water Company, whereby 0.5 mgd was committed to the estate's Waiahole and Waikane Valley lands from the Waiahole Ditch-tunnel system. The state acquired one quarter of those rights when it purchased approximately 590 acres of the McCandless land holdings in Waiahole Mauka. The existing system removes water from Intake 29 of the Waiahole tunnel and transports it in a 4-inch cast iron pipe to a weir box. The weir box provides a means to measure the flow (although there are no flow records) and discharges the water into Waianu Stream. Approximately 200 yards downstream from the weir box, an intake box along Waianu Stream collects stream water, which is then transported in a 6-inch cast iron transmission line to a pressure break tank. From the pressure break tank, the water is carried in a 6-inch delivery pipe, which extends along Waiahole Valley Road to the old Waiahole Poi Factory. Users of McCandless' water tap off the 6-inch pipe line at various locations with 3/4- or 1-inch service laterals for domestic and irrigation use.

Common problems associated with the McCandless system include low water pressure and "muddy" water. Downstream users of the 6-inch delivery line have occasionally experienced low pressure. This is probably due to an undersized, partially corroded supply line and simultaneous water demand creating a pressure reduction to these downstream users during peak demand periods.

The Waiahole Water Company intercepts dike impounded water in upper Waiahole Valley through the Waiahole Ditch-tunnel system. This water is conveyed to Central Oahu for sugar cane irrigation. In addition, 1.1 mgd is pumped from Waiahole Stream to the Waiahole Ditch under a lease between Waiahole Water Company and the state (DLNR).

Proposed Action. The state will develop a water system to provide domestic and irrigation water to the residents. The determination of who will operate and maintain this water system is still unresolved.

A single water system will be provided for both domestic and irrigation use (See Figures I-5 and I-6). The estimated domestic requirement is 80,000 gpd (Russ Smith Corporation, 1980). The estimated irrigation quantity of 700,000 has been derived from an agricultural needs study (Scott, 1981); however, the parameters and assumptions have been revised, utilizing more realistic and justifiable criteria (Table I-1). The supply source will be groundwater, which would obviate the need for the extensive treatment required for domestic use of surface water supplies. The wells will be located near the upper reaches of Waiahole Stream. New 12- and 8-inch waterlines will connect the wells to the 1.0 million gallon steel reservoir tank and distribute water throughout the project area. A 350 gpm booster pump and a 200,000 gallon steel reservoir tank will provide Waianu Valley residents at the higher elevations with a dependable water supply. Fire protection (fire hydrants) will also be provided through this water system.

Through prior McCandless water rights agreements, the 0.5 mgd from the McCandless water system was to be equally distributed to the areas of Waiahole Mauka, Waiahole Makai, Waikane Mauka, and Waikane Makai. By virtue of this four-way water rights allocation, the Waiahole Mauka parcel purchased by the state has rights to 125,000 gpd. The existing McCandless water system will remain unmodified by the proposed project. "Surplus" water that overflows into and supplements Waianu Stream will continue.

Wastewater Management System.

Existing Conditions. There are no existing sewer mains or treatment facilities in the area. The current method of wastewater disposal in Waiahole Valley is dependent on individual onsite cesspools. These cesspools are generally 7 feet in diameter, with depths of at least 10 feet. There are approximately 80 cesspools in Waiahole Valley, of which about 15 have required pumping more than once a year. Most of the cesspools that require frequent pumping are located at lower elevations adjacent to Waiahole and Waianu streams and the low-lying areas near Kamehameha Highway, where the soils are subject to periods of prolonged saturation.

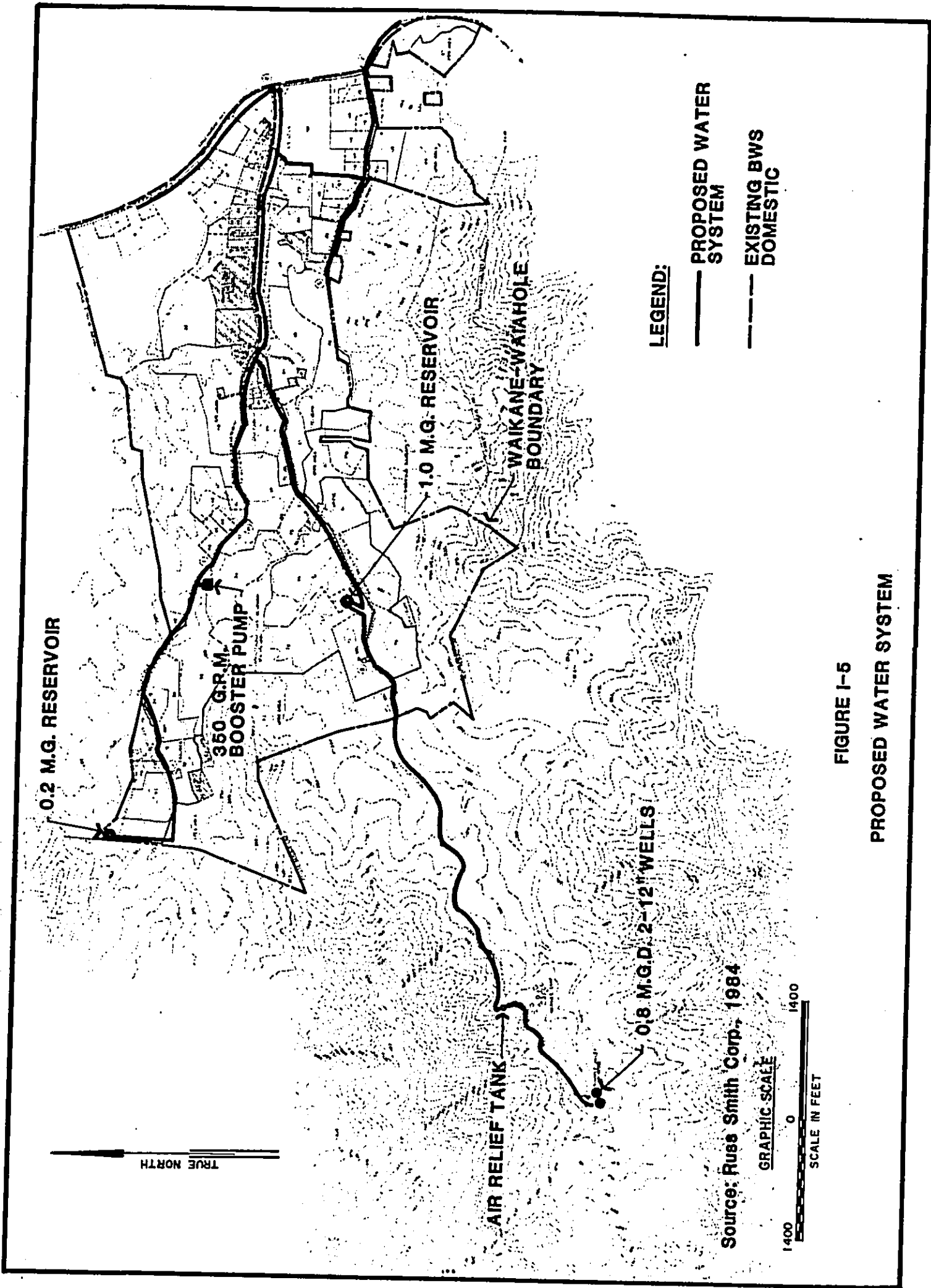


FIGURE I-5
PROPOSED WATER SYSTEM

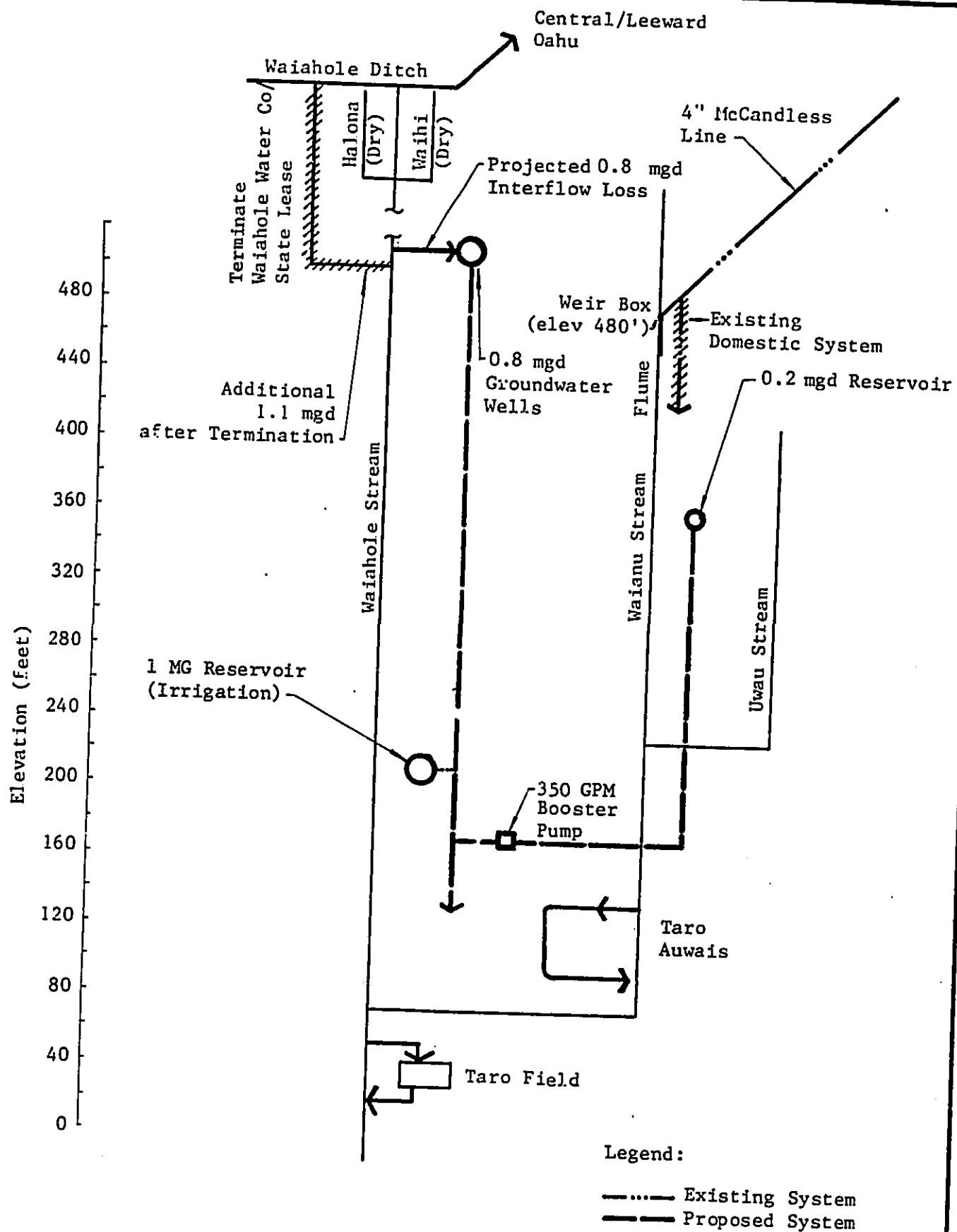


FIGURE I-6

SCHMATIC OF PROPOSED WATER SYSTEM

TABLE I-1

WATER REQUIREMENTS FOR DOMESTIC AND AGRICULTURAL
USE IN WAIHAOLE VALLEY^{a/}

DOMESTIC

<u>Projected Population</u>	<u>Per Capita Demand Avg/Day gpd</u>	<u>Total Demand Avg/Day gpd</u>
460	175	80,000

AGRICULTURE

<u>Crop</u>	<u>Acreage</u>	<u>Gallons/Acre/Day</u>	<u>Total Requirements</u>
Bananas	100	5,431	543,100
Papayas	25	4,073	101,825
Sweet Potatoes	40	4,073	162,920
Cucumbers	20	4,073	81,460
Tomatoes	30	4,073	122,190
Snap Beans	10	4,073	40,730
Miscellaneous Truck Crops	20	4,073	81,460
Flowers, Foliage, & Potted Plants (Shade House)	50	3,000	150,000
Subtotal	295		1,283,685
Prawns	10	21,600	216,000
TOTAL	305		1,499,685 ^{b/}

Source: Frank S. Scott, Jr., Agricultural Feasibility and Environmental Impact, December 1981.

a/ These water requirements are based on the amount of water required for each crop during the dry season when rainfall is negligible. During the rainy season, only supplemental water or no water would be required for all crops, except prawns and shade house plants. Stream requirements for prawns do not take into consideration water that is saved for reuse. Taro requirements are not included. Taro utilizes flow-through water to primarily maintain temperature conditions and consumes very little water. Taro needs will be met by existing flow-through (auwai) systems.

b/ This total assumes simultaneous needs of all crops. If field crops are watered twice a week as Scott recommends, 700,000 gpd would be sufficient.

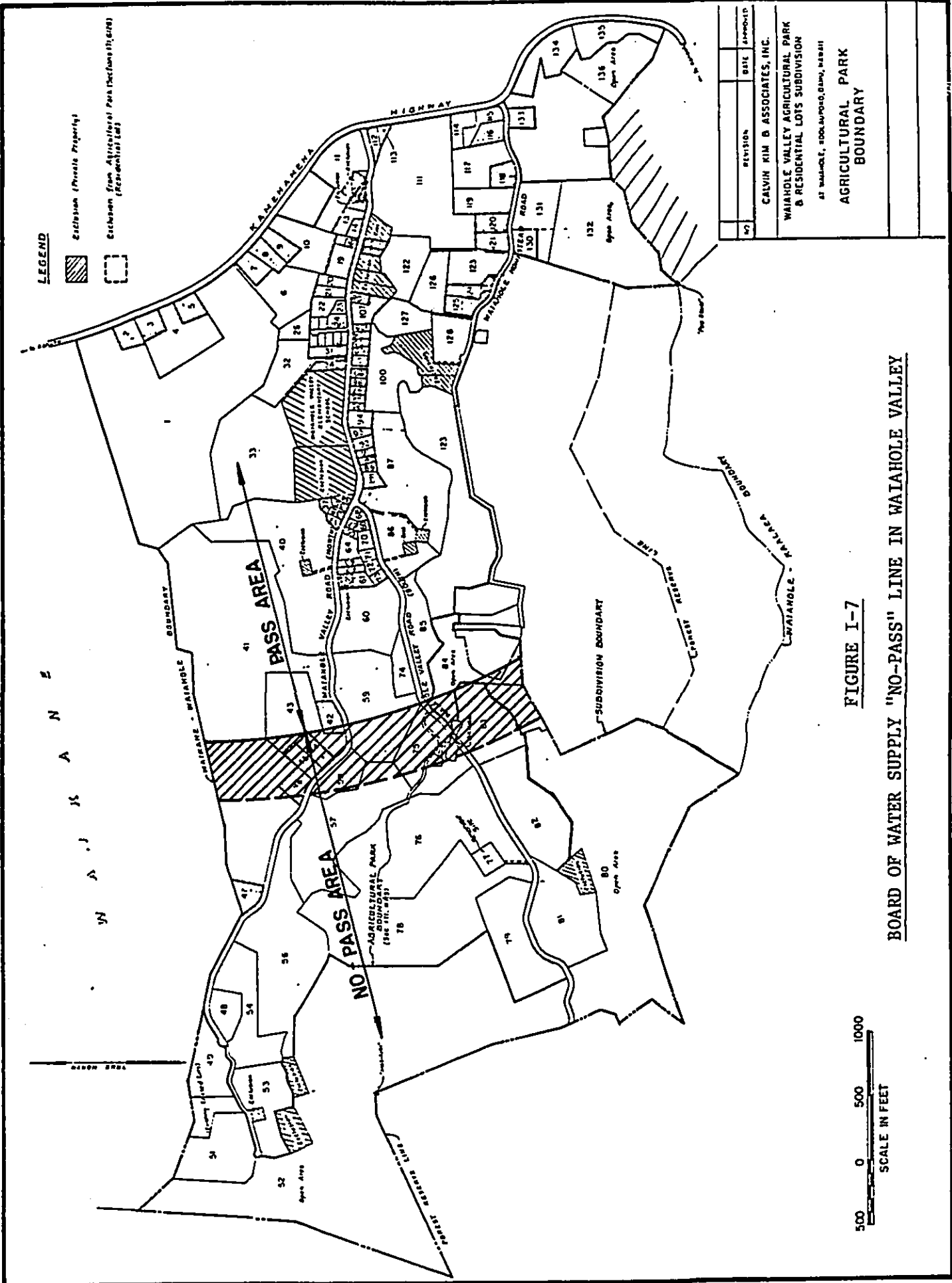
The "pass/no pass" line developed by the BWS to protect potential groundwater supplies cuts across the upper third of Waiahole Valley (see Figure I-7). Above the "no pass" line, no cesspool or leach field construction is ordinarily permitted. There are 15 existing dwellings within the project area above the "no pass" line. The proposed development will result in approximately 3 additional agricultural lots above the "no pass" line within the project area.

Proposed Action. The tenants will be responsible for providing their own individual wastewater disposal systems that comply with Chapter 57 of Title 11, Department of Health Administrative Rules and any other applicable laws. The suggested wastewater management system for the Waiahole Valley area consists of onsite individual disposal systems, primarily the closed vault and cesspool. The selection of one type of onsite individual disposal unit over the other will be dependent upon the location and geological conditions present at each specific site.

Specifically, it has been proposed that cesspools continue to be used as the method for wastewater disposal for the area down gradient from the "pass/no pass" line of the Board of Water Supply. In areas where malfunctioning is prevalent, a closed vault or some other approved system may be required for new tenants.

In the areas above the "no pass" line, it is proposed that a Department of Health-approved system such as the closed vault be implemented by new tenants to conform to the BWS's policy of groundwater protection. Such a system would entail the construction of singular or multiple closed vaults for the collection of each tenant's wastewater flow. The vaults will require periodic pumping by a private pumping company. The state Department of Health has "grandfathered" existing cesspool uses above the no pass line. Wastewater system construction permits and maintenance will be the responsibility of the lessee.

To minimize the frequency of vault pumping, composting toilets or other waterless systems could be installed as supplemental systems if approved by the Department of Health. Properly composted residential wastewater solids could then be added to non-food crop land as a solids amendment.



The proposed wastewater management system of new plus existing units will consist of 110 to 130 individual treatment units, handling approximately 33,000 to 39,000 gpd of domestic wastewater.

Electrical and Communications.

Existing Conditions. Three overhead lines (12,470 volts each) provide electricity to Waiahole Valley. Two of these electrical lines presently tap a 46 kV (kilovolt) transmission line located along Kamehameha Highway. One line runs along Waiahole Valley Road to the Waianu Stream crossing, then cuts across to the northern portion of the valley. The second 12.5 kV line runs a short distance along Waiahole Homestead Road. The third electrical line originates in Kaalaea Valley and serves Waiahole Camp and the Waiahole Irrigation Company pumping station. There are no street lights.

Telephone service is provided to valley residents by a main cable which extends from the Waiahole Poi Factory to the north fork of Waiahole Valley Road. Residents along Waiahole Homestead Road are provided telephone service on an individual basis.

Proposed Action. Widening of the existing roads will require relocation of the existing overhead telephone and electric distribution lines. In addition, the overhead system will be extended to provide electric and telephone services to all lots in Waiahole Valley.

High pressure sodium vapor street lights will be provided along Waiahole Valley Road up to the fork in the road and the lower end of Waiahole Homestead Road. The average illumination will be 0.4 to 0.6 foot candles. Maintenance of electrical and telephone lines will be the responsibility of the respective utilities.

Site Improvements. Site improvements for existing dwellings will be limited to driveway and grade adjustments, hookup of utility services, relocation of mail boxes, and restoration of property that is damaged by the road construction.

HHA will provide information to those leasing new agricultural and residential lots to obtain financing for construction of homes.

Project Costs and Funding

Project Costs. The estimated cost of the proposed Waiahole Valley development totals about \$13,100,000. Table I-2 shows a breakdown of the cost.

Funding. All proposed actions occur entirely on public lands and are funded entirely by public sources. Table I-3 lists the sources of the funds.

The project is being funded by the Hawaii Housing Authority's Dwelling Unit Revolving Fund (DURF) and Capital Improvement Project (CIP) appropriations. The CIP funds have been encumbered to continue beyond the fiscal year that the funds were appropriated for. The CIP funds have also been delegated to the Hawaii Housing Authority (HHA) as the expending agency for the \$3.6 million Department of Land and Natural Resources (DLNR) appropriation and the \$1.4 million Department of Agriculture (DOA) appropriation. An additional \$1.3 million has been appropriated directly to the Department of Social Services and Housing (DSSH) for the HHA. As mandated by the 1984 legislature, HHA will recover all DURF monies and carrying costs by exchanging the entire Waiahole project with the DLNR for lands of equal value that are suitable for housing developments; then land and water resources will be under the jurisdiction of the appropriate respective agencies.

No federal or municipal funds were used for this project.

PHASING AND TIMING OF ACTION

The proposing agency, Hawaii Housing Authority, has finalized the design of the Waiahole Valley Agricultural Park and Residential Lots Subdivision. Construction groundbreaking is projected for mid-1985, with the completion of improvements tentatively projected for late 1986. The approval of the subdivision by the City and County of Honolulu would allow long-term leases to be granted. Until that time, the state has granted interim leases to qualifying existing tenants of record.

The proposed construction work has been divided into two projects:

1. Project I will include: (1) waterlines within the project area boundary; (2) the reservoirs; (3) booster pump; (4) roadway improvements; (5) drainage systems; and (6) electrical systems.

TABLE I-2

PROJECTED COST OF DEVELOPMENT - WAIAHOLE VALLEY
AGRICULTURAL PARK AND RESIDENTIAL LOTS SUBDIVISION

<u>LAND</u>		PROJECTED AGENCY COSTS		
		HHA	DOA	DLNR
Acquisition	\$ 6,000,000			
Other Land Costs	200,000			
Feasibility	50,000			
Architect and Engineering Fees	70,000			
Legal Fees	80,000			
Contingency	150,000			
Administrative Expenses	110,000			
Total	\$ 6,660,000	\$6,660,000*		
<u>AGRICULTURAL PARK IMPROVEMENTS</u>				
Planning	\$ 99,000			
Design	659,252			
Total Pln. & Des.	\$ 758,752		\$ 758,752	
Construction (Estimated)				
Roadway Improvements	\$ 1,414,060			
Drainage System	741,060			
HECO & HTCO Charges	185,000			
Street Lighting System	30,000			
Total Estimated	\$ 2,371,000			
Construction Cost	\$ 2,371,000			
Allocation of Est. Construction Cost:				
a. Ag Park Share	65.10%		\$ 1,543,860	
b. Residential Share	34.90%	\$ 827,140*		
<u>WATER FACILITIES</u>				
Planning	\$ 40,000			
Design	363,747			
Total Pln. & Des.	\$ 403,747		\$ 403,747	
Construction (Estimated)	\$ 2,900,000		\$2,900,000	
<u>AGRICULTURAL PARK COST</u>				
PER AGENCY		\$6,660,000	\$ 2,302,610	\$3,303,750
TOTAL	\$12,266,360			
<u>RESIDENTIAL LOT COSTS</u>				
PER AGENCY		\$ 827,140		
TOTAL	\$ 827,140			

* Interest expense not included.

Source: Environment Capital Manager, 1981, as amended by Calvin Kim & Associates, the Russ Smith Corp., and the Hawaii Housing Authority, 1984.

TABLE I-3

FUNDING OF PROJECT

WAIAHOLE VALLEY AGRICULTURAL PARK

HHA's Dwelling Unit Revolving Fund (DURF)*	\$ 6,660,000
DOA - CIP Funds (Act 218, SLH 1974; Act 226, SLH 1976)	\$ 1,400,000
DLNR - CIP Funds (Act 218, SLH 1974; Act 226, SLH 1976)	\$ 3,600,000
DSSH - Supplemental CIP Funds (Act 285, SLH 1984)	<u>\$ 1,130,000</u>
	\$12,790,000

* Government General Obligation Bond Issue, November 1977 - November 1997, 6% per annum interest

Source: Environment Capital Manager, 1981, as amended by the Hawaii Housing Authority, 1984.

2. Project II will include: (1) development of the groundwater source; and (2) pipeline within the Forest Reserve area.

HISTORIC PERSPECTIVE

The existence of the proposed development plan and the form it has taken are the product of past historical events. Understanding the past may provide a better insight into the rationale behind many of the proposed actions.

In historic perspective, Waiahole Valley has been effectively in agricultural use since the time prior to the discovery of Hawaii by Captain James Cook (1778). After the discovery of Hawaii, however, Waiahole Valley experienced many changes. The feudal system of land ownership by the chiefs and land agents was replaced by the private system of land ownership. By the late 1800's, when many of the Hawaiian-owned kuleanas were absorbed, L. L. McCandless began to purchase land parcels in Waiahole Valley. With the migration of the Chinese into the valley and the introduction of rice to the valley, both population density and land use intensified.

In the 1910's, the majority of the land in the valley still belonged to the government and non-Hawaiians. McCandless, however, continued to acquire valuable land in the valley. Taro, rice, and pineapple were the main crops, but the latter two soon declined in productivity.

McCandless owned most of the desirable land in the valley by the late 1930's. Diversified agriculture was introduced to Waiahole Valley by the Japanese with such crops as taro, bananas, papayas, sweet potatoes, and other truck crops. Filipinos were the next racial group to migrate into the valley.

In recent times, the trustees of the McCandless Estate notified the tenants in January 1956 of a pending development in Waiahole Valley. The leases were changed to monthly terms and the insecurity of such a short tenure made extensive agriculture impractical. The valley thus remained in this position until the mid-1970's.

In 1974, the McCandless Estate heirs had planned to develop 1,337 acres of land in Waiahole and Waikane Valleys. The state Land Use Commission denied approval of the plan, however, which included the construction of 6,700 residential units.

A four-point program was instead proposed by the Waiahole-Waikane Community Association that was aimed at preserving the agricultural theme of the region. These were:

- "1. Expand agriculture in the area by opening more land for it.
2. Grant long-term leases to all agricultural lessees in the area to encourage serious pursuit of commercial agricultural activities.
3. Maintain the integrity of the Waiahole-Waikane community by preserving its rural lifestyle.
4. Institute regional planning with community participation."¹

In 1975, two related events occurred. Mrs. Elizabeth Loy McCandless Marks consolidated ownership of land from others in the family whereupon lease rents were raised after the consolidation of ownership. Mrs. Marks stated that the increase was based on the current market value and the property taxes imposed upon the land.²

Proposals made in 1975 by developer Joe Pao to develop residential units in Waiahole-Waikane were rejected because of state and city opposition to development in the area. The city sought urban development to be in the Ewa area, while the state wanted to preserve prime agricultural land on the windward side. In the existing agricultural zoning situation, however, several two-acre lots could conceivably be sold and developed by the land-owners.

The tenants, many of whom have occupied their tenancies for over 20 years, and Joe Pao/Mrs. Marks attempted to arrive at a settlement during the following year. The issues could not be resolved, however, because of a disagreement on the amount and location of land that would be made available for tenants wishing to farm or live in the valley. During this confrontation, the tenants refused to pay the higher rents, consequently leading to Circuit Court Judge Arthur Fong's ruling in favor of the eviction of 79 families.

¹ Honolulu Star Bulletin, October 29, 1974, Section D., p. 11.

² Honolulu Star Bulletin, May 22, 1975, Section B, p. 2.

In February 1977, Governor George Ariyoshi proposed to buy the 590 acres in Waiahole Valley in the public interest and seek development according to the State's agricultural preservation goals. The six million dollars required would come from the Dwelling Unit Revolving Funds created by Act 105.

Because Windward Partners (headed by the late Joe Pao) did not exercise its option to purchase the 590 acres in Waiahole Valley from Mrs. Marks, the state gained and exercised the option to buy the land. HHA announced the purchase in December of the same year. State plans for Waiahole Valley development proceeded and subsequently were based on retaining the rural profile associated with an agricultural district.

CHAPTER II

RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

The Hawaii State Plan, codified into law as Chapter 226, Hawaii Revised Statutes, has set forth goals, objectives, and policies to guide the state's future growth. A system for coordinating the actions of state and county agencies to implement the plan is also established. Through this system, the Hawaii State Plan acts as an umbrella document. State functional plans and programs, county general plans, and development plans fall under this umbrella and further define and implement the State Plan. In this chapter, the policies and plans contained in the Hawaii State Plan, State Functional Plans, City and County General Plan, and City and County Development Plan for Koolaupoko will be related to the proposed action to determine conformance. In addition, coastal zone management policies will be examined since a portion of the development is in the Special Management Area.

Besides being in conformance with adopted plans and policies, a development proposal must also be reviewed and approved by several agencies responsible for ensuring environmental quality and public health, safety, and welfare. The approvals necessary for this proposed project are discussed in the latter part of this chapter.

CONFORMANCE WITH PLANS AND POLICIES

State

Hawaii State Plan. The three goals set forth in the State Plan (Section 226-4, HRS) constitute three of the major reasons for the purchase and development of Waiahole Valley as an agricultural park. These goals and their relationship to the proposed action are as follows:

1. Goal: A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaii's present and future generations.

The visitor industry and federal expenditures presently dominate the economy in Hawaii. Diversified agriculture is promoted in the plan as one means to stabilize the economy (Section 226-7[a][2]).

The proposed action establishes diversified agriculture as the principal long-term land use of Waiahole Valley. Lease stipulations for agricultural lots require continuous cultivation and a percentage of the lessee's income to be derived directly from farming the land in order to ensure agricultural productivity. These lease conditions conform to the agricultural park provisions of Chapter 171, HRS. The creation of additional agricultural parks is one of the priority items in the State Plan (Section 226-103[d][9]).

2. Goal: 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.

Verdant beauty, cleanliness, and quiet make Waiahole Valley one of the few such areas remaining on Oahu. Protection of this type of priceless, fragile resource is in accordance with the environmental quality policies of the State Plan (Section 226-11). The natural environment of Waiahole Valley not only possesses physical beauty but is also an integral part of Hawaii's unique rural lifestyle (Section 226-12).

3. Goal: Physical, social, and economic well-being for individuals and families in Hawaii that nourishes a sense of community responsibility, of caring, and of participation in community life.

Besides the diversified agricultural goals and the natural beauty of Waiahole, the proposed action protects its most important resource--the people and their sense of community. Long-term leases will allow the community to continue living together in their rural setting.

A limited amount of residential lots will be developed along with the agricultural lots. The residential lots are anticipated to be directed to the low to moderate income households and foster a lifestyle traditional to Hawaii (Section 226-19[2][b][7]). The private development that would have occurred had not the state intervened would have negated state policies by changing the character of Waiahole and pricing homes beyond the range of the low to moderate income households.

State Plans. The proposed development plan for Waiahole Valley involves three broad categories of state programs: agriculture, water, and housing. A plan has been prepared for each category in order to provide interim guidelines to state agencies in the execution of their responsibilities. These plans constitute interim guidelines until the legislature adopts state functional plans pursuant to Chapter 226, Hawaii Revised Statutes.

State Agricultural Plan. The proposed action conforms to the State Agricultural Plan in the following respect:

1. Land. Waiahole Valley adds to the list of agricultural parks for diversified agriculture (Implementing Action B(3)[a]). As much as possible, land will be rezoned to reserve prime agricultural land for agriculture while attempting to limit residential development to the marginal lands (Implementing Action B(5)[c]).
2. Water. An irrigation system will be developed to provide adequate water at reasonable cost (Implementing Action C(2)[a]). No specific conditions were attached to the state lease that would require appropriate water conservation and erosion practices, as suggested in the plan (Implementing Action C(1)[c]) but the lessee will be required to comply with all federal, state, and county rules and ordinances, such as leaving all drainage patterns unaltered. The Soil Conservation Service will work with farmers on a voluntary basis.

Water Resources Development Plan. The state Water Resources Development Plan complements the agricultural plan in its support for state-operated irrigation systems to encourage diversified crop production (Implementing Actions E(1)[b] and E(4)[a]). Other concerns where the proposed action conforms with the water plan include:

1. Aquifer management. Subsurface wastewater disposal methods will be located and designed to avoid contamination of the groundwater supply (Implementing Action B(2)[b]).
2. Flood plain management. There will be no new residential developments within the 100-year flood plain (Objective C).

3. Instream uses. Groundwater will be developed as the primary water source. Individual tenants opting for stream source irrigation must each demonstrate that economic use of the surface water resources will be balanced with the natural value of the stream. Regulatory control by the DLNR will assure that the cumulative effect of these individual withdrawals will maintain a minimum streamflow suitable to the aquatic organisms (Implementing Action G(1)(b)).

State Housing Plan. In conformance with the State Housing Plan, a limited amount of residential lots will be made available for affordable housing (Implementing Action A(2)(c)). Because the major objective of the proposed plan was to preserve agriculture and maintain a rural environment, the amount of affordable housing lots had to be limited. Constraining housing development to protect important agricultural lands conforms to the housing plan (Implementing Action B(1)(a)).

Coastal Zone Management. Coastal zone management (CZM) policies have been codified into law as Chapter 205A, HRS. These policies are applicable to any proposed activity within the Special Management Area (SMA). SMA approval is actually under the jurisdiction of the City and County of Honolulu. Under the state's federal consistency provisions regarding the CZM Act of 1972 (Public Law 92-583), as amended, all federally licensed or permitted activities affecting the coastal zone must also furnish certification that the proposed activity will comply with the state's Hawaii Coastal Zone Management Program (HCZMP). For HHA's proposed action, these policies would only apply to the small portion of the total project area in the SMA and the U.S. Army Corps of Engineers' permit regarding stream bank protection.

A discussion of the CZM policies in regard to resource categories are as follows:

Recreational Resources. There are no unique coastal resources in the SMA. Shoreline access for recreational purposes will be maintained since the existing Waiahole Beach Park will not be affected by any of the proposed activities.

Historic Resources. There is one archaeological site located in the SMA that is on the State Register of Historic Places. This site, which is outside of the project area boundary, will not be impacted by any activity.

Scenic and Open Space Resources. Alteration of natural land forms will be restricted to minor road and water improvements. Public views to and along the shoreline will not be affected.

Coastal Ecosystems. Degradation of coastal water quality will be minimized through the farmers' voluntary compliance with the SCS's soil conservation program for the valley. A minimum stream flow will be maintained to ensure that stream and estuarine habitats are not adversely affected. Stream bank protection for a short length of Waiahole Stream will not degrade the stream habitat since a natural wetted channel bottom and a continuous flow to the bay will be maintained at all times.

Economic Uses. The proposed activity within the SMA includes the continued existence of limited residences. Further development, whether coastal-dependent or not, is not planned within the SMA.

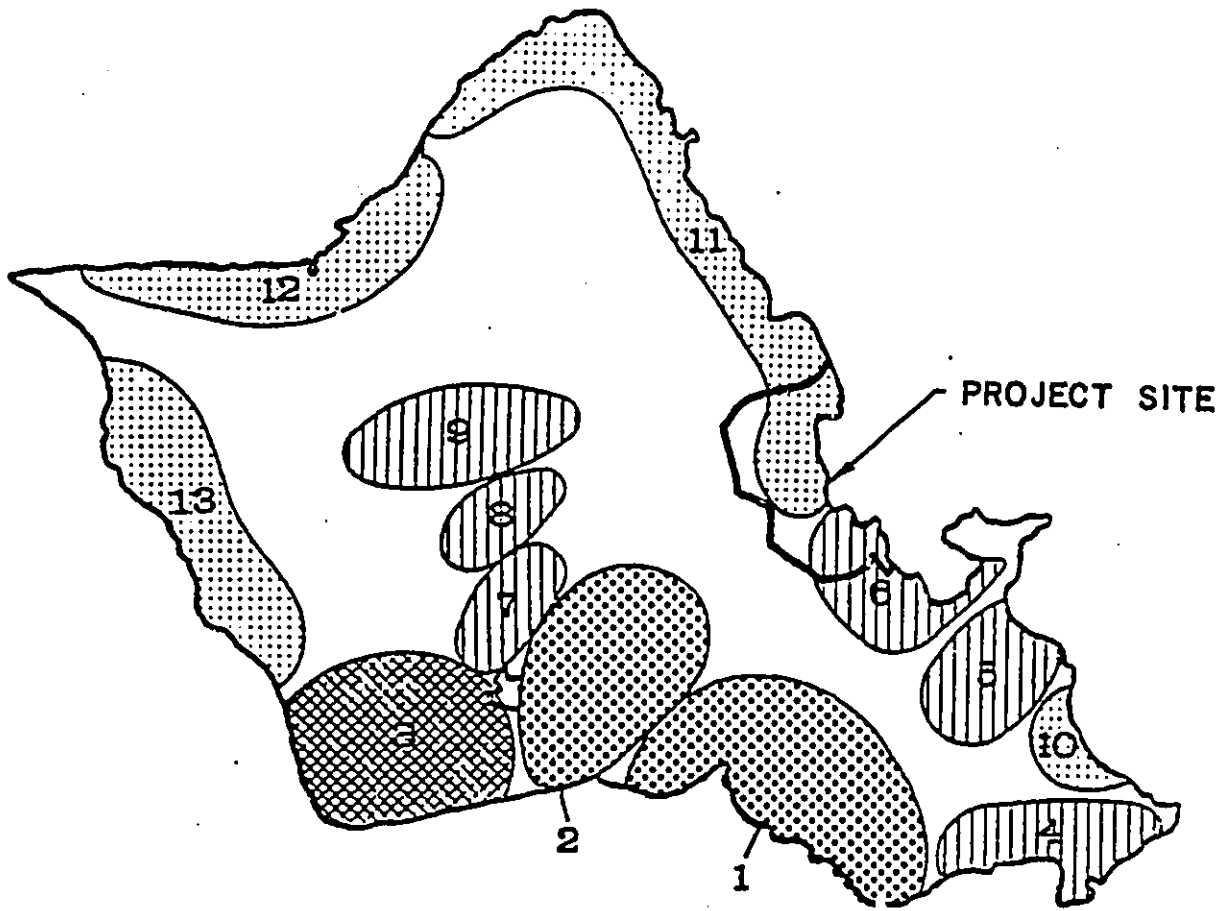
Coastal Hazards. No residences will be located within the 100-year flood plain. The proposed stream realignment will be designed to accommodate storm flows and remedy erosional problems.

Managing Development. The necessary permits have been subsequently identified in this chapter. The impact assessment and public input provided by the EIS process should facilitate the timely processing of those permits.

County




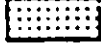
Special Management Area. (See previous state section.)

City & County General Plan. The General Plan has specifically stated that the maintenance of agricultural land along the windward and Waianae coasts for truck farming, flower growing, livestock production, and other types of diversified agriculture is a major policy objective (Economic Activity, Obj. C, Policy 4). The General Plan's population growth area objectives are illustrated on Figure II-1.



POPULATION AREAS
CITY AND COUNTY OF HONOLULU

LEGEND

- | | |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | PRIMARY URBAN CENTER
1. Honolulu (Waialae/Kehala-Halawa)
2. Aiea-Pearl City |
|  | SECONDARY URBAN CENTER
3. Ewa-Makakilo |
|  | URBAN-FRINGE
4. Aiea Koa - Hawaii Kai
5. Kailua
6. Kaneohe - Ahuimanu
7. Waipahu - Crestview
8. Mililani - Waipio
9. Wahiawa |
|  | RURAL
10. Waimanalo
11. Kahaluu - Kahuku
12. North Shore
13. Waianae Coast |

Adapted from: General Plan
City and County of Honolulu
January 18, 1977

FIGURE II-1
CITY AND COUNTY GENERAL PLAN
POPULATION AREAS

Koolaupoko Development Plan. Since adoption by the City Council and the Mayor in 1983, the development plans have become the underlying basis for zoning for each district. In areas where the development plan designations are more restrictive than the existing zoning, interim zoning has been adopted. Waiahole Valley is included in the scope of the Koolaupoko Development Plan. Except for the elementary school site which has been designated for public facilities, the entire valley has been designated for agriculture. The proposed plan for Waiahole will not conform to the development plan in the areas where residential use is proposed. As defined in Sections 171-111 through 118 and Section 359G-4.1, HRS, the state can exempt itself from the development plan. The City Council will review the proposed exemptions.

NECESSARY APPROVALS

The necessary approvals for the proposed action can generally be grouped into the following categories:

1. Approvals related to general planning and land use within the valley
2. Approvals related to the infrastructure improvements
3. Approvals related to certain agricultural practices
4. Approvals related to site improvements

These approvals are listed in Table II-1 along with the approving agency and status of the application. HHA is the applicant in the first two categories, while the lessee is the applicant for the latter two categories.

Planning and Land Use Approvals

The proposed actions are subject to state approvals, including acceptance as mandated by EIS requirements (Chapter 343, HRS) and land use laws (Chapter 205, HRS), but are exempt from typical city development approvals because of legislative provisions related to state-assisted housing projects (Section 359G-4.1, HRS) and agricultural park developments (Section 171-111 through 118, HRS). Instead, the City Council has a 45-day review period to determine the appropriateness of any exemptions.

TABLE II-1

LIST OF NECESSARY APPROVALS

Action	Applicant	Approval/Authority	Approving Agency	Status/Timing
<u>Planning and Land Use</u>				
Use of public funds and land	HHA	EIS (Chapter 343, HRS)	Governor	In review
Rezoning	HHA	LUC Dist Boundary Change (Chap. 205, HRS)	LUC	Application to be filed
• LUC districts	HHA	CZC Exemption	City Council	Application to be filed
• CZC				
Construction in SMA	HHA	SMA permit Exemption	City Council	Application to be filed
Subdivision and Park Dedication Ordinance	HHA	Exemptions from Subdivision Park Dedication Ordinance	City Council	Application to be filed
• Lot Size				
• Park Dedication Waiver				
• Road Design Standards				
• Overhead Electrical Lines in Nonagricultural Portions				
<u>Infrastructure Improvements</u>				
<u>Roads</u>				
• Stream Realignment	HHA	COE permit	Corps of Engrs.	Application to be filed
• Standards	HHA	Exemption from Subdivision Standards	City Council	Application to be filed
• Grading	HHA	Grading permit	DLU	Application to be filed
Drainage	HHA	COE permit	Corps of Engrs.	Application to be filed
• Discharge into Stream				
<u>Water</u>				
• Pipeline through Forest Reserve	HHA	CDUA (DLNR Reg. 4)	DLNR	Application to be filed
• Stream Withdrawal	Lessee	COE permit	Corps of Engrs.	Application to be filed
• Minimum Instream Flow Standards	Lessee	Stream Channel Alteration Permit (Chapter 167 of Title 13)	DLNR	Application to be filed
• Safe Drinking Water Quality	HHA	Safe Drinking Water Act Standards	DOH	Application to be filed
• Well Construction	HHA	Well Construction Permit	BWS	Application to be filed
<u>Electrical/Telephone</u>				
• Standards	HHA	Exemption from Subdivision Ordinance	City Council	Application to be filed
<u>Wastewater</u>				
• Cesspools	Lessee	DOH Cesspool Construction Permit	DOH BWS	Application to be filed
<u>Agricultural Practice</u>				
Stream Diversion	Lessee		DLNR	Application to be filed
<u>Site Improvements</u>				
Home Construction/Remodeling, Cesspool, Fences, etc.	Lessee	1) Review by HHA according to lease agreements 2) Building permit	HHA Building Dept.	Application to be filed

State Land Use Districts.

Existing. Most of the project area has been designated as agricultural land use districts. A central core of urban land use districts exists along Waiahole Valley Road from Kamehameha Highway to the school. A conservation land use district adjoins the project area on the mauka and southern sides. A regional perspective of the land use classifications are shown on Figure II-2.

Proposed. A total of about 35.86 acres are proposed for reclassification, as shown on Figure II-3. The proposed changes include the reclassification of approximately 25.02 acres of the existing urban district to agricultural for:

TMK: 4-8-8:portion of 1, 10, 10;

TMK: 4-8-9:portion of 1;

TMK: 4-8-11:portions of 2;

TMK: 4-8-12:portions of 5; (referenced in map as area 'A') and

The reclassification of approximately 7.35 acres of the existing agricultural district to urban land for:

TMK: 4-8-9:portion of 1;

TMK: 4-8-12:portions of 5 & 10;

TMK: 4-8-11:portion of 2; (referenced in map as area 'B') and

The reclassification of approximately 3.49 acres of existing conservation district land to agricultural land for:

TMK: 4-8-01:portion of 1 (referenced in map as area 'C')

The conservation district amendment has been sought because the indicated parcel fraction is already under agricultural cultivation.

All lots within the agricultural district will be restricted by a minimum lot size of 1 acre.

City and County Zoning.

Existing. The previous zoning had been consistent with state land use boundaries. The existing state Urban Land Use District had been zoned R-6 (single- and two-family residential); the new Koolaupoko Development

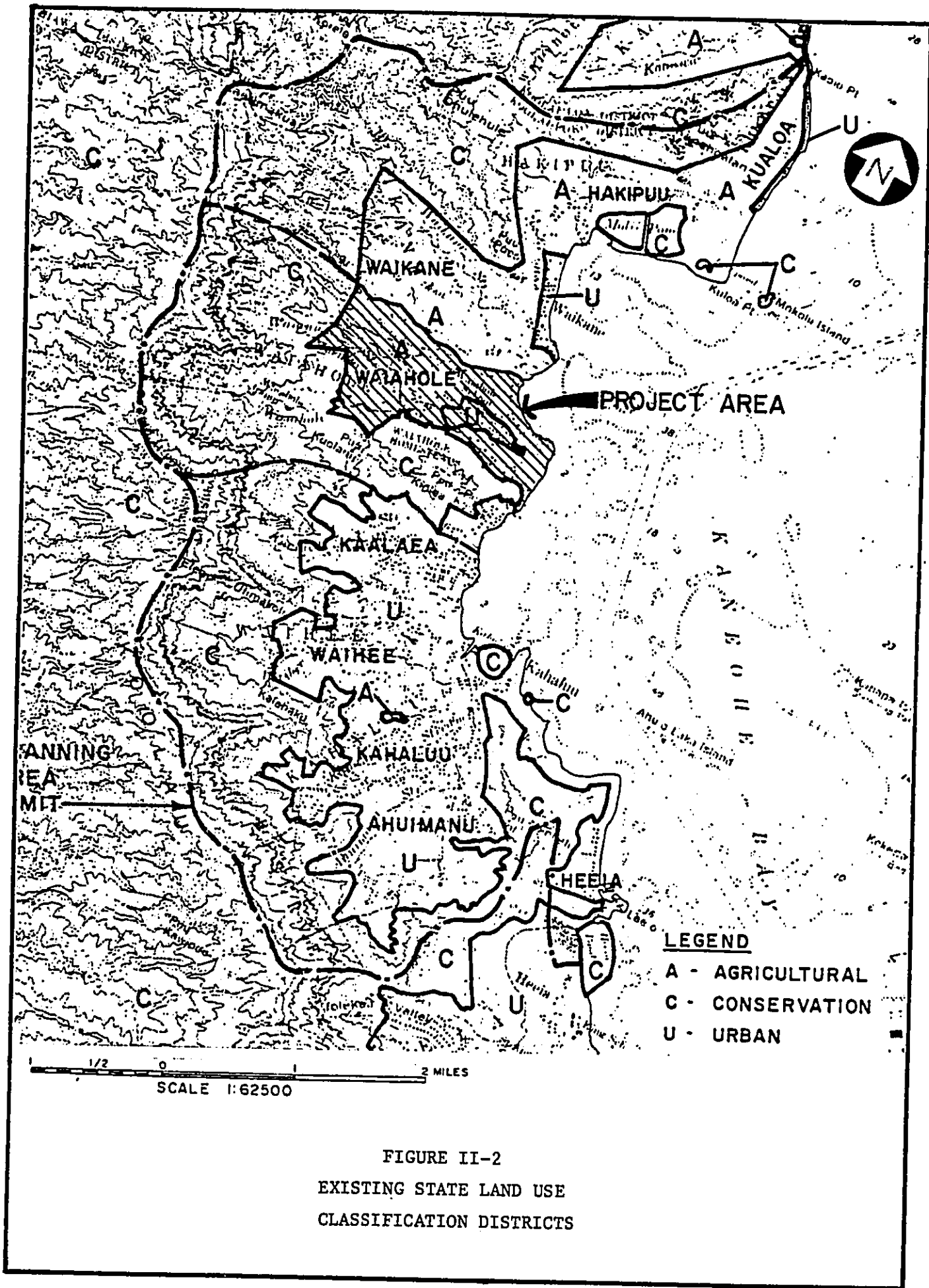




FIGURE II-2
 EXISTING STATE LAND USE
 CLASSIFICATION DISTRICTS

LEGEND

-  PROPOSED URBAN RECLASSIFICATION
-  PROPOSED AGRICULTURAL RECLASSIFICATION

PETITIONED PROPERTIES

- A** - Amend Urban to Agriculture, 25.02 AC
- B** - Amend Agriculture to Urban, 7.35 AC
- C** - Amend Conservation to Agriculture, 3.48 AC

Tax Map Key:
4-8-1,7,8,9,10,11
& 12

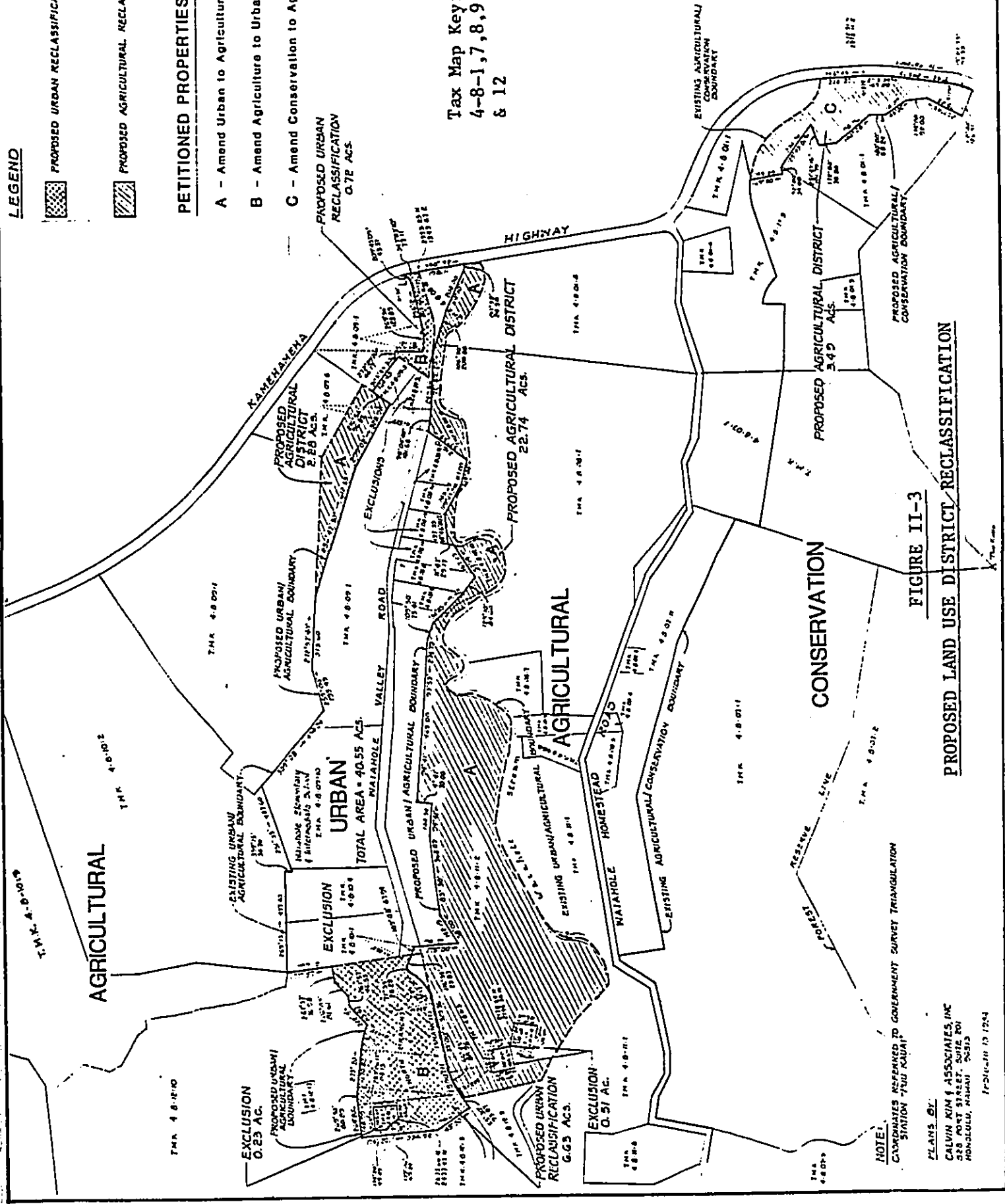


FIGURE II-3
PROPOSED LAND USE DISTRICT RECLASSIFICATION

NOTE:
COORDINATES REFERRED TO GOVERNMENT SURVEY TRIANGULATION STATION "TRU KOUAI"

PLANS BY:
CALVIN KIM & ASSOCIATES, INC.
358 POST STREET, SUITE 201
HONOLULU, HAWAII 96813
1/24/11-PR 13 1244

Plan adopted May 10, 1983 resulted in the elimination of any residential zoning (Figure II-4). The existing Agricultural Land Use District and the existing Conservation Land Use District are compatibly zoned AG-1 (restricted agriculture) and P-1 (preservation), respectively.

Proposed. The areas proposed for reclassification to Urban districts will not conform to development plan designations. The minimum agricultural lot size of 1 acre will not conform to the City and County's two-acre minimum required for AG-1 zones. Exemptions will be sought for both zoning requirements (Section 359G-4.1, HRS, and Section 171-111 through 118, HRS).

Special Management Area (SMA).

Existing. The SMA extends into the project area as a narrow band just inland of Kamehameha Highway (see Figure II-4).

Proposed. The only activity proposed by HHA includes road improvements. An exemption from county SMA procedures will be sought.

Infrastructure Improvement Approvals

Corps of Engineers (COE) Permit. A COE permit is necessary for the following actions:

1. Drainage. Storm drainage water will be discharged into Waiahole Stream near the Poi Factory.
2. Road. A 600-foot length of Waiahole Stream will need to be lined with boulder riprap where it meanders toward the existing Waiahole Valley Road near Kamehameha Highway intersection. These stream modification measures are necessary to provide bank stabilization and erosion protection.
3. Tenants adjoining Waiahole Stream opting for stream withdrawal for irrigation will need a permit for the intake structure.

Protection of Instream Uses of Water, Windward Oahu. The diversion of stream flow will require a permit for stream channel alteration. Tenants opting for stream withdrawal will be regulated by permit to maintain adequate minimum instream flows.

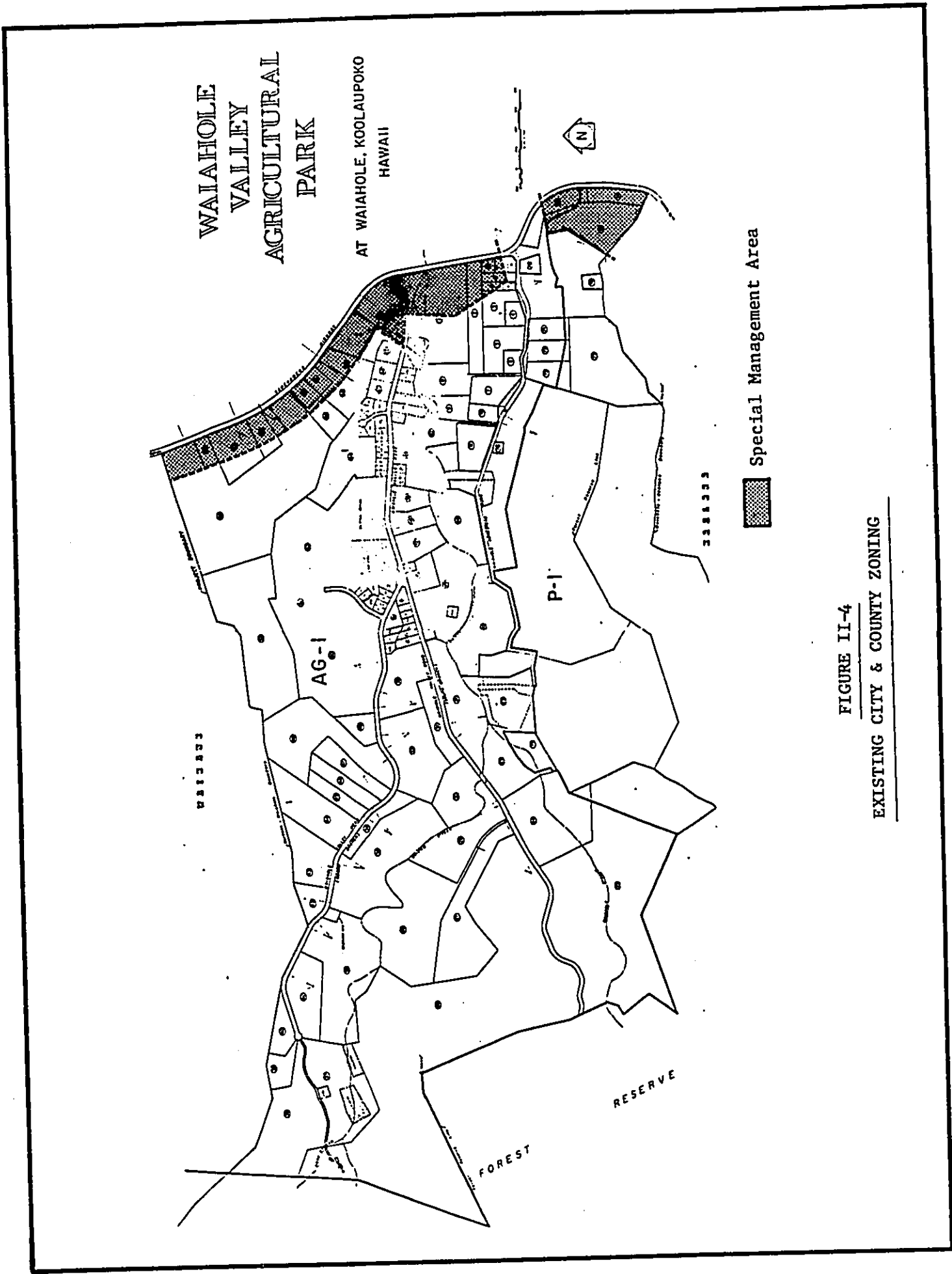


FIGURE II-4
EXISTING CITY & COUNTY ZONING

Conservation District Use Application (CDUA). A CDUA is necessary for the proposed pipeline in the forest reserve.

Safe Drinking Water Act (SDWA). The developer of a public water supply must demonstrate compliance with SDWA standards to the State Department of Health.

Welling Drilling Permit. A well drilling permit is necessary to demonstrate adequate construction that will not endanger groundwater supplies (Board of Water Supply).

Agricultural Practice and Site Improvements

Home Construction/Improvements. A building permit will need to be obtained by the lessee. This permit will ensure adequacy of sewer and water facilities and structural safety. HHA must review the plans prior to seeking the building permit according to provisions in the lease agreements.

CHAPTER III
ENVIRONMENTAL SETTING

The environmental setting for the project area and its surroundings are described in this chapter. This description provides baseline data against which prediction and assessment of the impacts of the proposed action and alternatives can be compared. Environmentally significant features are also highlighted. The environmental parameters are organized in the following categories: physical-biological, cultural, and socio-economic.

PHYSICAL-BIOLOGICAL CHARACTERISTICS

Climate

Rainfall. Due to its location on the windward side of the island, Waiahole Valley receives higher rainfall than the central and leeward parts of the island. Within the valley, the median annual rainfall ranges from 50 inches near the shoreline to 200 inches near the Koolau crest (see Figure III-1). The sharp increase of rainfall with elevation is the result of a dominant orographic precipitation regime due to persistent moisture-laden tradewinds that are rapidly cooled while flowing over the steep windward mountain slopes.

During the wet weather season, orographic rainfall is frequently supplanted by intense cyclonic storms. Median monthly rainfall data has shown that the wet weather season occurs between October and May, as shown on Figure III-2. The difference between the precipitation of the driest month (June) and the wettest month (December) is 4 inches. Data from rain gages located at two different elevations are shown. At the higher elevation, there are three pairs of high rainfall months, March-April, July-August, and November-December. This precipitation pattern is typical of high-rainfall areas in the Hawaiian Islands (Takasaki et al. 1968).

Wind. The closest long-term wind data available are from the Kaneohe Marine Corps Air Station (KMCAS). Wind speed and direction data, gathered during a 24-year period, are summarized in Table III-1. Since the open area of the KMCAS is exposed to higher wind speeds than valley areas, the wind speed data should be used only as general indication of magnitude.

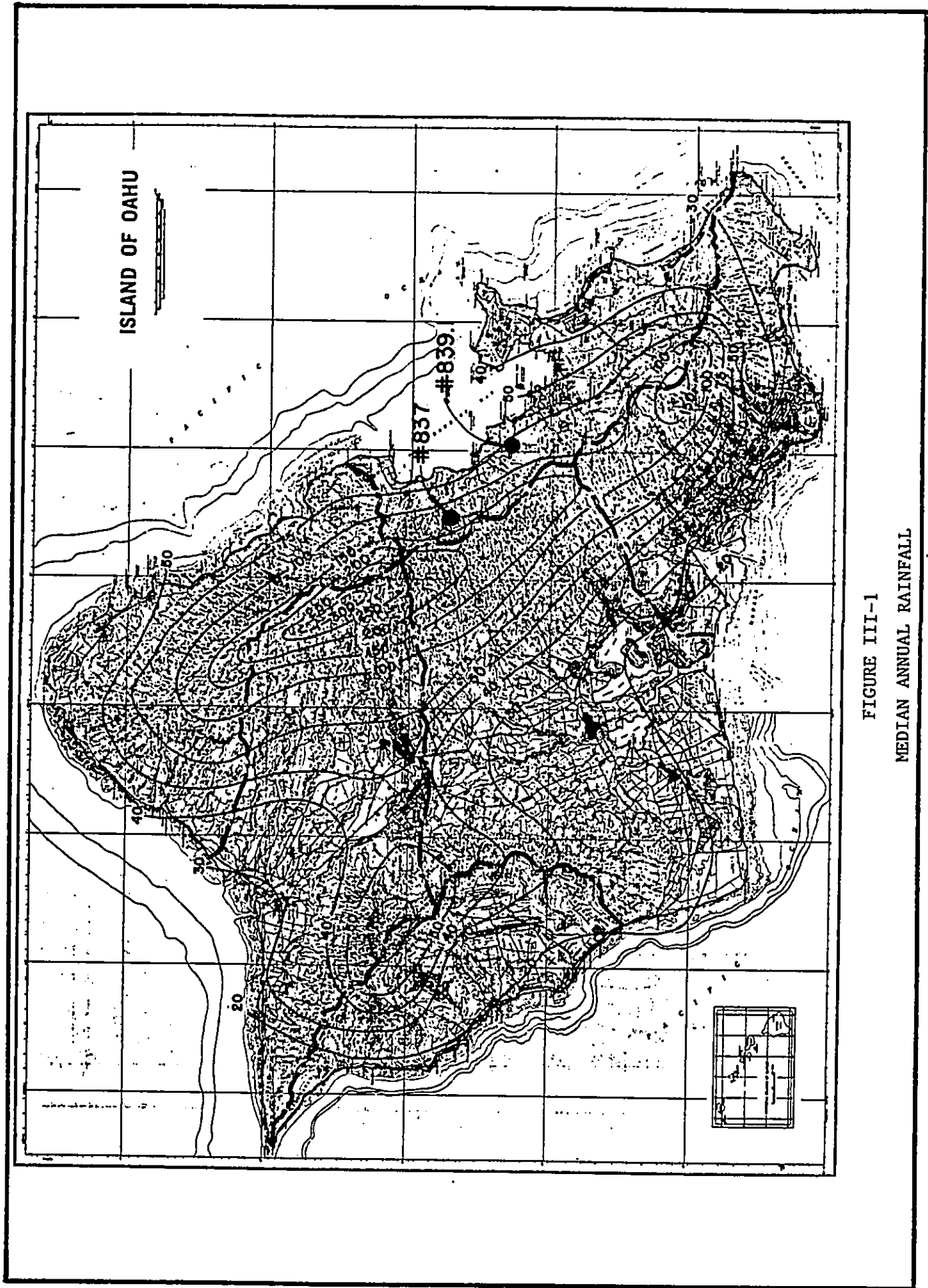
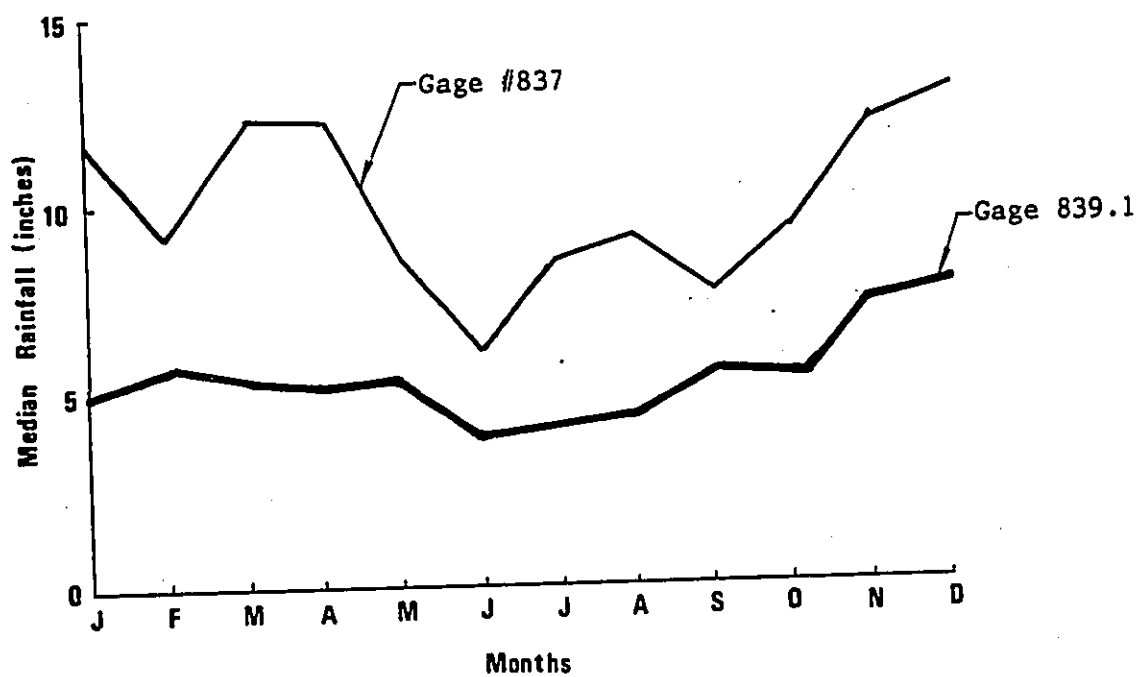


FIGURE III-1
MEDIAN ANNUAL RAINFALL

NOTE: A rain gage station is located in Waikane Valley at elevation 80' (gage #886.6). However, since the station has less than 10 years of record, the median rainfall was determined from another station along the same isohyet with longer-term records (839.1).



Gage Name	Elevation (ft)	Record Years	Annual Median(in)
#837 Waiahole	745	59	133.0
#839.1 Ahuimanu	240	21	81.1

FIGURE III-2
MEDIAN MONTHLY RAINFALL

TABLE III-1
PERCENTAGE FREQUENCY WIND VELOCITY AND DIRECTION
FROM KMCAS OBSERVATIONS 1945-49 AND 1952-72

Speed (knots) Direction	1 - 3	4 - 6	7 - 10	11 - 16	17 - 21	22 - 27	28 - 33	34 - 40	%	Mean Wind Speed
N	0.3	1.3	2.4	2.9	1.0	0.3	0.1		8.3	11.4
NNE	0.3	1.5	3.4	2.7	1.3	0.3			9.5	11.1
NE	0.3	1.5	3.2	3.5	1.3	0.3			10.1	11.3
ENE	0.5	1.6	4.9	8.3	2.3	0.4	0.1		18.1	12.3
E	0.8	1.4	3.4	4.8	1.6	0.2			12.2	11.5
ESE	0.3	1.3	1.8	2.0	0.7	0.3	0.0		6.4	11.0
SE	0.2	0.6	0.8	0.6	0.2				2.4	9.5
SSE	0.3	0.4	0.7	0.7	0.4	0.1			2.6	11.2
S	0.3	1.1	0.7	0.5	0.3	0.3	0.2	0.0	3.4	11.3
SSW	0.6	0.7	0.3	0.6	0.7	0.3	0.3	0.0	3.5	13.5
SW	0.3	0.8	0.6	0.2	0.2	0.3	0.3	0.0	2.7	12.6
WSW	0.2	1.0	0.3	0.2	0.0	0.0	0.0	0.0	1.7	8.1
W	0.6	1.7	1.0	0.2	0.1				3.6	6.6
WNW	0.2	0.6	0.8	0.2	0.2	0.1			2.1	9.0
NW	0.3	0.9	0.8	1.0	0.3				3.3	9.3
NNW	0.1	0.6	1.9	2.4	0.7	0.2	0.2		6.1	12.5
Calm									3.4	
	5.6	17.0	27.0	30.8	11.3	3.1	1.2	0.0	100.0	10.75

Source: U.S. Army Engineer District, Kaneohe Bay Urban Water
Resources Data Evaluation Study, 1976.

As shown on Figure III-3, the predominant wind direction is up the valley in a mauka (inland) direction. Winds blow in the up-valley direction (NNE-SSE) about 60 percent of the time.

Temperature and Humidity. Temperature and humidity of the project area are typically subtropical like other parts of Hawaii. In the lower elevations where the proposed actions will occur (less than 200 feet), temperatures range from a monthly average of 68°F in February to 80°F in September, with an annual average of 75°F (BWS, 1963). The average relative humidity varies between 70 and 80 percent, with the winter months somewhat more humid than the summer ones.

Geology and Topography

The island of Oahu was formed by the coalescence of two volcanoes-- Waianae Volcano and the Koolau Volcano.

Waiahole Valley, like other amphitheater-headed valleys on the windward side, was carved out of the Koolau Volcano by erosion. The erosion process has created a topography characterized by steep valley walls, a moderately steep, irregular ridge between Waiahole and Kaalaea, lower intertributary divides, alluvial benches and isolated terraces, a long narrow flood plain and coastal plain. The elevation ranges from 2,750 feet at the Koolau crest to sea level at Kaneohe Bay. The valley floor, where development occurs, has slopes from less than 15 percent to 40 percent locally (see Figure III-4).

Most of the windward side was part of the rift zone where repeated fissure eruptions occurred. Rift zones are characterized by numerous dikes, which are sheetlike vertical intrusions formed by slower cooling magma. Where dikes are numerous, closely spaced and generally comprise 10 percent or more of the rock, the term "dike complex" is applicable. The zone that adjoins the dike complex has more scattered dikes, generally less than 5 percent of the rock, and is called the marginal dike zone (Takasaki and Mink, 1981). In Waiahole, the dike complex extends from the coast to within a half mile of the crest and underlies the alluvium of the coastal lowlands and the valley floors. The marginal dike zone is a mile wide and is about equally proportioned on both sides of the range crest (see Figure III-5).

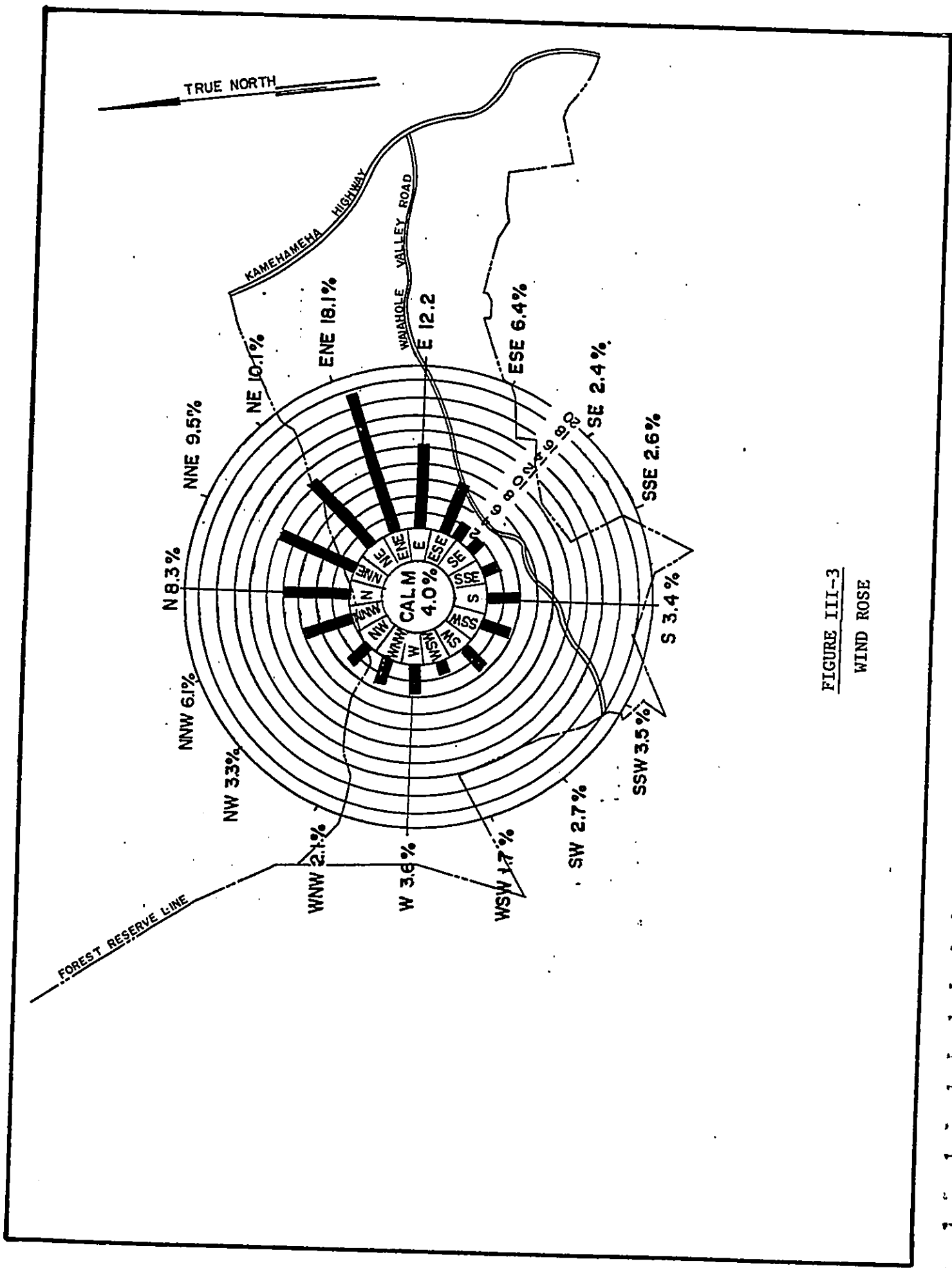


FIGURE III-3
WIND ROSE

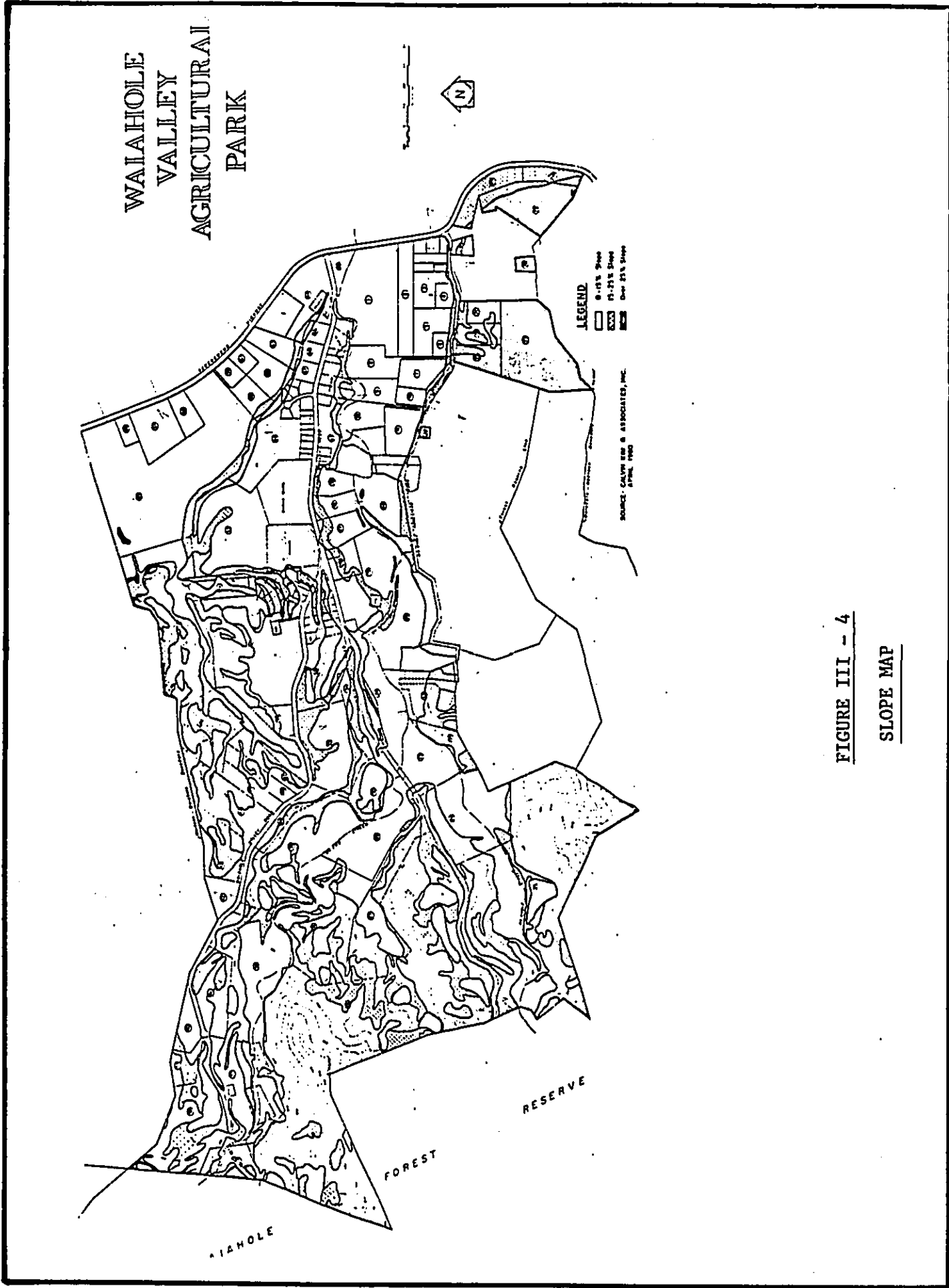
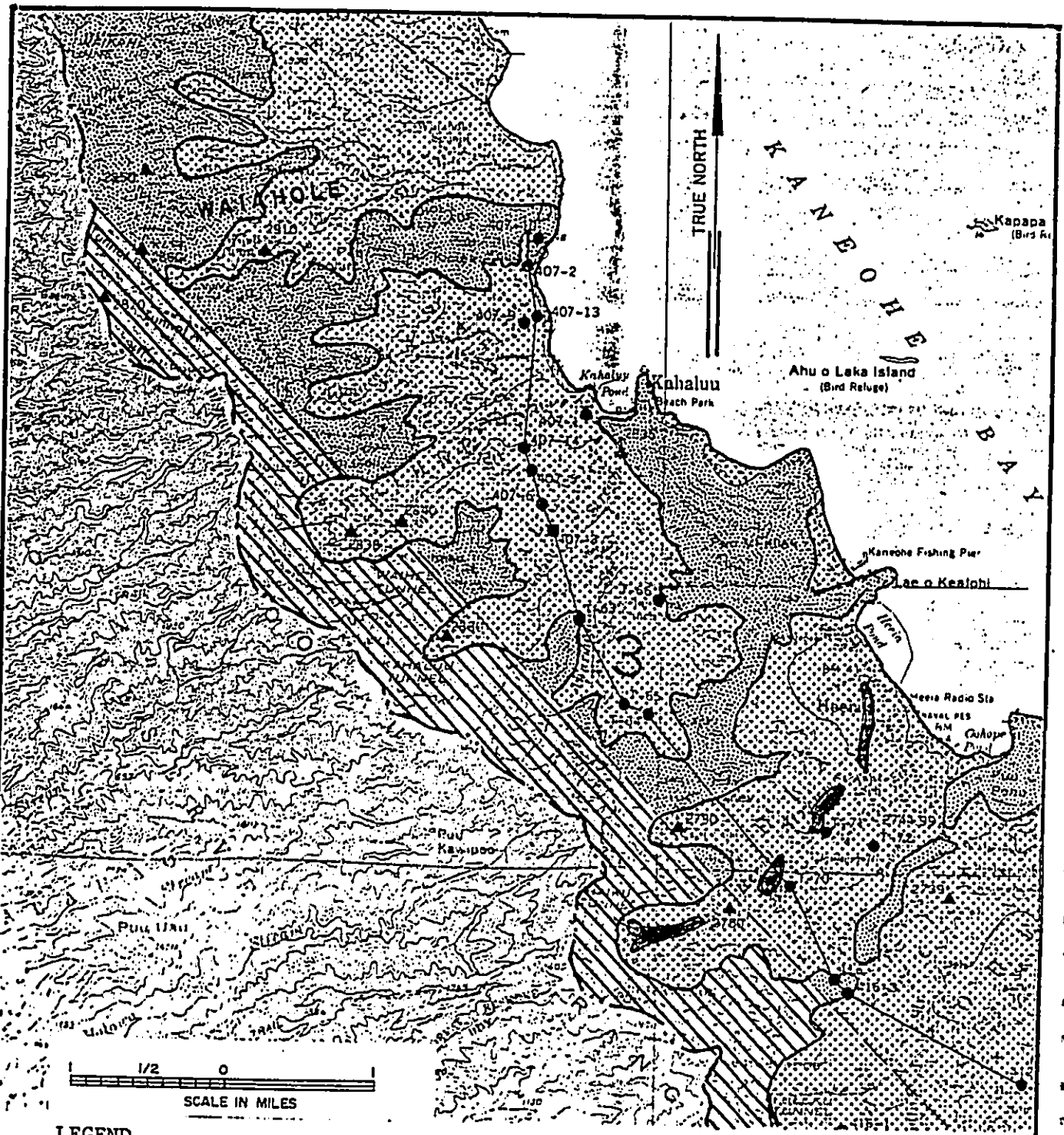


FIGURE III - 4

SLOPE MAP







- LEGEND**
-  Dike complex
 -  Alluvium
 -  Marginal zone of dikes
 -  Honolulu Volcanic Series
lava flows, cinders and tuff

FIGURE III-5
GENERALIZED GEOLOGIC MAP OF WINDWARD OAHU

Source: Takasaki et al. 1960

The dikes exercise much control in the occurrence and movement of groundwater. Because of the dikes' relative impermeability, groundwater moves parallel to the strike of the dikes. In the area southward of Waiahole Stream, the predominant strike of individual dikes is about N55°W. Northward from Waiahole Stream, dikes that strike N35°W become increasingly frequent (see Figure III-6). High-level rainfall, confined behind the individual dike walls, would slowly seek a point of discharge. Perennial streams are the primary discharge points, but other discharges occur through tunnels, wells, and springs. Figure III-7 illustrates the movement of dike-impounded groundwater for an area near Waiahole Valley. The figure shows how the recharged groundwater in one valley feeds a stream in another valley. The productivity of Waiahole Ditch stems from the fact that it intercepts the flow from several dike compartments.

Overflow from the dike compartments drain into Waiahole Stream and its tributaries (Figure III-8). During the dry weather season this groundwater seepage constitutes nearly all of the streamflow. During the wet weather season, surface runoff augments the groundwater contribution.

Hydrology

Surface Water Drainage System. Waiahole Stream is a perennial stream about 3 miles long with a drainage basin of about 3.82 square miles. There is one major tributary, Waianu Stream, which joins Waiahole Stream at an elevation of about 80 feet. Waianu Stream has one first-order tributary, Uwau Stream. Two other second-order tributaries at the head of Waiahole Stream, Halona on the south and Waihi on the north, have since dried up as a result of Waiahole Ditch (Takasaki et al. 1969).

Waianu Stream is artificially supplemented by a flow of 0.5 mgd from the Waiahole Ditch system as a result of an agreement between the McCandless Estate and the Waiahole Water Co. in 1912. Part of this flow is diverted into the existing water distribution system, with the remainder overflowing into Waianu Stream. Flow measurements taken in October 1979 indicated that only 0.4 mgd, rather than 0.5 mgd, was flowing from the Waiahole Ditch intake into the McCandless pipeline. Only half of that flow entered the existing water distribution system, while the other 0.2 mgd overflowed back into Waianu Stream. The 0.2 mgd overflow comprised

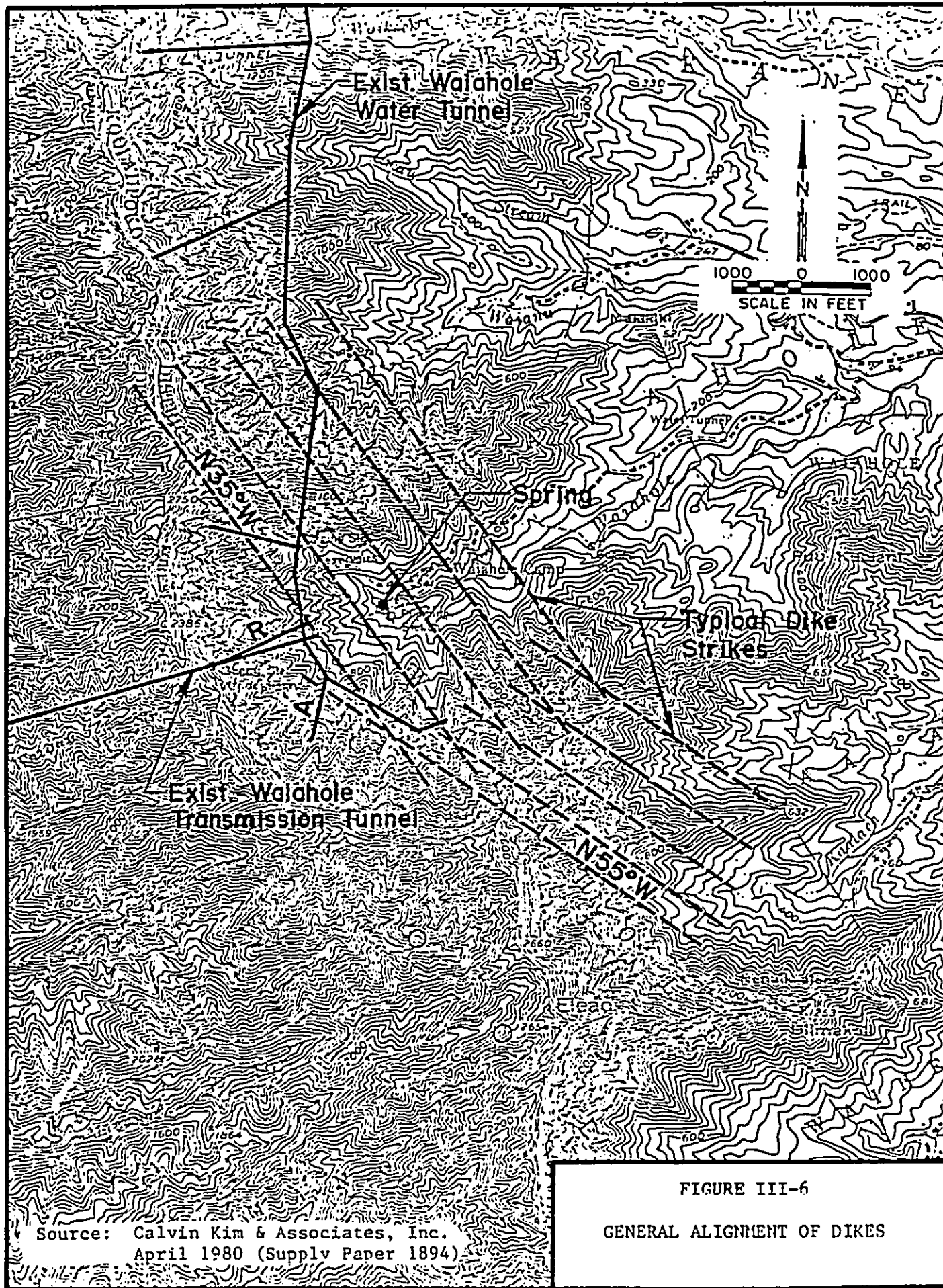


FIGURE III-6

GENERAL ALIGNMENT OF DIKES

Source: Calvin Kim & Associates, Inc.
April 1980 (Supply Paper 1894)

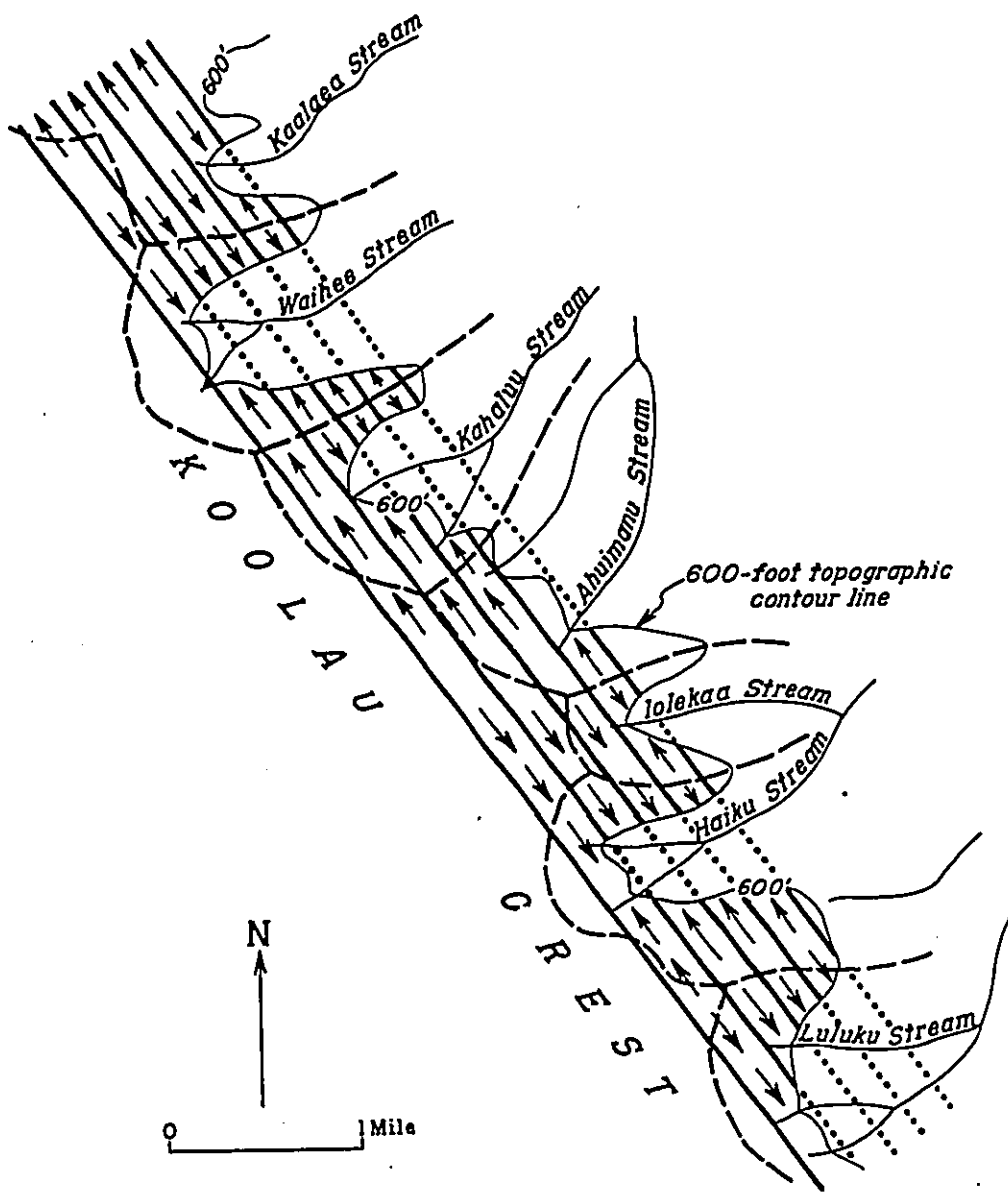
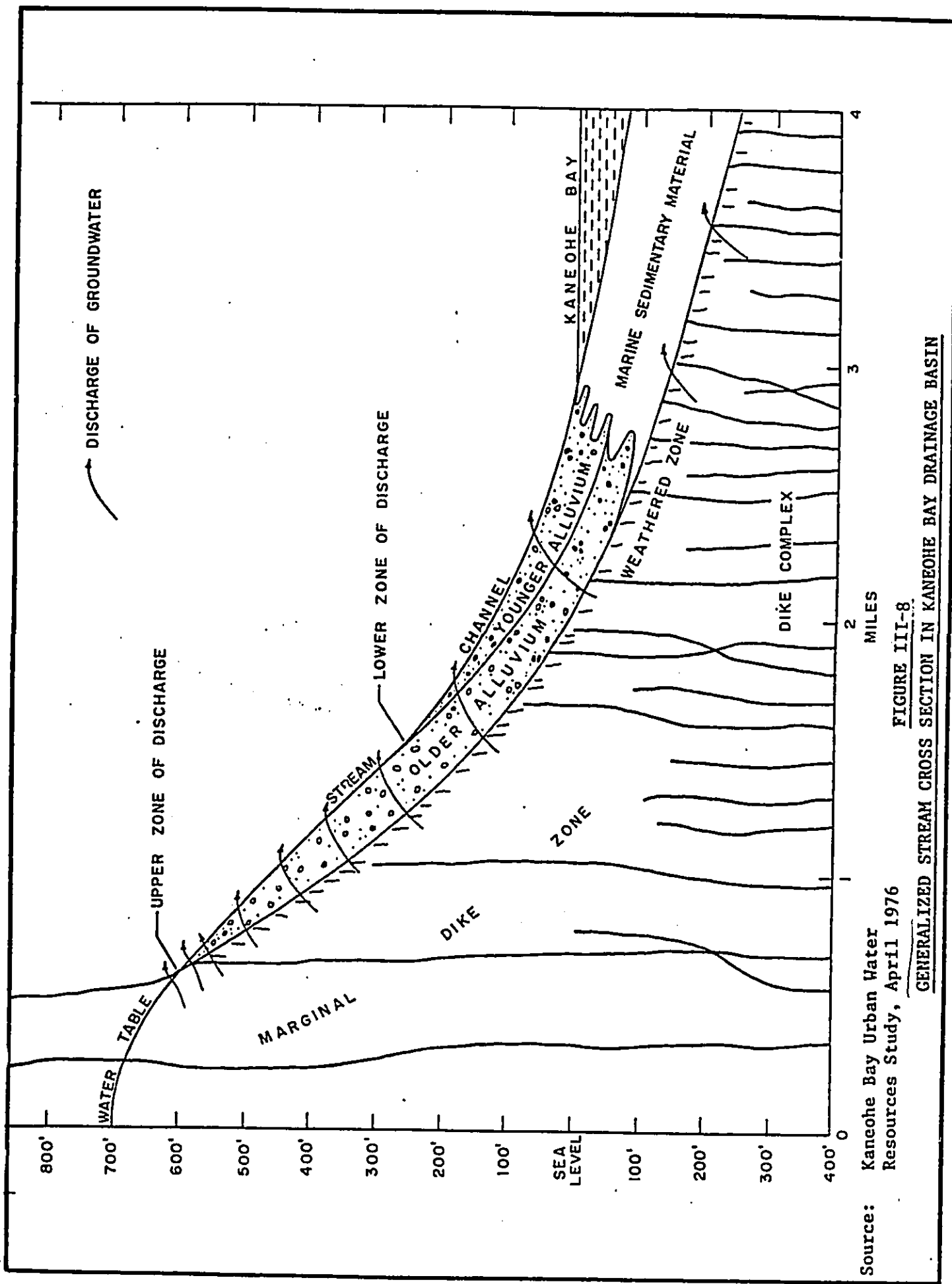


FIGURE III-7

SCHMATIC OF THE PROBABLE GROUNDWATER MOVEMENT BETWEEN PARALLEL DIKES ABOVE AN ALTITUDE OF 600 FEET IN AREA BETWEEN LULUKU AND KAALAEA STREAMS

Source: Takasaki et al. 1962



Source: Kaneohe Bay Urban Water Resources Study, April 1976

FIGURE III-8

GENERALIZED STREAM CROSS SECTION IN KANEOHE BAY DRAINAGE BASIN

one-third (0.2/0.55 mgd) of the Waianu Stream flow near its confluence with Waiahole Stream during the period of measurement (Russ Smith Corp., 1980).

The Waiahole Ditch system must be considered the major diversion since much of the flow in the ditch previously flowed through Waiahole Stream and its tributaries. Another existing diversion includes 1.1 mgd that is being pumped from Waiahole Stream at the 500-foot elevation to Waiahole Ditch. Entitlement of the pumped water was obtained by the Waiahole Water Co. in a lease with the state on December 31, 1970 that will extend to the end of year 2000. For the past several years, the Waiahole Water Company has voluntarily ceased pumping due to electrical costs. Negotiations are currently under way with the Waiahole Water Company to readjust their lease.

Streamflow Records. The only long-term streamflow record is based on measurements taken at the USGS gaging station (2910) on Waiahole Stream at the 250-foot elevation. Daily streamflow records were gathered over a 13-year period from 1955 to 1968, a considerable hiatus since the construction of the Waiahole Ditch system. Short-term records, however, are available for Waiahole Stream and its tributaries for 1911 (prior to the Waiahole Ditch construction), 1959 to 1961, and 1979. Stream gage station locations are indicated on Figure III-9, and stream gage records are summarized in Table III-2.

Streamflow records show that the impact of the Waiahole Ditch system has been significant:

<u>Stream Segment</u>	<u>Pre-Construction (mgd)</u>	<u>Post-Construction (mgd)</u>
Waihi Stream (750')	5.8	0
Halona Stream (750')	2.4	0
Waianu Stream (225')	7.7	0.55 (Russ Smith, 1980)
Uwau Stream (230')	1.4	0.153 (Takasaki, et al. 1969)
Waiahole Stream (250')	16.2	1.68 (Russ Smith, 1980)
Stream Mouth	25.2	3.32 (Russ Smith, 1980)

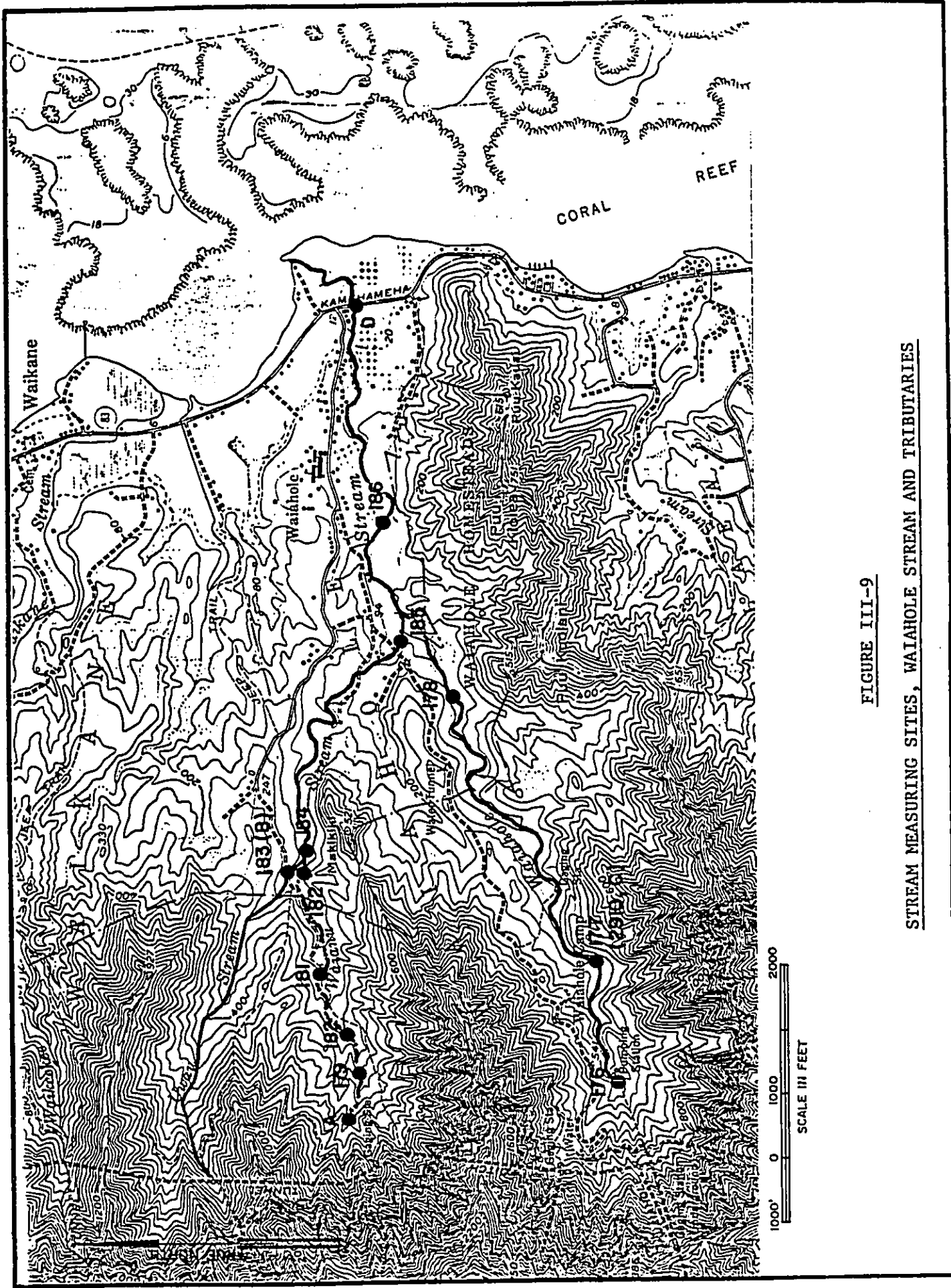


FIGURE III-9
 STREAM MEASURING SITES, WAIHOLE STREAM AND TRIBUTARIES

TABLE III-2

SUMMARY OF STREAM DISCHARGE DATA, WAIHAOLE STREAM AND TRIBUTARIES

<u>Station</u>	<u>Elevation</u> Ft	<u>Date</u>	<u>Discharge</u> mgd	<u>Reference</u>	
<u>Halona Stream</u>	750	Aug-Oct, 1911 (27 rdgs)	Ave 6.0*	1	
			max 7.1*	1	
			min 5.8*		
<u>Waihi Stream</u>	750	Aug-Oct, 1911 (32 rdgs)	Ave 2.4*	1	
			max 2.9*	1	
			min 2.4*		
<u>Waianu Stream</u>	650 A 480** 179	10-11-11	5.4*	1	
		7-21-59	.224	2	
		9-26-61	.348	2	
	180	400	7-21-59	.026	2
			3-28-61	.142	2
	181	320	7-21-59	.200	2
			7-19-60	.231	2
			3-28-61	.259	2
			9-26-61	.195	2
	182	230	7-19-60	.505	2
	184	200	7-21-59	.377	2
			3-28-61	.724	2
			9-26-61	.424	2
			Sept-Nov, 1911 (22 rdgs)	Ave 8.1* Max 9.7* Min 7.7*	1 1 1
	185	80	7-21-59	.619	2
7-19-60			1.06	2	
3-28-61			.918	2	
10-27-61			1.34	2	
10-17-79			.55	3	
<u>Uwau Stream</u>	B 230	9-9-11	1.3*	1	
		10-11-11	1.4*	1	
183	230	7-21-59	.083	2	
		7-19-60	.235	2	
		3-28-61	.153	2	

Table III-2, Cont.

<u>Station</u>	<u>Elevation</u> Ft	<u>Date</u>	<u>Discharge</u> mgd	<u>Reference</u>
<u>Waiahole Stream</u>				
176	480	7-20-59	.128	2
		7-19-60	.412	2
C	250	Sept-Dec, 1911 (98 rdgs)	ave 27.3* max 84.0* min 21.3*	1
(2910) 177	250	1955-1967	median 3.25	3
		1955-1968	ave 6.14 max 1440.6 min 1.5	4
		10-17-79	1.68	3
178	120	7-20-59	2.34	2
		7-19-60	2.96	2
186	50	7-21-59	2.73	2
		7-19-60	3.90	2
D	0	Sept-Dec, 1911 (98 rdgs)	ave 30.2* max 31.7* min 28.7*	1
		10-17-79	3.32	3

- 1) Martin & Pierce, 1913
- 2) Takasaki, et al., 1969
- 3) Russ Smith Corp, 1980
- 4) USGS, 1977

* Prior to construction of Waiahole Ditch/Tunnel System.

** McCandless pipe discharges into Waiianu Stream at this point.

The average flow conveyed by the Waiahole Ditch to Leeward Oahu is about 26 mgd. As a result, the amount of flow being discharged at Waiahole Stream mouth is almost 90 percent less than what flowed prior to the ditch construction.

Waiahole Stream records have shown that there is an increase in stream flow as measurements are taken progressively downstream. Between the gaging station (250 feet) and the confluence with Waianu Stream (70 feet), there is about a 25 percent gain in streamflow from groundwater seepage. There is an additional 25 percent influent stream gain between the confluence of Waiahole-Waianu and the stream mouth.

Monthly average and minimum stream flows are shown on Figure III-10. The average daily flow for the wet weather months (November to April) is about 12.4 mgd, which is three times the 4.1 mgd average flow for the dry weather months (May to October). According to the flow duration curve shown on Figure III-11, the 12.5 mgd average is equalled or exceeded about 8 percent of the time. The 4.1 mgd average is equalled or exceeded about 35 percent of the time. The minimum monthly flow is fairly constant at 1.5 mgd throughout the year, as shown on Figure III-10.

Water Quality. Water quality standards have been promulgated by the state Department of Health for the purpose of protecting public health and environmental quality (Chapter 54 of Title 11). The available water quality data for Waiahole Stream have been contrasted with the standards in Table III-3. Three previous studies collected water quality data on Waiahole Stream: Young et al. 1968; Lau et al. 1976; and Hathaway, 1978. In addition, a limited field sampling was conducted by M&E Pacific, Inc. (MEPAC) in 1982. The sampling station locations for the various studies are shown on Figure III-12. The fecal coliform count was the only parameter that exceeded the maximum allowable limit. Although the small sampling size did not meet the statistical requirement of the standards, it did qualitatively indicate through the FC:FS ratio that pollutant sources are a mix of human and animal wastes.

Instream Values. The primary instream value of Waiahole Stream and its tributaries has been its significance as a stream fauna habitat. Waiahole Stream and its tributaries were found to be among the best on Oahu when the abundance of native fish and shrimp are used as criteria

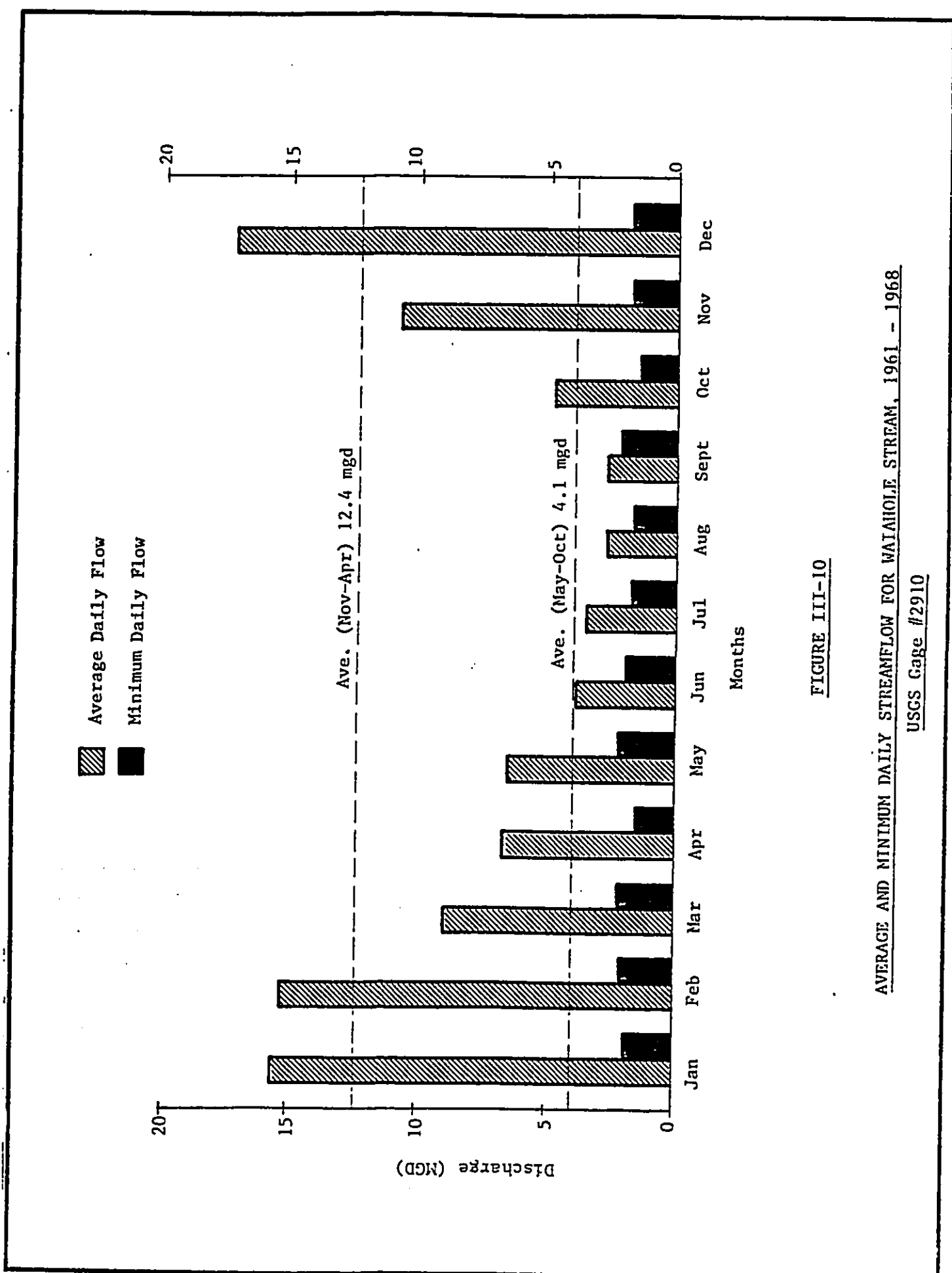


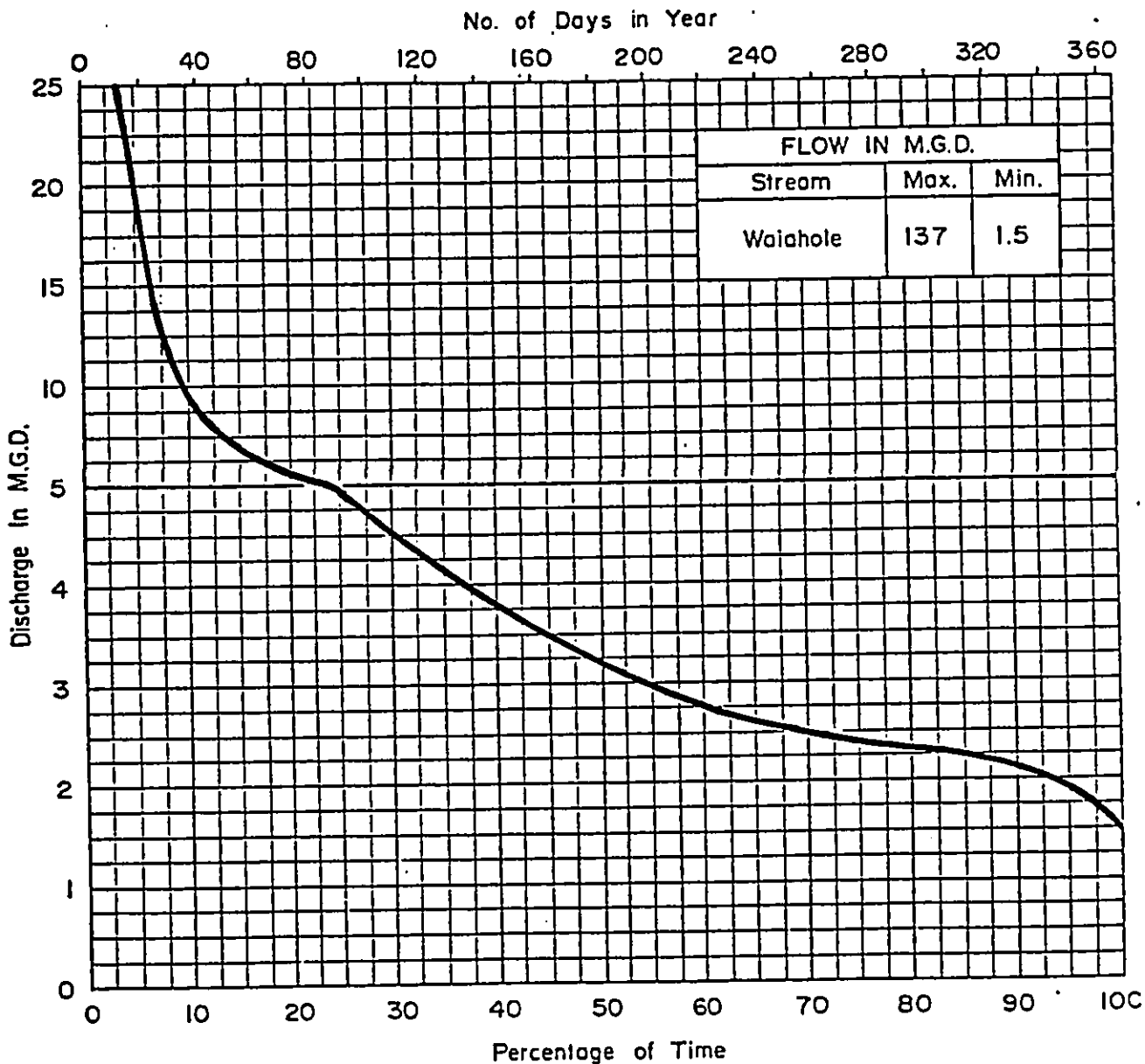
FIGURE III-10

AVERAGE AND MINIMUM DAILY STREAMFLOW FOR WAIHOLE STREAM, 1961 - 1968
 USGS Gage #2910

Waiahole Stream at 250' Altitude near Waiahole

Record - 12 Years
1955-1967

Period of Record 4383 days	Discharge Equal to or Exceeding - in M.G.D.							
	20	15	10	5	4	3	2	1.5
No. of Days in Avg. Yr.	219	334	420	1059	1665	2388	4090	4383
Percentage of Time	5.00	7.62	9.58	24.2	38.0	54.4	93.3	100



Source: Calvin Kim & Associates,
Inc. (The Russ Smith
Corporation), April 1980

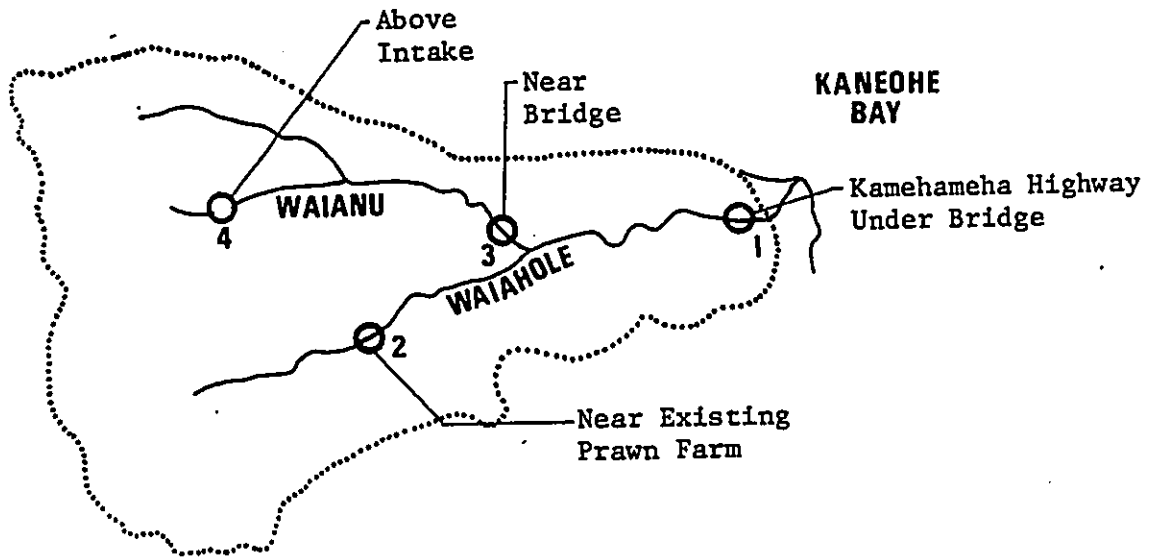
FIGURE III-11
WAIAHOLE STREAM DURATION DISCHARGE CURVE

TABLE III-3

SUMMARY OF WATER QUALITY DATA FOR WAIHAOLE STREAM

Date of Sampling	Sta No.	Wet Weather	No. of Samples	Total P (mg/l)	Total KN (mg/l)	Nitrate & Nitrite N (mg/l)	Turbidity (NTU)	pH	Dissolved Oxygen (% Saturation)	Temp °C	Fecal Coliform (FC) #/100 ml	Strep (FS) #/100 ml	FC:FS Ratio	Source of Pollution ²
DOH Standards ¹														
Wet Season ³	1			.050(0.15)	.25(.80)	.07(.30)	5.0	25.0	80%	--	200(400)	--	--	--
Dry Season				.03(0.08)	.18(.60)	.03(.17)	2.0	(10.0)						
1968 (Young, et al, 1973)	1	X	17	--	--	.02	--	6.6-7.9	94%	22.4	--	--	--	--
1976 (Lau, et al, (1976)	1	X	4	.115	.22	.22	13.3	7.7	92%	21.9	977	340	287	mixed
1977-1978 (Hathaway, 1978)	1	X	49	--	--	--	--	--	--	23.1	--	--	--	--
			7	--	--	--	--	7.0	--	--	--	--	--	--
			4	--	--	--	--	--	95	--	--	--	--	--
	2	X	48	--	--	--	--	--	--	20.9	--	--	--	--
			7	--	--	--	--	7.1	--	--	--	--	--	--
			4	--	--	--	--	--	99	--	--	--	--	--
1982 (HEPAC)	1	X	1	.04	--	4.05	--	--	--	21.2	--	--	--	--
	2	X	1	.05	--	4.05	--	--	--	20.2	--	--	--	--
	3	X	1	.05	--	4.05	--	--	--	--	--	--	--	--
	4	X	1	.05	--	4.05	--	--	--	--	--	--	--	--

Note: 1) Standards - geom. mean (max value)
 2) FC:FS less than 1.0 indicates waste from animal sources.
 FC:FS greater than 4.0 indicates waste from human sources.
 FC:FS greater than or equal to 1.0 but less than or equal to 4.0 indicates human-animal mix.
 3) Wet season: November 1 through April 30
 Dry season: May 1 through October 31



○ Sampling Station

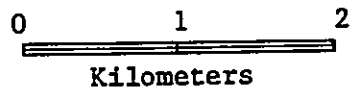


FIGURE III-12

STREAM WATER QUALITY STATIONS, WAIAHOLE STREAM
AND TRIBUTARIES

(Timbol and Maciolek, 1978). Native species require a continuous flow to the ocean since part of their life cycle is spent in marine waters (i.e., they are diadromous). Of the 54 perennial streams on Oahu, Waiahole is one of 23 that has not been altered. Values associated with the stream fauna include:

- a. Scientific/educational. The endemic native species have evolved in Hawaii. Their evolutionary adaptations and limited distribution render them vulnerable to man-made habitat alterations and subsequent extinction.
- b. Food. Only two native species are valued for food--the o'opu nakea and opae kalaole. The other food species are exotic and include the Tahitian prawn, crayfish, and Chinese catfish. Frogs and tilapia are also sought for food by some people. The dojo and opae are sought as fishbait.

Table III-4 summarizes the distribution of stream fauna in Waiahole based on surveys from a previous study (Norton, 1977). Station locations are shown on Figure III-13. O'opu naniha, o'opu okuhe, and opae oehaa inhabit estuaries as well as lower reaches of streams. Aholehole and mullet are also known to frequent the lower reaches as juveniles. The o'opu nakea's primary habitat has been the upper stream reaches because of its fresh water requirements during post larval stages. The opae kalaole also prefers higher elevations and is the predominant species in upper Waiahole Stream.

Offstream Values. Primary offstream uses include irrigation, domestic use, and industrial use (such as cooling). In Waiahole, taro field irrigation is the only offstream use. Taro irrigation is a flow-through system; that is, sufficient water must be continually flowing through the patches to maintain the proper water temperature. (Temperature of the water should be below 72 degrees F. to discourage fungus disease.) Very little water is actually consumed by the plants. Water diverted from the stream is returned to the stream a few yards downstream of the taro patches.

There are presently two taro growers in Waiahole. The farm adjoining Waianu Stream has about 0.2 mgd flowing through its fields. The farm

TABLE III-4

DISTRIBUTION OF STREAM FAUNA IN WAIAHOLE
As Sampled Between February 1976 and May 1977

<u>Species</u>	<u>STATIONS</u>			
	Waiahole Stream		Waianu Stream	
	Upper (Sta 4) (%)	Lower (Sta 1) (%)	Upper (Sta 3) (%)	Lower (Sta 2) (%)
<u>Fish</u>				
Native				
Oopu naniha		0.9		
Oopu nakea	0.1		1.2	
Oopu okuhe		0.9		
Exotic				
Chinese catfish			0.4	
Molly				4.5
guppy	5.3	7.4	56.7	84.8
swordtail	1.9	5.8	10.2	22.4
<u>Crustaceans</u>				
Native				
Opae kalaole	91.7	48.4	16.5	1.4
Opae oehaa		33.2	9.5	9.8
Exotic				
Tahitian prawn	0.6	3.4	5.5	2.8
Crayfish	0.4			

Source: Adapted from Norton, 1977

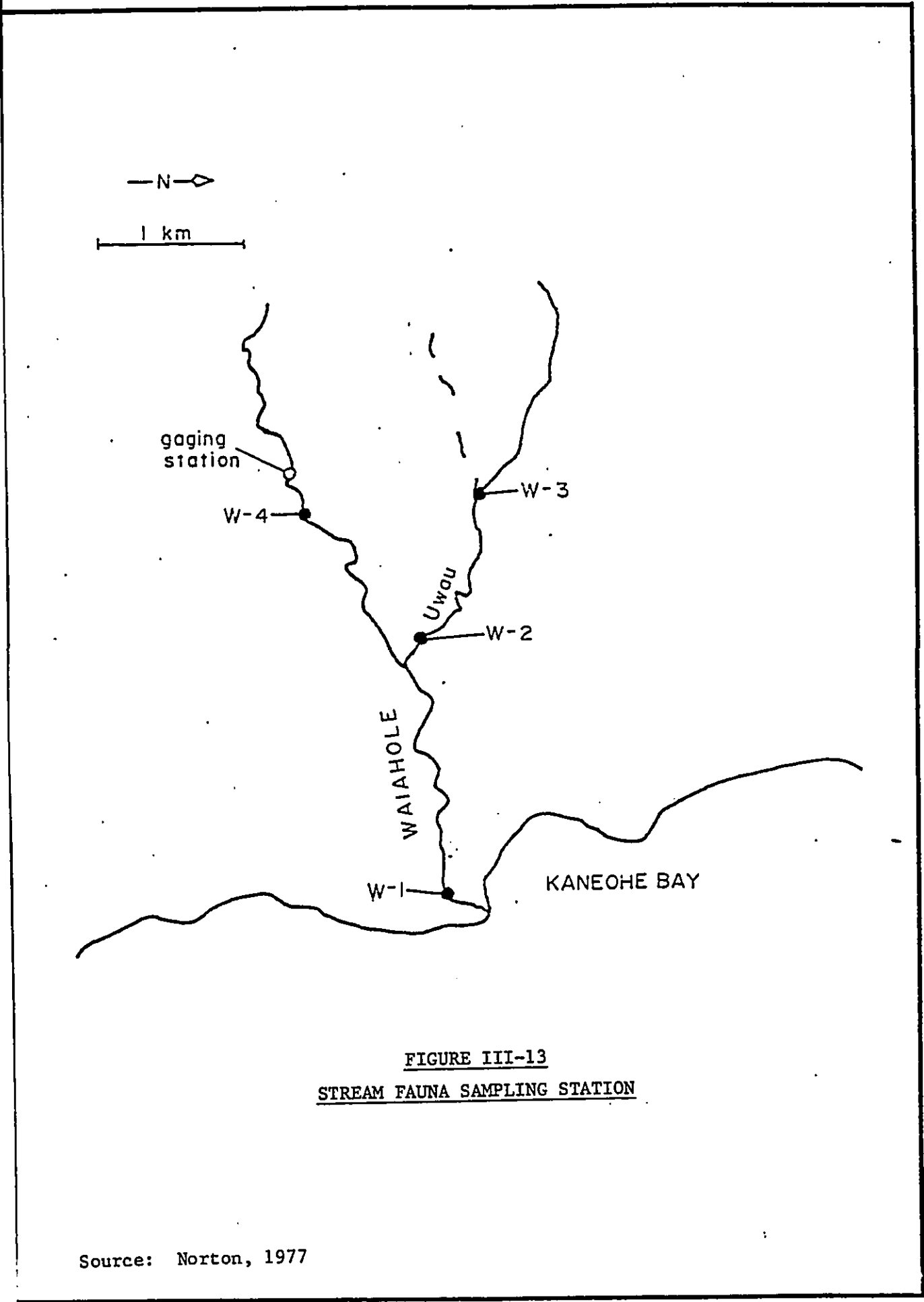


FIGURE III-13
STREAM FAUNA SAMPLING STATION

Source: Norton, 1977

adjoining lower Waiahole Stream also utilizes about 0.2 mgd (see Figure III-14).

Groundwater. In high-rainfall areas such as the windward side, a large percentage of the rain becomes groundwater, whereas in low-rainfall areas most of the rainfall evaporates or is transpired. The base flow of influent streams is maintained by groundwater; it is also the source of tunnels and wells. A part of the groundwater moves to sea as underflow; however, most of this occurs north of Kaneohe Bay where permeable, dike-free basalt extends to the sea (Takasaki et al. 1969).

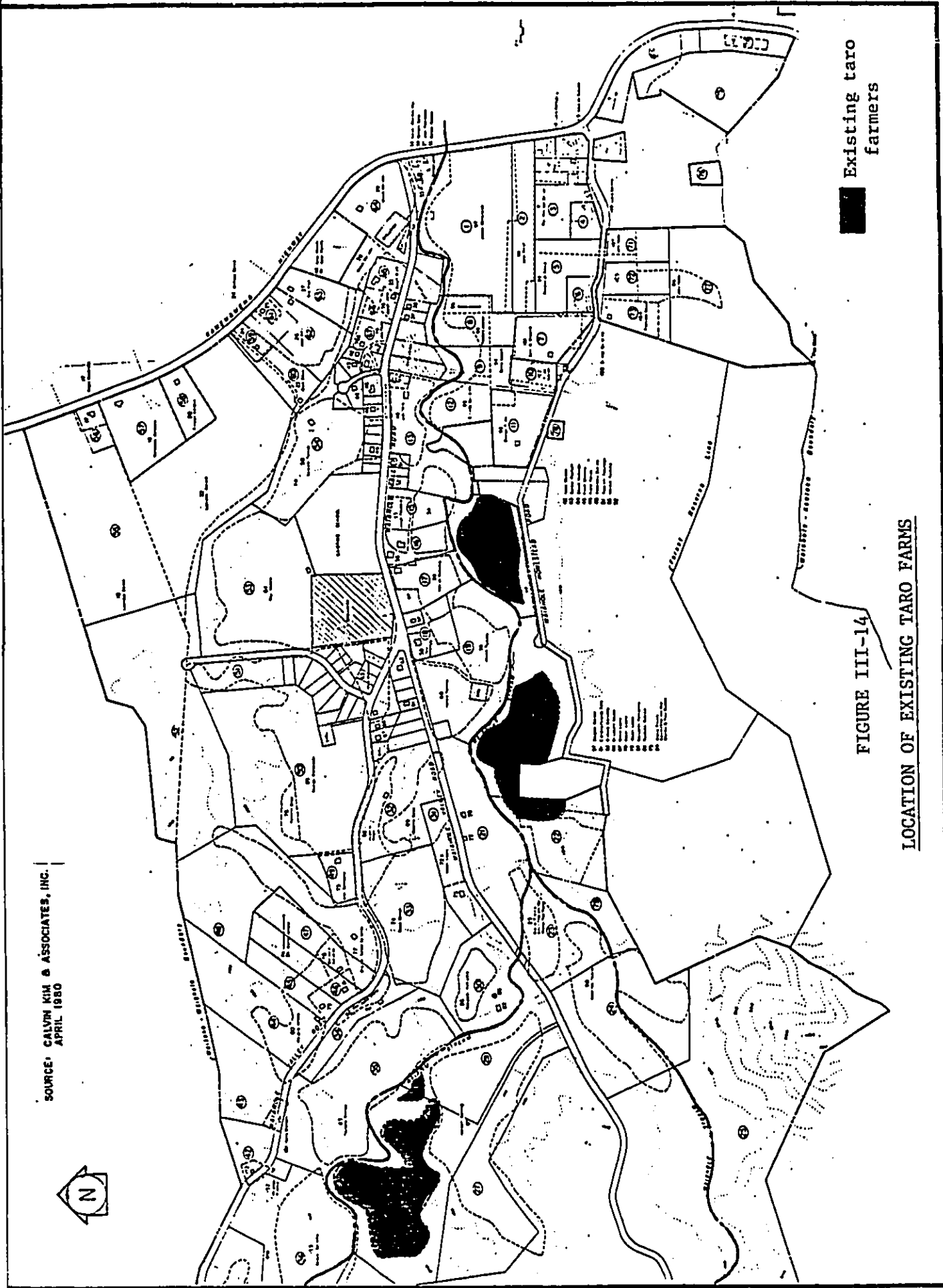
Wells drilled in the dike complex are not expected to yield large quantities of water because of the relatively low permeability of this lithologic unit. The expected yield ranges between 0.1 and 0.3 mgd per well (Takasaki and Mink, 1981). Such wells are not cost effective at the present time, although future needs and the cost of alternative water sources may change the economics of developing these wells.

The most favorable area for water development is the marginal dike zone. Springs once issued at the 1,000-foot elevation (Martin and Pierce, 1913). Since the Waiahole Ditch system lowered the point of discharge to 750 to 800 feet, the high-level springs have dried up. A lower spring still remains active at the 500-foot level. The pump station at this elevation has pumped an average of 1.1 mgd from the spring to the Waiahole Ditch system. Reduced cost effectiveness due to higher pumping electrical costs has curtailed the use of this source in recent years. Although there were instances when the stream has been dry immediately below the pump station, an additional inflow of at least 1.5 mgd reaches the stream above the 250-foot elevation (Russ Smith Corp., 1980).

Soil

Four soil series are represented in the Waiahole area: Pearl Harbor, Hanalei, Waikane and Alaeloa (USDA, 1972) (see Figure III-15).

Pearl Harbor (Ph) series soils in the area consist of very dark gray to gray-brown mottled clay on a muck or peat substratum, found on level plains adjacent to the ocean, such as the northeastern portion of the project area and the area immediately south of Waiahole Valley Road near



SOURCE: CALVIN KIM & ASSOCIATES, INC.
APRIL 1980



Existing taro farmers

FIGURE III-14

LOCATION OF EXISTING TARO FARMS

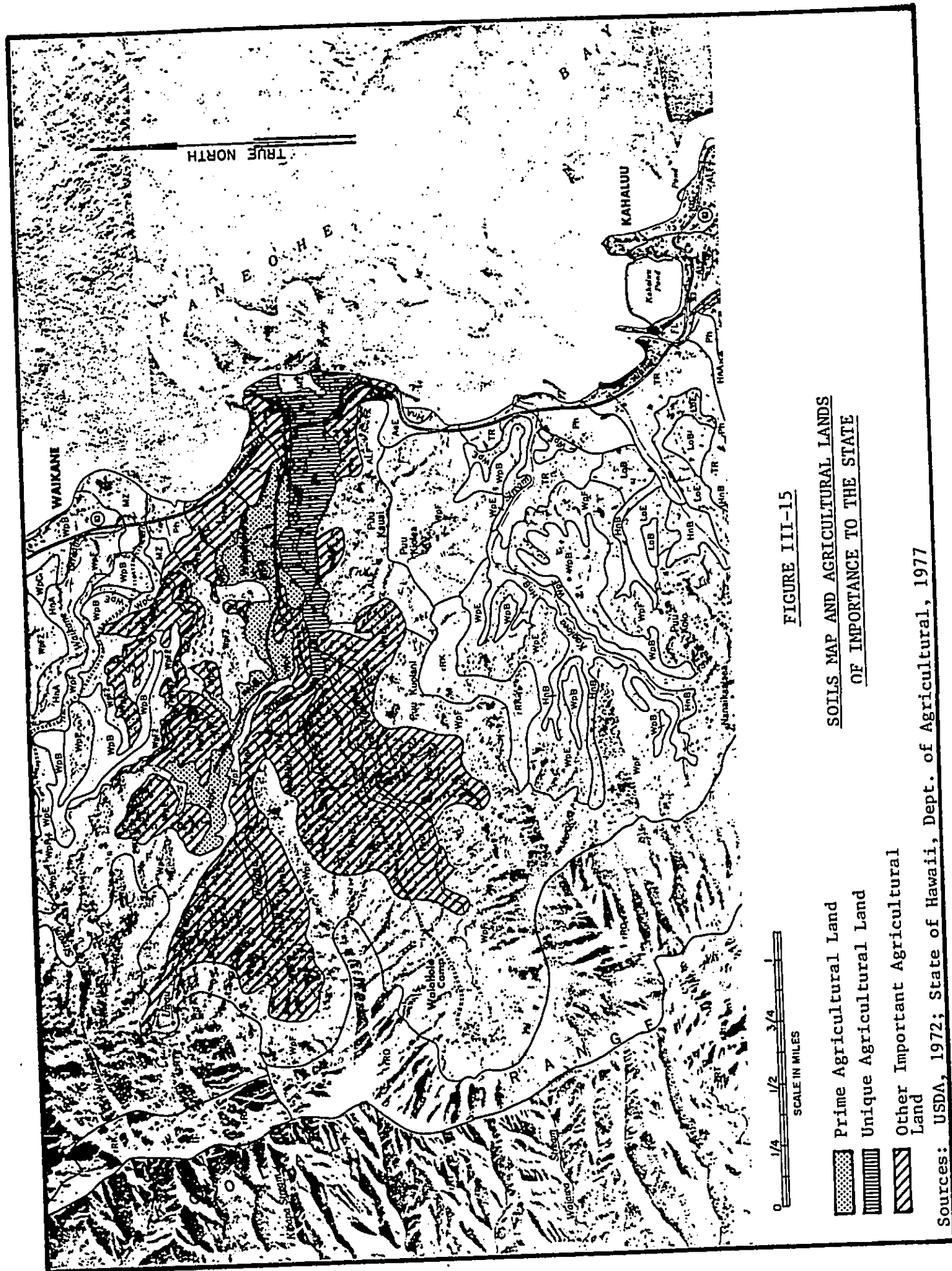


FIGURE III-15

SOILS MAP AND AGRICULTURAL LANDS
OF IMPORTANCE TO THE STATE

its intersection with Kamehameha Highway. The soils at these locations have very low permeability.

Hanalei (Hn) series soils consist of dark gray to very dark gray silty clays with red and dark brown mottles, with a subsoil of mottled dark gray and dark grayish-brown silty clay loam. Substratum varies from massive marine clays to peat, muck, or stratified alluvium. Hanalei soils, found on floodplains along Waianu and Waiahole streams, have fair to poor drainage. These soils are moderately permeable with good agricultural workability.

Waikane (Wp) series soils consist of a dark reddish-brown silty clay subsoil above a substratum of soft, weathered gravelly alluvium or colluvium, gravel content increasing with depth. The predominant soils in Waiahole Valley, Waikane soils are found on alluvial fans, terraces, and on colluvium. Drainage is good, with moderately high permeability and moderate to rapid runoff. Workability is fair to difficult, depending on gravel content and slope. Slopes range from 3 to 8 percent (WpB), 8 to 15 percent (WpC), 15 to 25 percent (WpD), 25 to 40 percent (AeE), and 40 to 70 percent (ALF).

Agricultural Suitability of Soils. The state Department of Agriculture has classified soils according to their agricultural importance to the state. The categories include:

1. Prime Agricultural Land (100 acres). Land which has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops economically when treated and managed according to modern farming methods (WpB, WpC).
2. Unique Agricultural Land (80 acres). Land that has the special combination of soil quality, location, growing season, and moisture supply, and is used to produce sustained high quality and/or high yields of a specific crop when treated and managed according to modern farming methods (Ph, HnA).
3. Other Important Agricultural Land (270 acres). Land other than Prime or Unique Agricultural Land that is also of statewide or local importance for agriculture use (HnA, HnB, WpE, AeE).

The project area contains all three major soil classifications (refer to Figure III-15). A more detailed analysis of the suitability of the various soil types to grow crops is described in Table III-5.

Engineering Properties of Soil. The Hanalei and Pearl Harbor soils are exposed to seasonal high water tables. The Pearl Harbor soils have a high shrink-swell potential. These two soil types require extra precautions for development. Waikane soils on steeper slopes (WpD, WpE, WpF) may be subject to slope instability as the result of deep weathering. Expansive clays were noted in several areas, usually at the base of slopes greater than 15 percent in conjunction with high water table. Massive slope failures in other areas of Oahu (Palolo, Aina Haina) occurred after housing tracts were developed in areas of similar soil conditions (Dames & Moore, 1977). Both soil types have low to moderate erodibility (USDA, 1972).

Flora and Fauna

Terrestrial. Most of the native flora and fauna in Waiahole Valley were disturbed over a century ago. Early activities included cultivation and settlement by the Hawaiians right up to the present. Moreover, domesticated and feral goats, pigs, and cattle contributed to the destruction of the native vegetation beyond the areas of cultivation. In 1918, 1,169 acres were set aside as the Waiahole Forest Reserve to protect the watershed functions. Reforestation activities were undertaken between 1937 and 1940 on about 46 acres in the reserve. About 17,340 trees of over 294 exotic species were planted (Devaney et al. 1976).

Four major zones within Waiahole Valley can be identified to distinguish the varying geographical features, altitudinal levels, and level of disturbance: (1) beach area; (2) main valley and stream banks; (3) forest reserve, ridges, and puu's; and (4) Koolau pali (Berger, 1974).

Beach Area. The dominant vegetation along the shore consists of the indigenous hau tree (Hibiscus tiliaceus) and two species of introduced mangrove (Rhizophora mangle, Bruguiera conjugata). A few scattered tree heliotropes (Messerschmidia argentea) and coconut palms (Cocos nucifera) are also noticeable (Richmond and Mueller-Dombois, 1972). Migratory shorebirds, such as plovers, ruddy turnstones, wandering tattlers, and

TABLE III-5

SOIL TYPES IN WAIHOLE VALLEY AND
THEIR SUITABILITY FOR AGRICULTURE

1. WpB (Waikane Silty Clay) - Slope 3 - 8%, well drained. Very good for sweet potatoes, string beans, cucumbers, egg plant, mountain yams. Very good for bananas except for wind problems on ridges. Good for tomatoes. Good for papayas except for wind and disease problems.
2. Ph (Pearl Harbor Clay) - Level, poorly drained. Very good for taro and pasture. Good for bananas, string beans, cucumbers, sweet potatoes, mountain yams, if properly drained. Good location mauka of highway for shade house production of flowers and foliage, greenhouse tomatoes and prawn farms.
3. WpC (Waikane Silty Clay) - Slope 8 - 15%. Fair to good for sweet potatoes, string beans, cucumbers, egg plant, mountain yams, tomatoes and papayas. Good for bananas except for wind problems on ridges.
4. HnA & HnB (Hanalei Silty Clay) - 0 - 6%. Excellent for taro. Good for bananas, snap beans, cucumbers, egg plant, mountain yams, tomatoes, if properly drained. Good location mauka of highway for shade house production of flowers and foliage, greenhouse tomatoes and prawn farms.
5. WpD (Waikane Silty Clay) - Slope 15 - 25%. Not recommended for agriculture, although bananas and certain vegetables could be grown under contour farming and/or terracing.
6. WpE (Waikane Silty Clay) - Slope 25 - 40%. Not recommended for agriculture.
7. WpE (Waikane Silty Clay) - Slope 40 - 70%. Not recommended for agriculture.
8. AeE (Alaeloa Silty Clay) - Slope 15 - 35%. Not recommended for agriculture.
9. ALF (Alaeloa Silty Clay) - Slope 40 - 70%. Not recommended for agriculture.

Source: Scott, 1981

sanderlings, can be seen at low tide during the winter months (Berger, 1976).

Main Valley and Stream Banks. Much of the vegetation in the main valley floor consists of agricultural crops, fallow land, and pastures. The fallow land is covered with a heavy growth of introduced grasses and scattered trees, shrubs, and introduced vines: paragrass (Panicum maximum), scattered pluchea (Pluchea odorata), Christmas berry (Schinus terebinthifolius) and Java plum (Eugenia cumini) (Nagata, 1982). Along the stream banks are dense stands of elephantgrass (Pennisetum purpureum), hau, and bamboo. Several tree species predominant along the streams above the fork include mango, Java plum, umbrella tree (Brassia actinophylla), hala (Pandanus sp.) and kukui (Aleurites moluccana). The fauna in this area are introduced species of birds (e.g., cattle egret, doves, mynah, cardinals), reptiles (e.g., gecko), and mammals (rats, mongoose). Most of the proposed activity occurs in this zone.

Forest Reserve, Ridges, Puus. The valley slopes are dominated by a mixed open-canopied forest of umbrella tree, hala, Java plum, and mango. Koa (Acacia koa), uluhe (Dicranopteris linearis), ie'ie (Freycinetia arborea), and hala represent the vestiges of the native forest which once inhabited these lower slopes. In the head of the valley, several species of the rare and endangered Cyrtandras, the endemic and possibly endangered Pteralyxia and Charpentiera were found in this very wet environment (Dames & Moore, 1977). The forest reserve at the mauka edge of the project is a denser forest. The planted trees in the reforestation project are located primarily at the south fork forest reserve area and include lemon-scented gum, paper bark, swamp mahogany, and brushbox. Native species observed include a tree, papala-kepau, and two fern species (Asplenium nidus and Vandenboschia sp.). The only native bird species that was sighted in this area is the black-crowned night heron. The elepaio, amakihi, and apapane were heard, but are believed to be transients and not nesters in the area (Berger, 1974). Pig-hunting occurs in this zone. Proposed activity would include a water line and reservoir.

Koolau Pali. Because the pali is exceedingly steep, only a few varieties of mosses, ferns, and low shrub growth grow. The steep slopes

provide suitable habitat only for the white-tailed tropic bird and feral pigeon.

Introduced "exotic" species of plants and animals predominate in Waiahole Valley. One known endangered species occurs at the head of the valley outside of the project area (Nagata, 1982).

Wetlands

Wetlands are valued as a habitat for waterbirds and as a "filter" for sediments and nutrients before surface runoff reaches the coastal waters. The only wetlands in Waiahole Valley are taro fields. These wetlands are the result of man-made modifications, including the construction of dikes, irrigation ditches, terraces, and stream diversions. Waterfowl habitation of the taro patches within Hanalei National Wildlife Refuge on the island of Kauai demonstrates the utility of artificial habitats.

Wetland acreage in Waiahole Valley was largest during the period of 1910 to 1920 when rice farming was at its peak. At that time, as much as 320 acres were devoted to wetland rice cultivation (Miyagi, 1963). Rice cultivation declined drastically after 1930; about 98 percent of the wetland areas were lost. Only 6 acres remain in taro cultivation at the present time. These six acres are one of four remaining subregions in the Kaneohe Bay region where wetlands still exist (see Table III-6). The Waiahole-Waikane subregion is not considered of significant value to waterbirds. The other three areas in the Kaneohe Bay region (Nuupia, Kualoa, and Haena), however, are considered significant. Nuupia has been protected as a wildlife sanctuary (U.S. Fish and Wildlife, 1977).

Natural Hazards

Flood Hazards. Flooding of low-lying areas can be caused by storms or tsunamis. Tsunamis are not a problem for shoreline areas adjacent to Kaneohe Bay because the bay area is sheltered by fringing reefs and Mokapu Peninsula (Loomis, 1979). Storm flooding, however, is a concern in Waiahole Valley.

Known historic floods in Waiahole Valley were recorded by a USGS stream gage that was operational from 1955 to 1967 at the 250-foot elevation of Waiahole Stream (Gage #2910). Three floods were recorded:

TABLE III-6

STATUS OF WETLAND ACREAGE IN THE KANEOHE BAY REGION BETWEEN 1900 AND 1968
(Excludes Open Water Areas)

Wetland	Approx. 1900-1928 Acreage*	Approx. 1968-1977 Acreage**	Percent Loss
Waiahole/Waikane	520	6	98.8
Kahaluu/Kaalaea	300	0	100
Heeia/Kaneohe	200	155+	23
Waihee	160	12 ⁺⁺	92.5
Hakipuu	10	0	100
Nuupia	112 [#]	45	59.8
Kualoa	unknown	4	--
TOTALS	1302	222	83

Legend:

- + Heeia only, with Kaneohe containing no remaining wetland area today.
- ++ Hawaii Department of Agriculture 1977 estimate.
- ** Planimeter measurements from 1968 U.S.G.S. topo. maps. Verification by 1977 field observations, and aerial photos.
- * From Coulter and Chun (1937), Chun (1954) and Miyagi (1963).
- # Planimeter measurements from 1928 U.S.G.S. topo. maps.

Source: U.S. Fish and Wildlife, 1977

April 15, 1963 (1440 mgd); May 5, 1965 (1440 mgd); and November 12 to 14, 1965 (592 mgd). About 0.76 square miles, or 10 percent of the combined Waiahole-Waikane drainage basin, were inundated (Ewart and Lee, 1974).

The peak rate of discharge, the duration of the peak flow, the amount of rainfall on lowland areas, and the coincidence of runoff with respect to the tidal cycle all contribute to the extent of overflow. For example, the peak discharge of the November 1965 flood was only 40 percent that of the May 1965 flood, but the extent of inundation was nearly the same because of a longer storm period and greater volume of rainfall.

The condition of culverts and bridge openings has also contributed to flooding problems in Waiahole Valley. Runoff from lowland area drained by a ditch parallel to Kamehameha Highway is conveyed to Kaneohe Bay through several culverts. These culverts are often clogged by debris or are hydraulically inadequate, thus water backs up and overflows over the highway during periods of high rainfall. Moreover, flood levels in Waiahole Stream have risen to the level of the bridge and have caused overflows (see Figure III-16). On May 1965, debris clogged the bridge opening; the hydraulic pressure of the flood waters collapsed the bridge and further dammed the stream.

The National Flood Insurance Program was initiated to improve management of flood plain development and to lessen threats to public safety and property. The City and County of Honolulu has adopted flood insurance maps to comply with its flood hazard ordinance. The county is in the process of conducting further studies to append the area of coverage. The flood insurance maps distinguish zones for the 100-year flood, the 500-year flood, minimal flood hazard, and coastal high hazard (City and County, 1980). Within Waiahole, the following two zones are applicable:

- Zone A - Areas of 100-year flood (a flood magnitude with 1 percent chance of being exceeded in any one year)
- Zone B - Areas between 100-year and 500-year flood limits (a 500-year flood has a 0.2 percent chance of being exceeded in any one year).

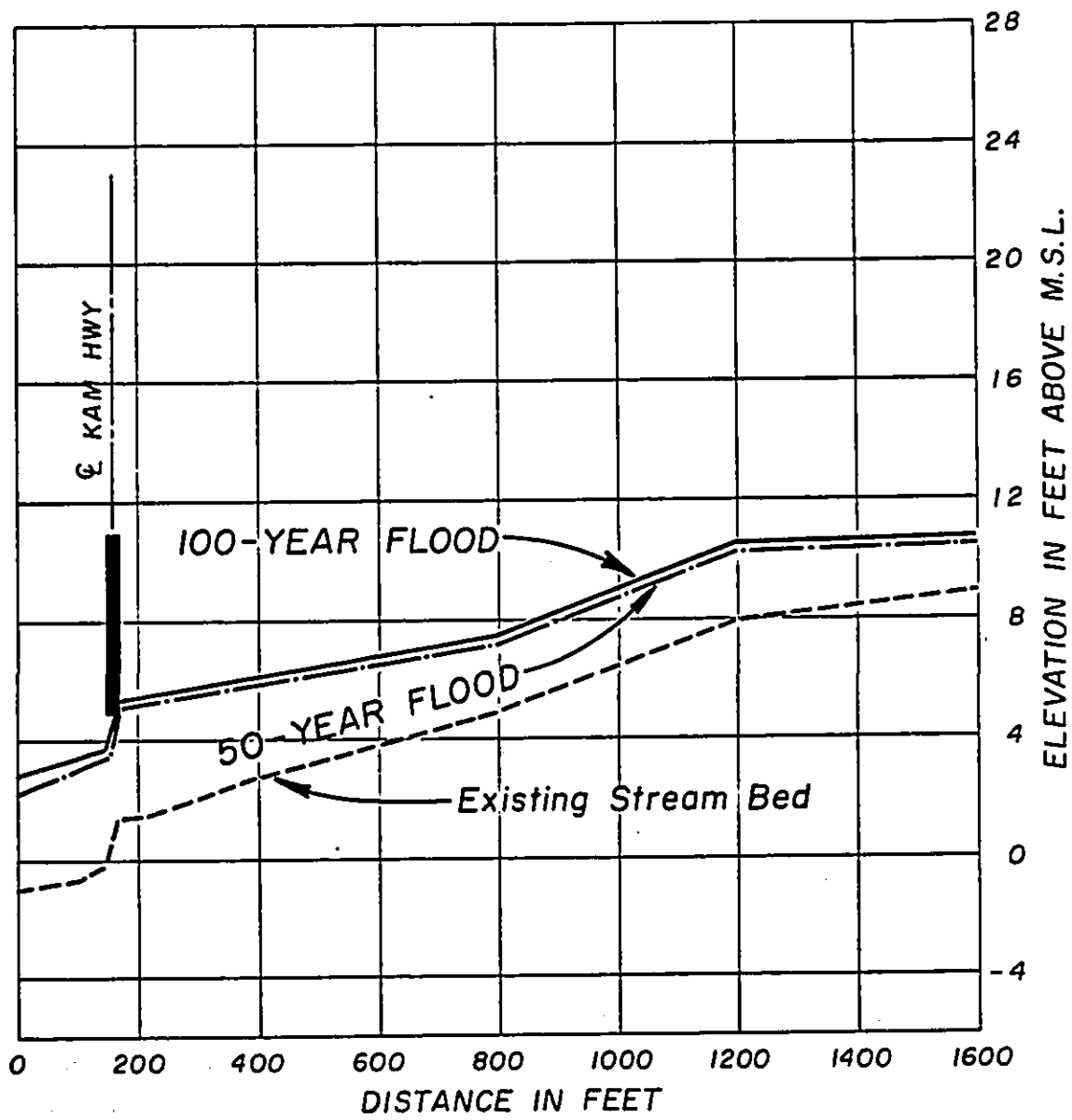


FIGURE III-16
WAIAHOLE STREAM FLOOD PROFILES

Source: DLNR, 1973

Figure III-17 shows the official delineation of flood insurance zones and the expected water surface elevations of the 100-year flood.

As a point of reference, the destructive May 1965 flood was computed to be a 12-year flood, meaning that there is an 8 percent chance of such an event recurring in any one year (Ewart and Lee, 1974).

Earthquake Hazard

Seismic risk maps have been prepared to show zones of approximately equal seismic risk. They are based upon damage that has occurred in past earthquakes and show the regions of greater or lesser intensity of ground shaking. The zones are as follows:

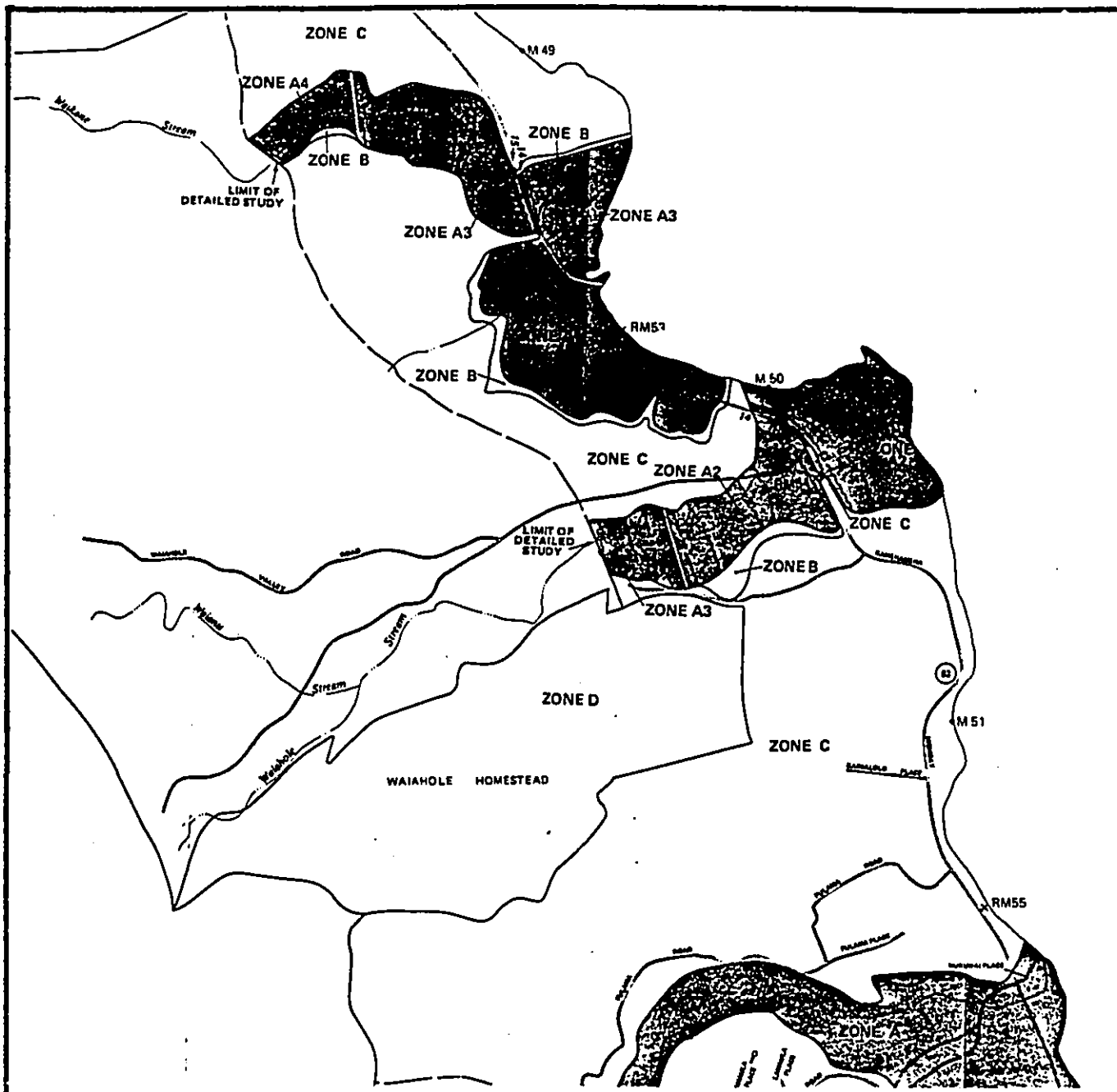
- Zone 0: No damage
- Zone 1: Minor damage
- Zone 2: Moderate damage
- Zone 3: Major damage
- Zone 4: Severe damage

A seismic report recommends that the island of Oahu be designated Zone 1, which corresponds to an intensity on the Modified Mercalli Intensity Scale of less than 6 (see Figure III-18) (Furumoto et al. 1973), or a magnitude 6 earthquake producing a peak acceleration of 0.1 g (Structural Engineering Association of California, Standard No. 1).

Air Quality

The major sources of air pollution in Waiahole are automobiles, open burning, and defective cesspools. Odors, dust, and pesticide aerosols are periodically generated by agricultural activities. During easterly or southeasterly winds, Waiahole Valley may receive pollutants generated in the Kaneohe to Kahaluu area. Fortunately, winds from this direction are infrequent.

The closest air sampling station in the vicinity was maintained by the state Department of Health at Kahaluu during 1961 and 1963. Only particulate matter was measured at the Kahaluu station, and the average concentration was 33 micrograms per cubic meter of air (Nekota, 1974). This is below the present Ambient Air Quality Standard of 55 micrograms

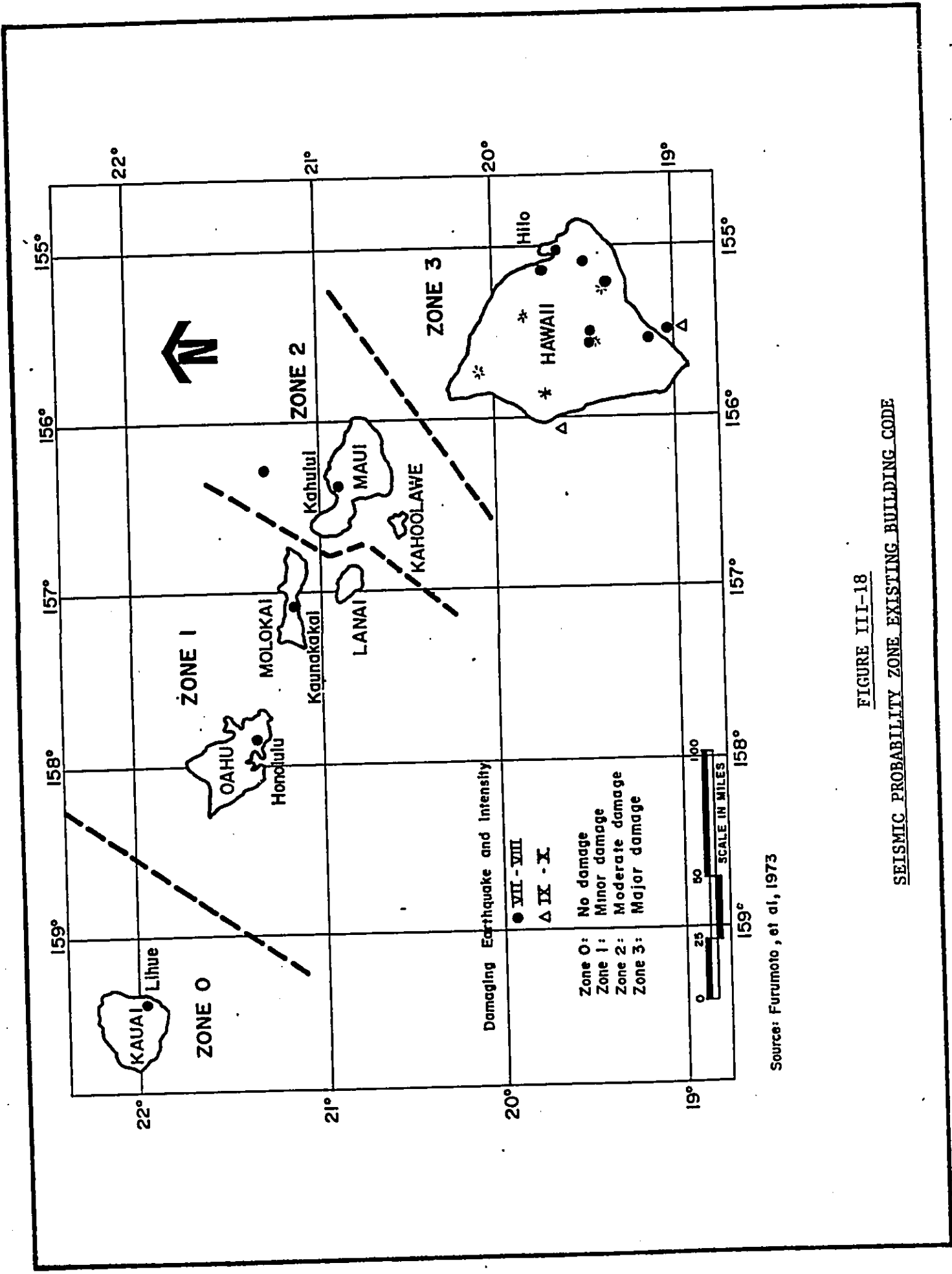


KEY TO MAP

500-Year Flood Boundary	_____
100-Year Flood Boundary	_____
Zone Designations* With Date of Identification e.g., 12/2/74	
100-Year Flood Boundary	_____
500-Year Flood Boundary	_____

FIGURE III-17

FLOOD INSURANCE RATE MAP, WAIAHOLE VALLEY



Source: Furumoto, et al, 1973

FIGURE III-18
 SEISMIC PROBABILITY ZONE EXISTING BUILDING CODE

per cubic meter (Chapter 59 of Title 11, Administration Rules). More recent data were collected for Waimanalo, a rural agricultural area similar to Waiahole Valley. The particulate matter concentration during the period of 1971 to 1978 averaged 31.25 micrograms per cubic meter.

Noise

The only noise survey data applicable to the Waiahole district were collected by the state Department of Health at Waimanalo, about 14 miles southeast of the district boundary.

A report by Iwao Miyake of Acoustical Consultant Design Engineering, Inc. indicated that the noise level exceeded 90 percent of the time in the Waimanalo area was 44.5 decibels. The noise level exceeded 50 percent of the time was 50.0 decibels. These readings are considered to be quiet according to the rating scale developed in the study by C.H.G. Mills and D.W. Robinson of England (Miyake, 1974).

CULTURAL CHARACTERISTICS

Background

In the late Hawaiian period prior to Cook's arrival, settlement in Waiahole Valley was at its peak. As many as 500 persons were believed to have lived in the valley during that period (Miyagi, 1963).

The system of land tenure and use changed with the arrival of Westerners. The traditional land tenure system was replaced by a Western system of fee simple ownership. Commoners were given an opportunity to claim the land on which they lived and farmed. In Waiahole Valley, a total of 53 such awards (Kuleana awards) were granted. Four other awards (of more than 10 acres) were also granted; these were 'ili grants to konohiki (Devaney et al. 1976). The Land Commission Award documented these grants and awards.

The kuleana awards to commoners were spread out along the banks of the valley streams, from the coast to approximately 3.7 km (2.3 miles) inland. Some parcels were situated on the Kaneloa terrace and along the base of the southern spur near the ocean.

In general, the parcels along the stream edges were used for irrigated taro cultivation. The kula parcels were planted in a variety of crops, including potatoes, melons, sugar cane, 'awa, and bananas. Houses were usually located with the kula farms and described as being "separate and not enclosed" (from Land Commission Award claims and testimonies).

Awards in the upper gulches and in the delta area of Waiahole Stream did not have kula parcels.

Within twenty years, however, subsistence taro cultivation was supplanted by rice growing. Thrum (1876) writes that the rice industry took off with the decline of whaling in the early 1860s, so much so that good taro was being pulled up and terraces were being replanted in rice.

An 1878 map of Waiahole Valley shows extensive rice fields, particularly on the coastal flat fronting Kaneloa. The only inland fields are on Crown lands along Waianu Stream mauka of its junction with Waiahole Stream.

By planimetric measuring of historical maps, Miyagi (1963, Fig. 22) calculated the area under rice cultivation to be approximately 280 acres at the height of the rice industry. He also noted that the rice farmers had brought new areas into irrigated cultivation through the construction of new canals, particularly those which crossed the top of the Kaneloa terrace.

The rice industry began a continuous decline from the turn of the century until the final blow in the late 1920s caused by the appearance of the rice borer insect. In Waiahole Valley, rice fields were being abandoned as early as 1910, although Miyagi notes that "farmers in the valley recall some rice being planted as late as 1920" (1963).

Japanese replaced Chinese on the land during this period and truck farming replaced rice cultivation (Miyagi, 1963).

During this same period of rice decline (1910 to 1925), pineapple growing underwent a rapid rise and equally rapid fall on the windward side of Oahu. Focused at Libbyville, the Libby, McNeill, and Libby cannery in Kahaluu, pineapple cultivation took over large tracts of land. In Waiahole and Waikane valleys, Libby acquired leaseholds totalling 600 acres in 1912, and pineapple was grown "by individual Chinese and

Japanese farmers on moderately sloped hill lands where rice and taro could not be grown" (Miyagi, 1963). Farmers used a train (possibly the same used for the construction of the Waiahole Ditch) "to haul pineapples... from Waiahole to Waikane landing...and from Waikane...by boat to the Libby cannery at Wailau" (Ferreira, 1940, in Miyagi, 1963).

For economic reasons, the Libby cannery was closed in 1925 and production was shifted to the more profitable, Central Oahu operations. The closing took its toll on the small planters in Waiahole.

Throughout the decades of rice, pineapple, and truck farming, taro continued to be grown, though of course at a lesser scale than pre-19th century Hawaiian land use. The Waiahole Poi Factory operated continuously from 1904 to 1971, processing taro from the valley as well as from other areas (Sichter n.d; Paglinawan, personal communication). Miyagi was told by a long-time Waiahole resident that "the farmers of the valley sent their taro and other products to Honolulu by muleback by way of the Pali Road as late as 1910. They started early in the morning, sold their produce in the market and returned late in the evening" (1963).

The valley today retains the rural atmosphere of truck farms, which produce bananas, papayas, sweet potatoes, and other vegetable crops. Large nurseries occupy the coastal flat between Kamehameha Highway and the Kaneloa escarpment. Residences line the main and northern segments of Waiahole Valley Road and cluster in the Waiahole Farm Homesteads area along the base of the southern spur.

Waiahole Valley gained its secure place in island history as being the site of the Waiahole Ditch, which tapped the rich water resources of the Koolau range and carried them to the parched sugar fields of Ewa. Construction began in 1913 and the main bore and most of the interceptor tunnels were completed in 1916. It took water from Kahana and Waikane valleys as well as Waiahole and Waianu. Miyagi (1963) accounted for the lessened stream flow in Waiahole Valley by the interception of water by the tunnel system. He figures that the average daily discharge of Waiahole Stream in 1956 to 1958 was only approximately two-fifths that of 1912.

Registered Sites. The background historical understanding of the Waiahole region is based on written records and oral history (interviews).

Archaeological sites are the storehouses of information that could refine our understanding or even provide revelations that could alter our understanding of the past. Unfortunately, detailed archaeological investigations have not been previously undertaken for Waiahole Valley. Consequently, only one site in the entire Ahupua'a has been placed on the state Register of Historic Places (Site #1086). This site, which consists of house platforms, is located outside the project boundaries near the mouth of Waiahole Stream.

To fill this void of knowledge, reconnaissance surveys were undertaken in two steps:

Step 1: Based on a literature review and walk-through survey, areas with high potential for containing significant sites were identified (Chiniago, 1982).

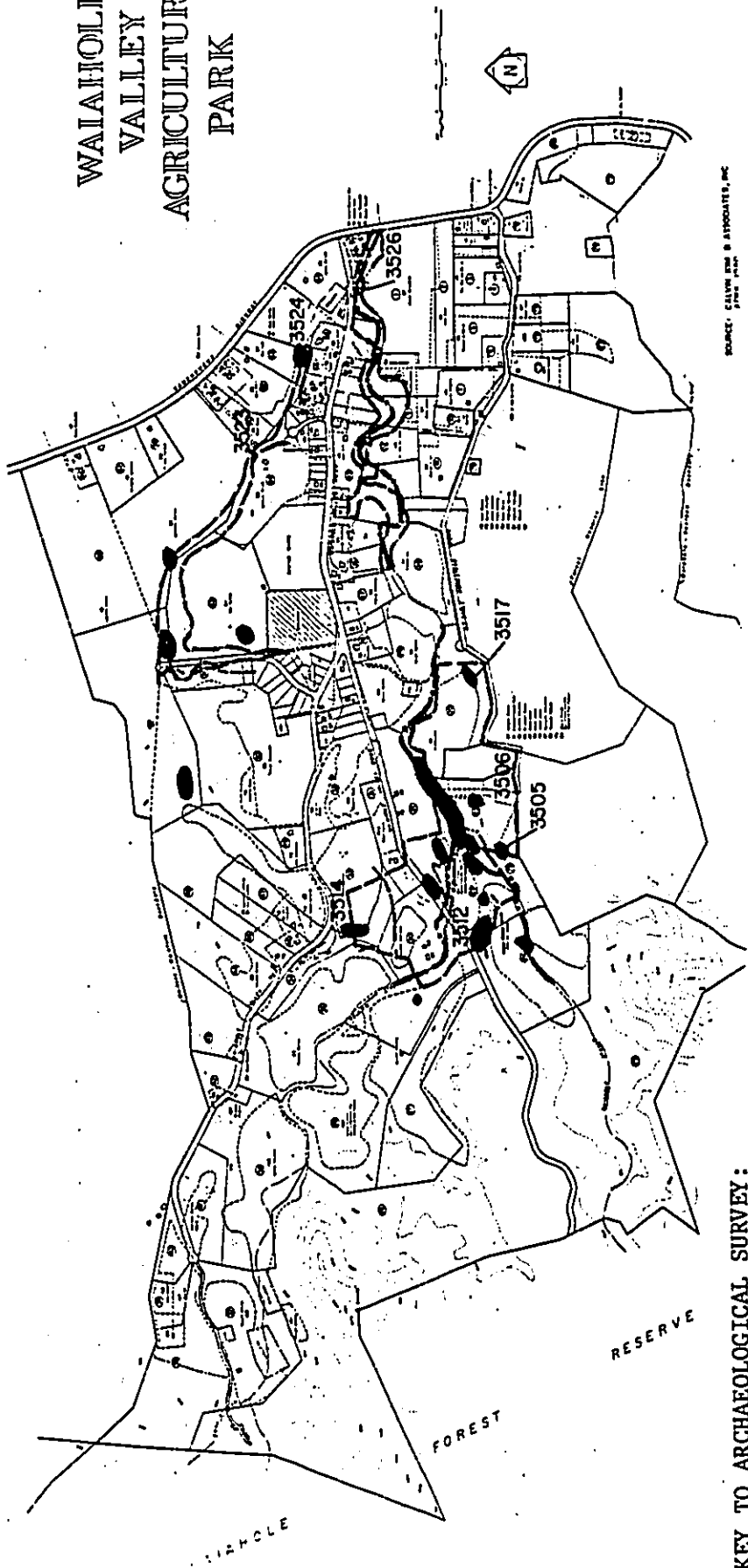
Step 2: A more detailed survey focused on the high potential areas, with particular emphasis on those areas that would be disturbed by the proposed actions. Four areas were specifically identified to receive more detailed study (Tomonari-Tuggle, 1983).

From these reconnaissance surveys, a total of 28 sites and site localities were identified--most appear to be of traditional Hawaiian origin, although almost all show evidence of historical and/or recent modification (Tomonari-Tuggle, 1983). There are 19 agricultural features, 6 habitation sites, and 4 sites of other function. The last category includes a lithic site, a historical road bed, an artifact scatter, and the remains of McCandless Rice Mill.

It should be emphasized that archaeology is not solely confined to the study early Hawaiians. There is growing interest in other ethnic groups, plantation systems, and the effects of urbanization. Therefore, sites related to the rice industry do have a research value, as well as cultural and public interest, albeit of slightly different nature than Hawaiian sites.

Of the 28 sites surveyed, 8 were considered of particular significance in terms of research value (see Figure III-19). The criteria for determining significance include the uniqueness of a site in relation to

WAIAHOLE
VALLEY
AGRICULTURAL
PARK



NOTE:
ALL NOTATIONS ON ARCHAEOLOGICAL
SITES ARE PRELIMINARY-SUBJECT TO
CHANGE FOLLOWING FINAL DATA ANALYSIS.

FIGURE III-19
SIGNIFICANT ARCHAEOLOGICAL SITES
IN WAIAHOLE VALLEY

KEY TO ARCHAEOLOGICAL SURVEY:

- ARCHAEOLOGICAL SITE
- WAIAHOLE STREAM
- WAIAHOLE STREAM, AS MAPPED DURING ARCHAEOLOGICAL SURVEY
- BOUNDARY OF SURVEY, BASED ON LAND COMMISSION AWARD DATA

associated features or archaeological areas, availability of supplementary historical information, the condition of the site, and the kind of information retrievable.

Six archaeological sites in Waiahole Valley that would be impacted by construction activities were subsequently excavated to salvage any potential research value (see Appendix B). Two of the six sites (3512, 3526) excavated were among the eight sites considered significant.

A brief description of the eight significant sites are as follows:

Site 3505: Flake deposit. This site is an exposed cultural deposit containing considerable amounts of lithic material, including basalt flakes, adzes, a whetstone, and cores. It has been exposed by the construction of an 'auwai (irrigation canal, site 3506), suggesting an earlier date for the deposition of the lithic deposit.

This site is significant in two respects: (1) it may be possible to trace the lithic material to two quarries located near the top of the ridge, Kuolani, which rises from the valley floor near this site. Raw material, adze preforms and blanks, and large flakes and cores have been found in the quarries and this site may be a basalt tool-making workshop, to which the quarried material was brought to be refined and fashioned into a final product; and (2) it is one of only two sites in the survey areas (site 3512 is the other) which has no historical associations in the form of written documentation or the presence of 19th or 20th century historical artifacts. Thus, they may be unique preservations of pre-Contact Hawaiian lifestyles in these areas, which have seen considerable change since the 1800s.

Site 3506: Irrigation canal. This site is an irrigation canal which begins at site 3505 and winds its way down the south side of the valley, across Kamehameha Highway, and into the ocean. Although its present intake can

be dated to 1950, the 'auwai itself has long appeared on historical maps and is mentioned in several Land Commission Award testimonies from the mid-1800s. Its origin may predate the earliest records since taro cultivation in the valley (for which the south side of the valley is a prime environment) is noted in several legendary traditions.

The significance of this site is its continuity-- beginning in the far past, its history continues as a means for irrigating the fields under lease 91 (see Appendix A for identification and location of leases). Thus, its significance lies not so much in its research value, but in its cultural value (as an asset to traditional Hawaiian, 19th century Chinese, and modern farmers) and in its public value (as a tangible link among the different periods of the valley's agricultural history).

Site 3512: Buried occupation deposit. This site appears to be an habitation-agricultural complex with at least two distinct occupational events. The earlier event is related to the agricultural use of the hill slope, with some possible intermittent habitation or specialized activities also taking place. The later event is an intense habitation activity in which wood-working was certainly occurring; this event was probably associated with continuing agricultural use of the hill slope.

The interpretation of this site has been re-evaluated following the results of the excavation. The site has proved to consist of multiple strata, at least two of which are of original deposition. This indicates a discontinuity of occupational activity, possibly two separate occupations of the site area. In addition, preliminary interpretation of results suggests that the site may have an early historical component;

therefore, the "modern" radiocarbon dates may not be erroneous.

Excavation indicated that the site has two major spatial zones: an area of extensive activity and an area of intensive activity. The first zone covers the area of Site 3512 which lies west of the road cut; it consists of a single surface cultural deposit with no features. The latter zone lies east of the road cut and contains a multiple stratum deposit with habitation features. By coincidence, the area where the two zones graded together has been removed by the construction of the dirt road.

Site 3514: Artifact scatter in plowed field. Over 230 artifacts (basalt flakes and cores, polished adze fragments, volcanic glass flakes, ceramic shards, and bottle glass) were noted in an area 20 m by 50 m. The chronological range of these artifacts reflects a continuity of occupation throughout the 19th century and possibly earlier into the 18th century. This field (under lease 74) was surveyed (rather than bypassed as a disturbed area) because (1) it had been freshly plowed but not yet replanted; (2) artifacts had been found earlier in a field outside of the survey boundaries (site 3525); and (3) the field fell within the boundaries of a recorded land grant and was possibly the site of a house noted on the Dove 1897 map.

This site is particularly significant as it shows the viability of plow-zone surveys in Hawaii, a methodology which heretofore has not been attempted, but which has the potential to yield valuable evidence on Hawaiian habitation and agricultural practices (given the large acreages presently under cultivation throughout the islands).

Site 3517: Abandoned wood frame house and associated trash pit.

Although this site may appear to be a broken down, abandoned shack on the edge of Waiahole Homestead Road, it has a history which goes back at least to the turn of the century when it was noted on the 1897 Public Lands map by CVE Dole. The presence of the nearby trash pit or outhouse pit offers an opportunity to investigate the occupation of the flat on which the house stands and its possible association with the rice fields which once occupied the new overgrown expanse of lease 91.

Site 3523: McCandless Rice Mill. The known remains of this rice mill consist of a concrete foundation for a waterwheel and an exposed bedrock channel of an 'auwai' which powered the wheel. This rice mill was constructed in the last decades of the 19th century by L.L. McCandless, who played a major role in the 20th century use and modification of the valley landscape.

An interview with the present resident of the site revealed that the escarpment adjacent to the 'auwai' had been long used as a trash dump and historical bottles and miscellaneous paraphernalia from the 1800s and early 1900s have been seen exposed on the slope. In controlled excavation and with laboratory cataloging and analysis of this material, such a dump can be significant in two ways: (1) it could add considerable information on the changing character of the occupants of this area, from possibly long-ago Hawaiians, to rice plantation employees, to the present truck farmers, thus adding details to the cultural history of the valley; and (2) in a larger context, it could be used to assess the impact of growing urbanization in Honolulu and in the southern Kaneohe Bay area on a peripheral rural area; i.e., the distribution in the kinds and quantities of historical material could suggest the kinds of economic and

social ties which connected the Waiahole region with other parts of the island.

Site 3524: Irrigation canal and rice fields. This site is the best preserved of any "rice-related" site in the survey areas. It contains the junction of several irrigation canals as well as the fields which were irrigated. Furthermore, there is some hint of traditional Hawaiian use in the presence of a basalt flake on a canal bed. Research value in furthering understanding of technical aspects of the rice irrigation system is high, as well as investigating the possible preservation of a Hawaiian system beneath or integrated with the historical one.

Site 3526: Buried cultural deposits. This site is a probable irrigation agricultural deposit exposed in the bank of lower Waiahole Stream. The uppermost stratum of the five profiles which were examined indicate disturbance of the agricultural soils by historical and/or modern farming activities. The impact of farming is also evident in the numerous artifacts which can be found by walking through the cultivated fields adjacent to the stream (basalt flakes and stone tools have been found in every farm field which has been archaeologically surveyed).

SOCIO-ECONOMIC

The Waiahole Valley area is considered rural-agricultural in character. About 80 percent of the present households reported some farming activity, either for personal or commercial use. In 1972 the overall agricultural contribution from Waiahole Valley farmers to the state's total crop was 54 percent for sweet potatoes, 7 percent for bananas, and 2 percent for papayas (Scott, 1981).

Lifestyle in this rural area has changed very little; more than 60 percent of the leaseholds have been maintained by the same family for over 20 years. Families are close-knit and many people have known their

neighbors for a long time. As in most rural communities, the neighborhood is quiet and the lifestyle leisurely. Some households raise livestock for domestic use and many families have small gardens. A few roadside stands are maintained by the residents, who offer fruits and vegetables from family gardens for sale to passing motorists.

The Waiahole Valley community is small and there are many cultural and social differences among the residents, but a strong sense of community prevails.

Population Profile

Population Size and Density. The population in Waiahole Valley has declined within the past 20 years. According to a report by Michihiro Miyagi (Masters Thesis, 1963), in September 1962 there were 453 people (94 households) residing in the valley. In 1977, when the State of Hawaii conducted its survey of valley residents, 63 households (out of an estimated 80 households) responded. These 63 households accounted for 243 people, or an average of 3.9 people per household (the Oahu average is 3.24 people per household).

If the average household size (3.9) is multiplied by the estimated number of households (80), the estimated population for Waiahole Valley is about 300 persons. The density of this population when computed for the gross land area of Waiahole Valley (590 acres) is 0.5 persons per acre. The density, when computed for the urban-zoned lands (53 acres), is about 6.3 persons per acre.

Age. The age distribution figures in Table III-7 indicate that over 35 percent of the residents are 50 years or older compared to less than 20 percent for Oahu as a whole. This tabulation also shows that the median age of the valley residents is approximately 31 years, compared to 25.9 years for all of Oahu.

Ethnic Background. When Miyagi conducted his survey in 1962, the Filipino, Japanese, and Hawaiian or part-Hawaiian residents each accounted for about one-fourth of the total population (26.9, 25.2, and 24.5 percent respectively). The Caucasian and Portuguese residents made up 7.5 and 7.3 percent of the total. In addition, there were three households of

TABLE III-7

DEMOGRAPHIC CHARACTERISTICS OF WAIHAOLE VALLEY RESIDENTS

	Waiahole Valley* (%)	Oahu** (%)
AGE		
0 - 9	13.2	18.0
10 - 19	16.6	10.6
20 - 29	13.2	20.2
30 - 39	10.7	13.1
40 - 49	8.8	10.6
50 - 59	14.6	9.4
60 - 69	12.7	5.2
70 and Over	10.2	3.4
Median Age	31.0	25.9
ETHNICITY		
Hawaiian and Part-Hawaiian	18.7	15.3
Filipino	32.0	10.2
Japanese	21.3	24.6
Caucasian	3.6	27.9
Samoan	0.4	1.0
Mixed	21.8	8.2
Other	2.2	1.4

	Waiahole Valley (%)	Hawaii (%)
RESIDENCY		
Less than 5 Years	11.3	0
5 - 9 years	21.0	0
10 - 19	4.8	1.6
20 - 29	41.9	16.1
30 - 39	11.3	11.3
40 - 49	8.1	21.0
Over 50 years	1.6	50.0

* Source: State of Hawaii survey, 1977.

** Source: OEO 1975 Census Update Survey.

Table III-7, Cont.

	Waiahole Valley (%)
MARITAL STATUS (HEAD OF HOUSEHOLD)	
Single	6.4
Married	77.4
Divorced	8.1
Widowed	8.1
EMPLOYMENT (HEAD OF HOUSEHOLD)	
Full Time	49.2
Part Time	4.9
Unemployed	21.3
Retired	23.0
Disabled	1.6
FARMING (HEAD OF HOUSEHOLD)	
Full Time	29.0
Part Time	71.0

Chinese ancestry and one household each of Samoan, Korean, and Puerto Rican ancestry.

The 1977 survey shows that there is now a preponderance of people of Filipino ancestry and those of mixed ethnic background and a decline in the part-Hawaiian, Japanese, and Caucasian population. No separate category was established for those of Portuguese ancestry, who may have been included under "mixed."

Residency. Over 30 percent of the present residents have lived in Waiahole Valley for less than 10 years, but the majority have lived in Waiahole at least 20 years or more. Although 30 percent of the people are relative newcomers to the valley, they are not newcomers to the state (Table III-7). Some of the recent arrivals settled in the valley to farm; others may have moved in because they wanted the amenities of a rural setting. Among this group of newcomers, there is almost an equal number of people between the ages of 27 and 35 and between 40 and 59.

Education. The educational level of the residents in Waiahole Valley is lower than for all of Oahu. According to the 1975 Census Update Survey, 77.9 percent of Oahu residents completed high school and 16.6 percent had completed college. Extrapolating the survey responses resulted in the following tabulation of the highest grade completed for those residents in Waiahole Valley who are 18 years or older:

Elementary School:	23.2%
Intermediate School:	19.6%
High School:	50.0%
College:	7.2%

One reason why the educational level in Waiahole Valley is lower than Oahu's total may be due to the type of employment offered in an agricultural environment, where higher education may not be necessary. Ten of the fifty heads of household who indicated farming activity, however, did have some agricultural education, and most who farm had many years of agricultural experience.

Household Size. A household can be a single person or a group of related individuals or unrelated individuals. The majority (77.4 percent) of the Waiahole Valley households are typical families--married couples

with children. The average household size is 3.9, which is larger than the Oahu average of 3.24.

Income. The annual average income for approximately 80 households in Waiahole Valley was provided by Architects Hawaii in its report, "Waiahole Valley," dated January 1978. A breakdown is shown below.

	<u>Number of Households</u>
\$ 0 - \$ 2,999	13
3,000 - 4,999	8
5,000 - 6,999	5
7,000 - 8,999	13
9,000 - 10,999	12
11,000 - 12,999	3
13,000 - 14,999	6
15,000 - 16,999	9
17,000 - 18,999	1
19,000 - 20,999	1
Over \$21,000	9

These figures show that most of the households are in the low income brackets, earning much less than the mean household income for Oahu of \$16,273 (1975 Census Update Survey).

According to the survey responses, 38 households receive some government aid in the form of social security, general assistance, food stamp, medicaid, or unemployment benefits.

Employment

There are approximately 180 people in Waiahole Valley who are 18 years or older. In this group, about 42.7 percent are employed full time, 11.9 percent work part time, 27.3 percent are unemployed, 16.8 percent are retired, and 1.3 percent are disabled.

Miyagi (1963) states that about three-fourths of the households derive their major source of income from secondary and tertiary industries. Most of these residents commute to their jobs in Kaneohe, Kailua, Honolulu, Hickam, or Pearl Harbor. Some residents are employed by Waiahole School and a few are fishermen.

Out of 44 heads of household who responded in the 1977 survey that they are presently farming, 4 indicated commercial farming, 12 for personal use only, and 28 for both commercial and personal use. In addition, 7 households indicated they had farmed previously. Some people have ceased farming because of the uncertainty of Waiahole's future.

Housing Characteristics

Age and Condition. The 1977 survey showed that almost 75 percent of the homes were built over 20 years ago (Table III-8). The oldest home is about 120 years old and two homes are over 70 years old. Of the total number of homes over 20 years old, 82.5 percent are in need of repair; over 70 percent of all the homes in the valley need to be repaired.

In response to the question on types of repairs needed, the residents indicated the following:

Exterior	
Roof	36.8%
Walls	28.9%
Foundation	21.0%
Lanai or Porch	15.8%
Interior	
Plumbing	15.8%
Electric Fixtures	7.9%
Walls	18.4%
Doors	10.5%
Windows	10.5%
Floor	21.0%
All the Above	36.8%

Type. The houses in Waiahole Valley are mostly one-story, single-family dwellings, which is also typical for Oahu as a whole. Most of the homes have the basic kitchen facilities (sink, refrigerator, and stove) and water and plumbing fixtures. Almost one-third of the homes, however, do not have hot running water. A few homes have outdoor bathroom facilities only and some households have kerosene stoves.

TABLE III-8
AGE OF HOUSES AND REPAIR

Age	Percentage	In Need of Repair	
		Yes	No
Less Than 5 Years	7.4	1	3
5 - 9 Years	14.8	3	5
10 - 19	3.7	1	1
20 - 29	27.8	11	4
30 - 39	18.5	8	2
40 - 49	13.0	6	1
50 and Over	14.8	<u>8</u>	<u>0</u>
		38	16

Source: 1877 State of Hawaii survey.

Tenure

Preference. Over 80 percent of the residents would choose to live in a single-family rural district; 10 percent in a single-family suburban area; and 3 percent in a single-family urban area. High rises are not desirable.

Community Perception and Attitudes

This section describes the perception and attitudes of the residents toward their community and toward growth and development.

Community Identification. According to a survey conducted as part of the Kaneohe Bay Urban Water Resources Study (U.S. Army Corps of Engineers, 1975), approximately 85 percent of the Waiahole Valley residents are either satisfied or very satisfied with their community. These residents describe their community as very close knit in that they share similar views and values. This high degree of satisfaction may also be due to frequent neighborhood interaction.

Similarly, Robert Anderson (Waiahole-Waikane: A Socio-Economic Profile, 1974) found that 83 percent of the residents would not be willing to move from their present place of residence. Among the advantages of the area are listed, in ranking order, peace and quiet (or privacy), inexpensiveness, backyard agriculture, closeness to job, and family ties and other. The disadvantages were distance to services, uncertainty of tenure, inadequacy of utilities, other, and no response or no problems (69 percent).

Growth and Development. Waiahole Valley residents express strong opinions on the question of development (U.S. Army Corps of Engineers, 1975). With regard to the Waiahole area, 81.1 percent of the residents favor no growth; 58.7 percent of the residents do not favor growth in any area.

Waiahole residents are very concerned about preserving agricultural lands by limiting future housing development. They feel that residential development should be controlled to protect these agricultural lands and conservation areas and that population growth should be discouraged. In order of priority, Waiahole residents feel they should receive government funds for agricultural development, expansion of sewerage system, and

recreation. Other windward residents, however, ranked environmental quality first, followed by expansion of sewerage system and agricultural development (U.S. Army Corps of Engineers, 1975).

As a result of their concern over growth and development, the residents of Waiahole-Waikane organized a community association. Other valley residents who are not part of the association have similar concerns over development.

Waiahole-Waikane Community Association (WWCA). The WWCA was formally organized in 1974. Among its concerns are the attainment of these goals (Architects Hawaii, Ltd., 1978): (1) long-term leases at fair and reasonable rates, (2) expanded agriculture, (3) preserved community integrity, and (4) regional planning, all achieved through "real community participation."

Other concerns include the following:

1. Preservation of the agricultural/rural nature of Waiahole Valley
2. A residential lot size of 5,000 sq ft is not compatible with a rural environment
3. Leasing of farm lands is most effective in controlling and preserving agricultural land use
4. High-priced housing is not acceptable
5. Lands at the head of the valley would be suitable for open space and park use
6. Self-help programs should be utilized to build new homes instead of by outside developers

Other Valley Residents. The concerns of those people not members of the WWCA are as follows (Architects Hawaii, Ltd., 1978):

1. Make more agricultural zoned land available.
2. Farmers desire to live on their farms.
3. Long-term leases should be offered.
4. The valley should be dedicated to farm use in perpetuity.

5. Agricultural lands should be made available to farmers at the earliest opportunity.
6. Farm leases should be utilized to discourage or prevent speculation.
7. The state should have the right to revoke leases if tenants do not farm.
8. Consider housing for retired farmers.
9. Establish an open air market or rural general store.
10. Commercial development should be done in later phases.
11. A valley cooperative should be considered.
12. Residential development should not be expanded in the valley.
13. Consider recreational mountain cabins.
14. There should be no fee simple sale of property.

Recreation

Existing public recreation resources in Waiahole Valley include (1) a hiking trail in the mauka area, (2) a beach park, and (3) court and field facilities at Waiahole Elementary School for activities such as basketball, softball, football, etc.

Inland Resource - Hiking Trail. Although the hiking trail is located outside the study area, the only access is through the south branch of the Waiahole Valley Road, which will continue to be a public road. Vehicles are not allowed beyond the forest reserve boundary mainly because of vandalism to Oahu Sugar Company's irrigation facilities. The vegetation along the trail are predominantly introduced species. Activities include hiking, hunting, and camping. Day use does not require a forestry permit, but overnight camping does. All recreation activities are restricted to the lower forest, below the closed watershed area. Present usage is low because of the frequent rains in the area.

Improvements to the trail system are being proposed by the state Forestry and Wildlife Division. These improvements include the creation of a loop trail and provision of shelters, outhouses, and picnic tables in the Norfolk pine groves. These improvements are of low priority in the

state Forestry and Wildlife Division's development program.¹ The agricultural park's boundaries include a small portion of the Koolau Pali scenic area - the lower section of the ridge situated between Waianu and Waiahole streams. The unused land areas will be turned over to the DLNR. Although this area will remain open space, the DLNR may reclassify this land from agriculture to conservation if it is deemed necessary.

Coastal Resource - Beach Park. Waiahole Beach Park is also located outside of the study area. It is used primarily for boat launching. There are no facilities such as restrooms.

Improvements are being proposed by the City and County Department of Parks and Recreation. This is a low priority project involving acquisition of 39 acres to accommodate camping.²

Court and Field Facilities. There is one court to accommodate basketball or volleyball and a grassy field large enough for football or softball. Children's playground facilities are also part of the school grounds. These facilities are available for use after school hours by the community.

No improvements to the court or field facilities are being proposed by the state Department of Education or the City and County Department of Parks and Recreation.

Demand. The most popular recreation activities among residents within the Kaneohe-Waimanalo area are swimming/sunbathing, picnicking, and bicycling (see Table III-9). A high need exists in the windward region for inland picnicking and camping areas, and for coastal recreation areas (see Table III-10). Waiahole area residents, however, engage more frequently in beach swimming, fishing, squidding, and picking limu than other residents in the Kaneohe area (U.S. Army Corps of Engineers, 1975).

¹ Personal communications with state Forestry and Wildlife Division.

² Personal communications with county Department of Parks & Recreation.

TABLE III-9
RANKING OF RECREATIONAL ACTIVITIES
(KANEOHE-WAIMANALO AREA)

Activity	% of Total Activity
Swimming/Sunbathing	22
Picnicking	16
Bicycling	16
Game Playing	10
Outdoor Events	7
Walking/Jogging	6
Camping	5
Surfing	4
Diving	3
Tennis	2
Golf	2
Fishing	1
Hiking	1
Canoe Paddling	1
Other	1

Source: Hawaii State Comprehensive Outdoor
Recreation Plan (SCORP), 1975.

TABLE III-10

EXISTING AND FUTURE RECREATION NEEDS - KOOLAUPOKO

Activity/Resource	Existing	Future	
	1980	1985	1995
Inland Resource			
Camping - Inland	High	*	*
Hiking	Medium	High	High
Hunting	Low	*	*
Picnicking - Inland	*	*	*
Coastal Resource			
Diving	High	*	*
Surfing	High	*	*
Canoe Paddling	High	Low	Low
Fishing	High	Low	Low
Swimming/Sunbathing	High	High	High
Picnicking - Beach Park	High	Medium	Medium
Boating - Launch Ramps	High	Low	Low
Boating - Slips and Moors	Low	*	*
Nonspecific Resource Requirements			
Walking/Jogging	High	High/ Medium	High/ Medium
Bicycling	High	Medium	Medium
Motorcycling	High	Medium	Medium
Outdoor Events	Low	Low	Medium
Courts or Fields			
Court Games	High	Low	Low
Field Games	High	Low	Low
Golf	Low	High	High
Tennis	High	Low	Low

* Insufficient data/no supply/no demand

Source: Department of Land and Natural Resources, 1980.

SENSITIVE ENVIRONMENTAL AREAS

Sensitive environmental areas include those that are recognized by state or federal legislation as possessing ecological, economic, or social value, or pose a hazard to public safety. Resources that are unique or scarce should be preserved and protected from further degradation. Other resources can tolerate multiple uses and should be managed to properly accommodate these uses. Hazard areas need to be carefully managed to avoid threats to life or property.

A list of these sensitive resources is provided in Table III-11. Some of these resources are present in Waiahole Valley, while others are located outside the project area.

TABLE III-11

PRESENCE OF SENSITIVE ENVIRONMENTAL AREAS IN WAIHOLE VALLEY

Resource	Federal Legislation	State Legislation	Presence/Absence in Waihole
Areas to Be Preserved, Protected or Maintained:			
Habitats of Endangered Species	Endangered Species Act of 1973	State Plan (Chap. 226, HRS)	+
Wetlands	E.O. 11990, Protection of Wetlands		++
Drinking Water Sources	Safe Drinking Water Act	State Plan; Groundwater Use (Chap. 177, HRS)	+
Agricultural Lands		State Plan; Land Use Law (Chap. 205, HRS)	++
Cultural Resources	National Historic Preservation Act of 1966; E.O. 11593, Protection and Enhancement of the Cultural Environment; Archaeological and Historic Preservation Act of 1977	State Plan; Coastal Zone Management Act (Chap. 205A, HRS) Historic Objects and Sites (Chap. 6E, HRS)	++
Areas to Be Managed for Multiple Uses:			
Forest Reserves		DLNR Conservation District Plan	++
Perennial Streams		Hawaii Instream Use Protection Act, CZM Act	++
Shoreline Areas (Kaneohe Bay)		State Plan, CZM Act	+
Hazard Areas to Be Managed:			
Flood-Prone Areas	National Flood Insurance Act of 1968; Flood Disaster Protection Act of 1973	State Plan; CZM Act	++
Erosion and Landslide Areas		State Plan; CZM Act	++

+ Present in Waihole Valley but not in project area.

++ Present in project area.

CHAPTER IV

PROBABLE IMPACT AND MITIGATION MEASURES OF THE PROPOSED ACTION

This chapter has analyzed the ramifications of the proposed action on the physical environment, the local and regional community, and the fiscal situation of the existing Waiahole residents and the state. Adverse or beneficial impacts may stem directly from the project or indirectly through interaction with external factors. Impacts that depend on external factors are called secondary or cumulative impacts.

Where adverse impacts have been identified, measures to mitigate these impacts are recommended. The methods by which the mitigation measure should be implemented are also identified. In some cases, the impacts may be unavoidable and beyond any means of mitigation.

The chapter concludes with a summary of those impacts that are considered significant.

DIRECT IMPACTS

Direct impacts are categorized according to whether they affect sensitive resources, public health and safety, public welfare, or are fiscal considerations. The first two categories are considered physical impacts. The latter two categories are typically considered social and economic impacts.

DIRECT IMPACTS ON SENSITIVE RESOURCES

Sensitive resources in Waiahole Valley have been identified in Chapter III. These resources are considered sensitive because they are unique, scarce, irreplaceable, or basic to human sustenance and therefore have statewide significance. Sensitive resources present in Waiahole Valley include the groundwater, the stream ecosystem, prime agricultural land, conservation land, endangered species, and archaeological/historic resources.

Groundwater Resources

Because groundwater is the island's primary drinking water source, its quantity and quality are vital concern.

Quantity. The Waiahole Ditch-tunnel system, constructed in the early 1900's to tap the dike groundwater in the Koolau range, currently transports approximately 26 mgd to the leeward side of Oahu for sugar cane irrigation. Through a water rights agreement with the Waiahole Water Company, the McCandless Estate was given the rights to 0.5 mgd from the ditch-tunnel system. The purchase of Waiahole Mauka from the McCandless Estate conveyed one quarter of 0.5 mgd, or 125,000 gpd appurtenant water rights to the state. The source of the proposed 0.8 mgd design capacity water supply is groundwater. Any interflow related surface water decreases from this pumpage would be more than offset by the additional 1.1 mgd available subsequent to the reapportionment of Waiahole Water Company's lease.

Quality. Two sources of potential pollution to the groundwater presently exist: (1) wastewater seepage from cesspools and (2) agricultural seepage from fertilizer and pesticide application. The proposed actions do not introduce new types of pollutant sources, but may intensify the volume of existing pollutants. Agriculture will be expanded, thus greater amounts of fertilizer and pesticides will be used. Since the municipal sewerage system will not be extended to Waiahole Valley [Kahaluu Wastewater Facility Plan (Towill, 1980)], onsite systems will have to be provided for the additional housing units.

Since there are no monitoring wells, the extent of existing pollution, if any, is unknown. Despite this uncertainty, the degree of risk from proposed new impacts can be ascertained based on knowledge of the geohydrology of the region and the characteristics of the wastewater systems, fertilizer and pesticide constituents.

Potential Risks Associated with the Proposed Onsite (Cesspool) Wastewater Disposal. The Board of Water Supply (BWS) has delineated a "no-pass" line to protect existing and potential potable water supplies (Figure I-7). No new surface or subsurface sewage disposal is permitted inland of the no-pass line and no subsurface disposal is permitted deeper than 30 feet in areas below the "no-pass" line. Exceptions may be granted

in "borderline areas" if soil boring logs indicate acceptable subsurface conditions associated with low groundwater contamination potential. In addition, the Department of Health (DOH) requires that each cesspool be located at least 50 feet away from surface water bodies to minimize the risk of surface water contamination. The BWS and DOH have "grandfathered" existing cesspools above the no pass line.

Each new tenant will be required to utilize acceptable onsite disposal systems and certify to the Department of Health (DOH) that the system complies with Chapter 57 of Title 11, Administrative Rules of the DOH. Typically, this will require the use of closed vault systems above the no-pass line and cesspools below the no-pass line if geohydrologic and geomorphological conditions permit (Figure IV-1). No additional risks associated with wastewater disposal due to the proposed project are expected.

Existing BWS and DOH rules and regulations should be more than adequate for protecting existing groundwater quality. Studies have shown that 4 feet of soil is sufficient to remove viruses, bacteria, and phosphorus from cesspool seepage (EPA, 1980). Percolation through the soil filters the larger particles, such as bacteria and phosphate precipitation, and adsorbs viruses and phosphorus onto the clay particles. Nitrate, however, is water soluble and passes freely through the soil. Much of the nitrates are taken up by higher plants or used by microorganisms. The remaining fraction that reaches the groundwater is not considered significant because of its high dilution. The proposed domestic source well for Waiahole residents is upgrade of the subdivision. The BWS has no long term plans for deep drinking water wells seaward of the "no-pass" line in Waiahole (BWS, 1975). Minimum instream flow requirements may also limit groundwater development because of the significant degree of interflow between Windward Oahu streams.

Potential Risks Associated with Expanded Fertilizer and Pesticide Use. The tradeoffs between risks and benefits of fertilization and pesticide use are not unique to the proposed project; it is a worldwide concern. In Waiahole Valley, the risks in terms of water quality are associated with the leaching of fertilizer and pesticide constituents to

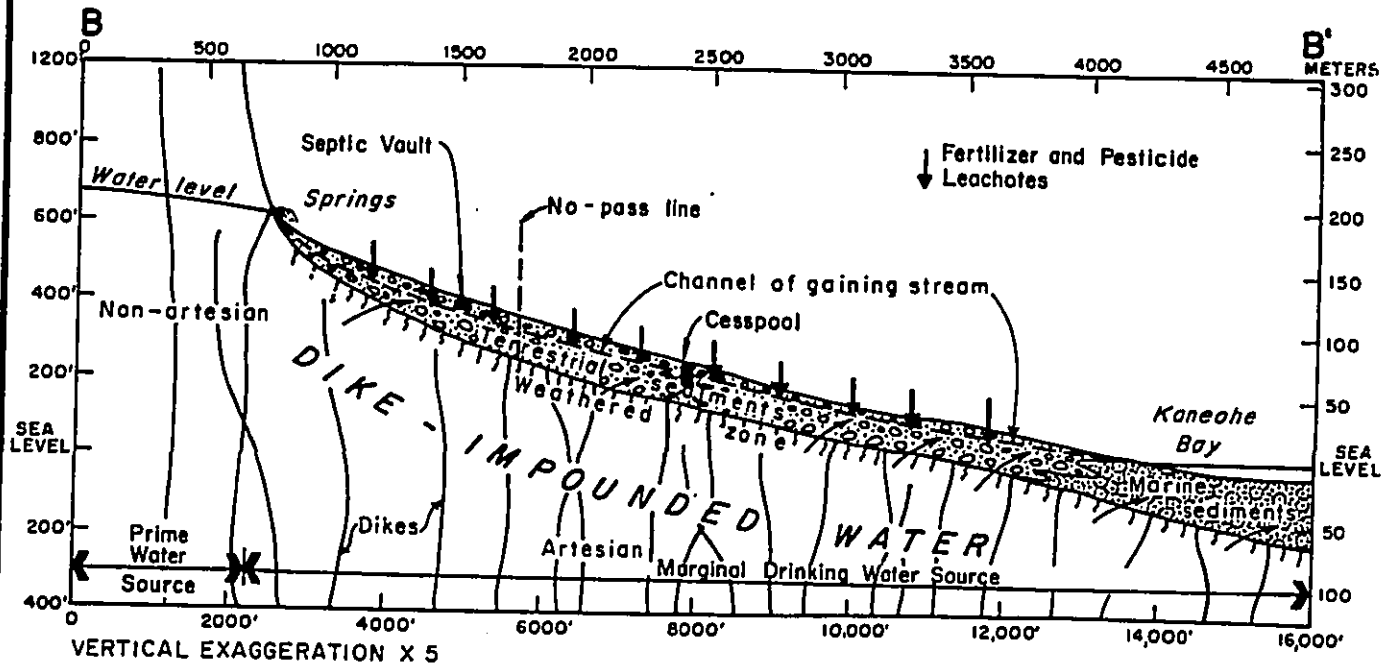


FIGURE IV-1
GROUNDWATER QUALITY IMPACTS FROM
WASTEWATER AND AGRICULTURAL LEACHATES

the groundwater, with subsequent transport to the stream and Kaneohe Bay. Impacts to Kaneohe Bay are discussed in more detail in the latter part of this chapter.

Since the groundwater underlying the agricultural activity is not intended for future development as a potable water source, there is little risk to potable water supplies. Areas of potential risk are ecological; i.e., the potential upset of the stream or nearshore coastal ecosystems, toxic impacts to organisms, or bioaccumulation in food chains, including human consumption.

Despite the risks associated with fertilizer and pesticide use, the promotion of agriculture is one of the major goals of the Hawaii State Plan. Alternative pest management and fertilization practices have been explored, but may not be practical or feasible. A degree of mitigation can be achieved, meanwhile, by implementing available state programs such as--

1. Educate farmers through the University of Hawaii's Cooperative Extension Service to select less mobile fertilizers and to minimize application during rainy periods;
2. The Hawaii Pesticides Act (Chapter 149A, HRS) requires pesticide operator certification (State Department of Agriculture) for registered pesticides and requires that these pesticides be applied properly in the proper dosages; and
3. Monitor Waiahole Stream near the mouth during low flows (Takasaki, 1977). The source of the base flow is primarily groundwater, therefore would serve as a good indicator of groundwater contamination. Should Waiahole Valley ever be designated a future groundwater source, pertinent not to exceed standards of the Safe Drinking Water Act that would then be applicable are as follows:

Nitrate - 10 mg/l

Organic chemicals

Endrin	0.0002 mg/l
Lindane	0.004 mg/l
Methoxychlor	0.1 mg/l
Toxaphene	0.005 mg/l
2,4-D	0.1 mg/l
2,4,5-TP Silvex	0.01 mg/l

Stream monitoring could be periodically conducted as part of the drinking water monitoring program of the Department of Health if Waiahole Valley is ever designated a future water source, or if anomalous tissue bioassay or sediment test results from the Kaneohe Bay receiving waters are noted.

Stream Ecosystem

Waiahole Stream is one of the few remaining unchannelized perennial streams on Oahu. It is a habitat for native aquatic fauna such as o'opu nakea and food species such as prawns. The stream mouth is an estuarine habitat for juveniles of mullet, aholehole, and other ocean species.

Streamflow. Historically, stream habitats on the windward side had been degraded by drastic flow reductions that resulted from the completion of the Waiahole Ditch system in the early 20th century. Despite these reductions, native fauna have persisted and taro farmers still use the stream flow to nourish their fields.

The projected irrigation and domestic water demands should be more than offset by an additional average of 1.1 mgd that will be made available after the state reapportions Waiahole Water Company's water rights lease, as authorized in Section 171-37(3), HRS. Due to higher pumping electrical costs, Waiahole Water Company has voluntarily ceased diverting and pumping Waiahole Stream water from the 500-foot elevation up to the Waiahole Ditch-tunnel for the past several years (Figure IV-2). Sugar cane growers in Central Oahu have correspondingly reduced water needs by reducing sugar cane acreage under cultivation.

Since the new domestic water system will be supplied by wells in lieu of the 4" McCandless pipeline, an additional overflow of 125,000 gpd from the latter will be available to Waianu Stream. No water will be removed

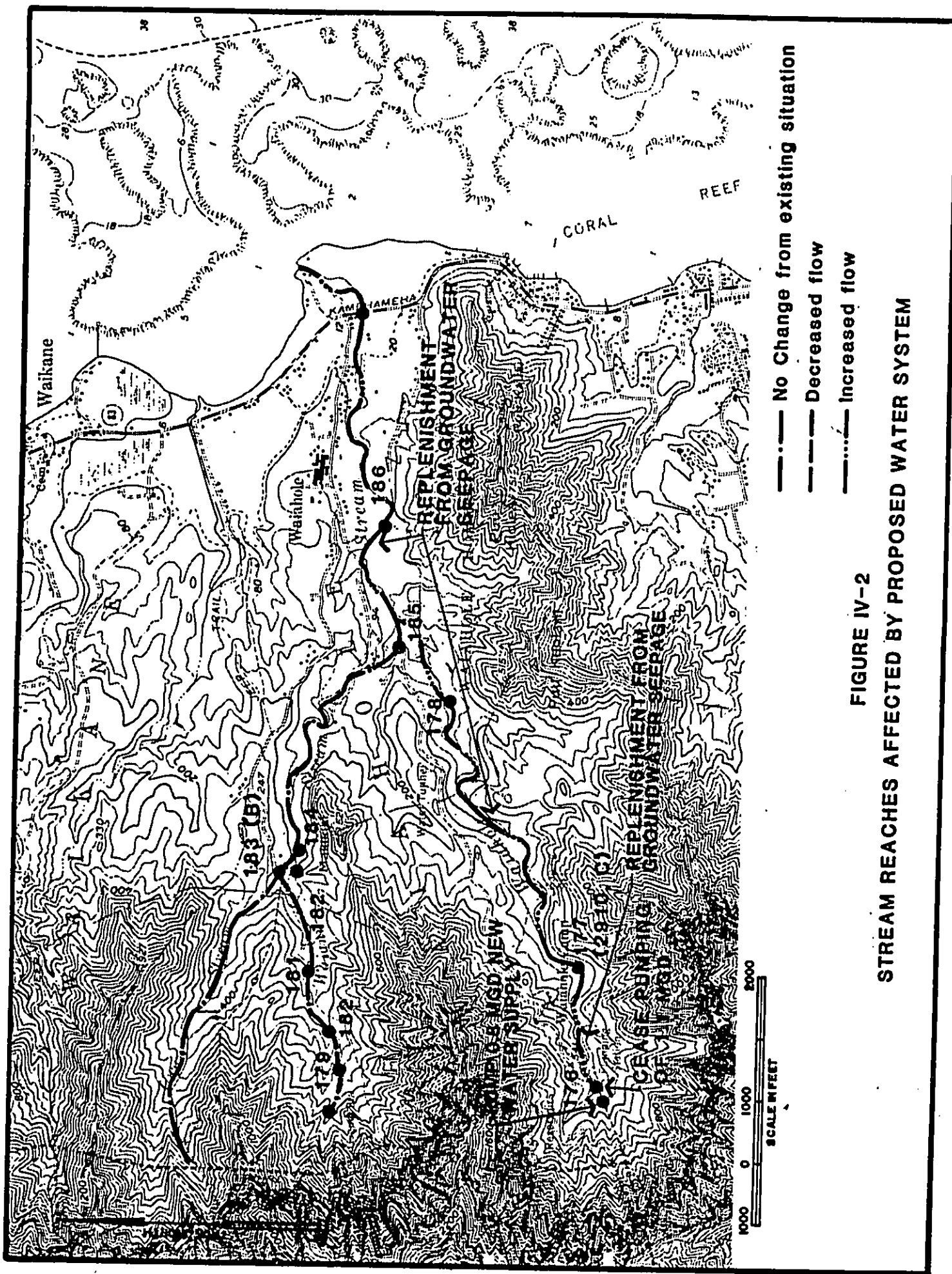


FIGURE IV-2
 STREAM REACHES AFFECTED BY PROPOSED WATER SYSTEM

from Waianu Stream. At worst, existing flow conditions will be maintained in Waianu Stream. More likely, there may be an increase over present flow conditions in Waianu Stream.

Native stream fauna in Waianu Stream as well as the taro farmers along Waianu Stream will benefit from the effort to maintain or enhance present streamflows.

The 0.8 mgd design water system will be supplied by two 12-inch wells near Waiahole Stream below the 500-foot elevation level. Like most other perennial streams on the windward side, Waiahole Stream is heavily dependent on influent groundwater. For design purposes, it was assumed that this groundwater would create a corresponding reduction in surface water flow at or near the same elevation. Superposition of this 0.8 mgd demand over the additional 1.1 mgd gained from the Waiahole Water Company lease renegotiation would result in a net increase of 0.3 mgd over existing conditions below the 500-foot elevation level. Correspondingly, the Q_{100} of 1.5 mgd and Q_{90} of 2.1 mgd (Figure III-11) would be increased to 1.8 and 2.4 mgd, respectively.

The Hawaii Instream Use Protection Act of 1982 (Chapter 176D, HRS), through the rules promulgated by the DLNR (Protection of Instream Uses of Water, Windward Oahu; Chapter 167 of Title 13), has set up a program for the establishment of permanent and interim instream standards. Presently, no quantifiable standards have been formally established for Waiahole Stream.

Given the lack of detailed transect data, stream flow discharge methods were the necessary choice as planning guidelines for minimum instream flow, although any such method still needs to be validated for the assessment of Hawaiian streams. The Tenant (Montana) method appeared to be the most compatible with the high annual variability (Figure III-10) yet relatively short period of available stream flow record. The use of only dry weather and wet weather seasonal averages would dampen out any extreme monthly variations within the period of record while still accounting for seasonal variations.

Based on the total draft of 0.8 mgd as supplanted by the additional 1.1 mgd flow for Waiahole Water Company cessation pumping, there would be a net gain of 0.3 mgd. When applied to the dry season flow of 4.1 mgd and

the wet season flow of 12.4 mgd, this will result in the maintenance of 107 percent of 102 percent of existing flow for the respective seasons. According to the Tenant criteria (Table IV-1), this exceeds the "optimum" range for instream habitats.

Tenants that utilize stream withdrawal for irrigation will be required to demonstrate the lack of significant adverse effects through compliance with all regulatory requirements.

Downstream taro farmers along Waiahole Stream are located at a lower elevation below the Waiahole-Waianu confluence where the streamflow is considerably augmented by groundwater. The taro farmer may experience increased flow as a result of interflow from the additional 0.3 available within the drainage basin.

Stream Water Quality. Groundwater seepage into Waiahole Stream accounts for about a 50 percent increase in flow from the 250-foot elevation to the stream mouth. Thus any wastewater, fertilizer, or pesticide leachates that reach the groundwater has a chance of being transported to the stream. In the previous discussion on groundwater quality, it was noted that nitrate from wastewater and fertilizer was the only constituent that leached readily, but nitrate concentrations in the groundwater would be minimal.

To determine the present impact on stream water quality, samples were taken along Waianu and Waiahole streams from stations located above any agricultural fields or residences to the stream mouth (refer to Figure III-12). The concentrations of total phosphorus and nitrate were relatively constant throughout the length of the stream and were well within the water quality standards (refer to Table III-3). These standards were established to protect public health and the integrity of stream ecosystems (DOH, 1977).

Mitigation measures to reduce risks have been previously discussed under the groundwater section.

Agricultural Lands

The state owns about 320 acres of agricultural lands in Waiahole Valley. About 53 percent is presently under cultivation.

TABLE IV-1

STREAMFLOW CRITERIA TO MAINTAIN INSTREAM VALUES¹

Percentage of Average Flow		Habitat Condition	Effect
Wet Weather Season	Dry Weather Season		
<10%	<10%	Severe Degradation	---
10%	10%	Poor - Not Acceptable	Fish habitat - Wetted areas for fish survival limited to pools, resulting in overcrowding and interrupted migration.
10%	30%	Fair	Recreation and aesthetics - Severely diminished.
20%	40%	Good	Fish habitat - Satisfactory flow for migration.
30%	50%	Excellent	Recreation and aesthetics - Satisfactory for shallow water recreation, such as wading. Stream aesthetics will be satisfactory.
40%	60%	Outstanding	Fish habitat - Most of the channel substrate will be covered with water, thereby providing ideal conditions for most aquatic life forms during their primary periods of growth. Recreation and aesthetics - Recreation and aesthetics are not significantly different from unaltered flow.
Waiahole Streamflow 60% to 100% of the average flow		Optimum	No significant effect.

¹ Source: Tennant, 1976.

The proposed action will have beneficial impacts on the agricultural lands:

1. The subdivision plan will result in beneficial impacts through more efficient and complete utilization of suitable agricultural lands. New agricultural lots will open up areas that are not presently cultivated. The proposed irrigation system will bring water to the existing and additionally available lots.
2. Long-term leases will enable farmers to develop long-term cropping plans and seek the necessary loans and equipment. The lease agreements will also ensure that the land is used for agriculture by mandating continuous cultivation of all arable lands, except for normal fallow periods, and will require a certain percentage of the tenant's time and income to be derived from farming the leased property.
3. Technical assistance for the control of soil erosion is available to farmers through the Windward Oahu Soil and Water Conservation District and the USDA Soil Conservation Service.

Some of the new residential lots will be situated on prime agricultural land. This is a necessary trade off to open up areas that are presently cultivated while maintaining the contiguity of the residential lots.

Conservation Land

Construction of the waterlines will not disturb any endangered species habitat nor will it affect any water resources. Erosion control measures should be effected during construction since the area receives frequent rainfall. Restoration measures should also be undertaken after construction to prevent erosion and aesthetic degradation. These mitigation measures are normally enforced through permit conditions and are also included in contract specifications.

Endangered Species

The habitat for the Hai'wale plant (Cyrtandra), the known endangered species, is located in the head of the valley where no action will occur; consequently, there will be no impact.

Archaeological/Historical Resources

Based on reconnaissance surveys within the project area (Barrera, 1982; Tomonari-Tuggle, 1983), eight sites with potential significance were identified. Two of these eight potentially significant sites (3512, 3526) are among six sites which have been salvaged prior to road and flood control improvements. An archaeological salvage program (see Appendix B) has been enacted under the auspices of the HHA in consultation with the Historic Sites Office prior to and during construction. The State Historic Preservation Officer has concurred that the salvage excavation investigations were adequate for mitigation purposes. Through this program, information relating to pertinent research questions have been recovered through systematic surveys and salvaging. To ensure implementation and coordination with construction activities, necessary requirements will be included in the construction specifications.

DIRECT IMPACTS ON PUBLIC HEALTH AND SAFETY

Flood Hazards

No new residential lots will be located within the 100-year flood hazard zone. Therefore, there is no additional threat to life or residential property due to storm flooding or tsunamis. Some agricultural land, however, is situated within the flood zone, most of which are low-lying lands suitable for taro. Minimization of crop damage will occur if farmers select crops, such as taro, for those areas susceptible to flooding.

Unstable Slopes and Soils

The Pearl Harbor and Honolulu soil series possess high shrink-swell characteristics that could cause structural damage to walls and foundations. Fortunately, these soils are located near the stream within the flood zone and are not found in those areas planned for residential development.

Drinking Water Quality

The proposed domestic water system will significantly improve drinking water quality for those residents who are presently not connected to the BWS system.

During storms, the tap water of those residents connected to the McCandless system has been known to become turbid. This turbidity occurs because the dike water conveyed from the Waiahole Ditch-tunnel system is discharged into a stretch of Waianu Stream before it enters the distribution system. When turbidity is high, there is a high probability that bacteriological levels are also high (EPA, 1976). Although there have not been any reported illnesses, the drinking water quality is below acceptable standards. The standard for turbidity is 1 NTU; the standard for bacteria concentrations are based on statistical distributions (Chapter 20 of Title 11, Administrative Rules of DOH).

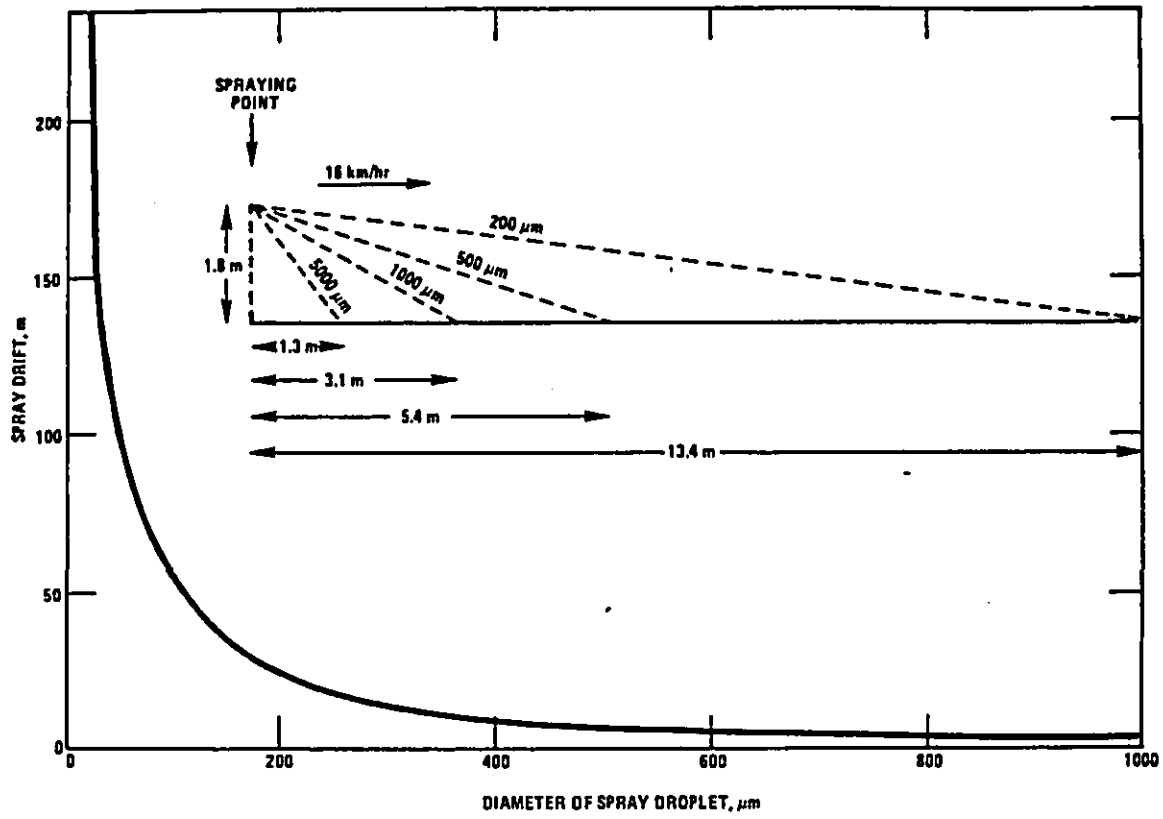
The proposed system would eliminate any intake of stream flow by the completion of the project. The community would be served by two groundwater wells near the 500-foot elevation level. Chlorination facilities will be provided should they ever be necessary.

Air Quality

Residential areas need to be carefully situated relative to agricultural areas in order to mitigate health hazards from pesticide aerosols and nuisance from odors.

Pesticide Aerosols. With the exception of granular pesticides applied to the soil, most pesticides are applied as sprays. Assuming that pesticides are used in accordance with the manufacturer's recommended rates and methods, farm workers can safely apply pesticides in the field when using protective clothing and respiratory equipment. Drift of aerosols to residential areas is affected by the spray equipment, wind direction and velocity, and the height above ground at which the pesticide is applied. In Waiahole Valley, pesticides are usually applied by manual or power-operated sprayers at heights less than 6.5 feet (2 m) above ground. Figure IV-3 indicates the influence of droplet size on the drift distance traveled by the droplet. In general, droplet sizes are categorized as follows:

Aerosols	50 um
Mists	50 to 100 um
Fine sprays	100 to 400 um
Coarse sprays	400 um



Source: Lewis and Lee, 1976

FIGURE IV-3
INFLUENCE OF SPRAY DROPLET SIZE ON DRIFT

Normal spray equipment delivers droplets with an average size in the fine spray range. Some mists, aerosols, and coarse sprays are also generated in normal spraying operations; however, these droplets generally contribute collectively less than 10 percent of the total spray. Based on these factors, most pesticides will remain in the field where they are applied, with only a very small fraction of aerosols traveling over 100 meters from the point of application under normal tradewind conditions (10 to 15 mph).

Odors. Odor complaints have been made by existing residents in the past. The primary source of obnoxious odor is animal manure that is spread on the fields as a fertilizer or soil amendment. Determination of the degree of odor nuisance is highly subjective, since the olfactory senses of a person continuously exposed to an odor becomes insensitive to that odor in time. An odor problem may therefore not exist to a farmer, but a resident may be highly sensitive to a problem. Because Waiahole Valley is planned as a rural and not a suburban community, the acceptable levels should not be as strict as an urban or suburban setting. Prospective residential tenants should be made aware of these conditions by HHA before signing leases.

In manure, the malodorous substance is primarily ammonia (NH_3), with traces of aromatic compounds (e.g., indole, skatole) (Miner and Smith, 1975). Ammonia has one of the highest threshold levels among odorous vapors. It takes a concentration of 37 ug/l for ammonia to be detected by a median number of observers. In contrast, hydrogen sulfide needs to be present in only 1.1 ug/l to be detectable (Leffel, 1976).

Atmospheric dispersion equations were used to determine the downwind distance where the threshold odor of 3/ ug/l could still be detected. Assuming an average tradewind speed of 10 to 15 mph, the downwind distance of odor threshold detection is about 300 feet. Besides the intensity of the odor, the frequency of occurrence should be considered in determining the significance of the problem. Farmers apply manure to their fields after harvesting, which amounts to two to three times per year. The infrequency lessens the significance of this problem.

Whenever piles of manure are stored in the field, they should be covered and kept dry to prevent anaerobic processes from starting and

aggravating odor problems. It may be appropriate for the community association to mediate and administer preventive measures. Otherwise, complaints can be directed to the Department of Health.

Noise

Short-term noise inconveniences will result from construction activity. Long-term noise inconveniences may result from agricultural equipment and domestic animals. Noise effects include hearing loss, interference with speech communication, sleep loss, annoyance, and anxiety.

Construction Noise. Because construction will occur in proximity to existing residential areas, high noise levels will be experienced by these residents during the construction period. Construction equipment noise ranges are given on Figure IV-4. Tractors and jack hammers have the highest noise levels, in the range of 78 to 98 dBA. Although noise levels above 70 dBA could impair hearing over a 40-year exposure period, acceptable levels over a short-term period have not been determined (Leffel, 1976). Nevertheless, to minimize annoyance, construction noise can be controlled through maintenance of noise control devices (exhaust mufflers, intake silencers, and engine enclosures) and scheduling equipment operation to coincide with the times of highest ambient levels; i.e., daytime. The necessary permits (Chapter 43 of Title 11, Administrative Rules) will be secured prior to construction.

Agricultural Noise. Noise from agricultural equipment would be mitigated by the distance separating the cultivated fields from the residences. Most of the fields are at least a half mile from the nearest residences. A simple first approximation of the reduced sound level with distance is determined by the following equation:

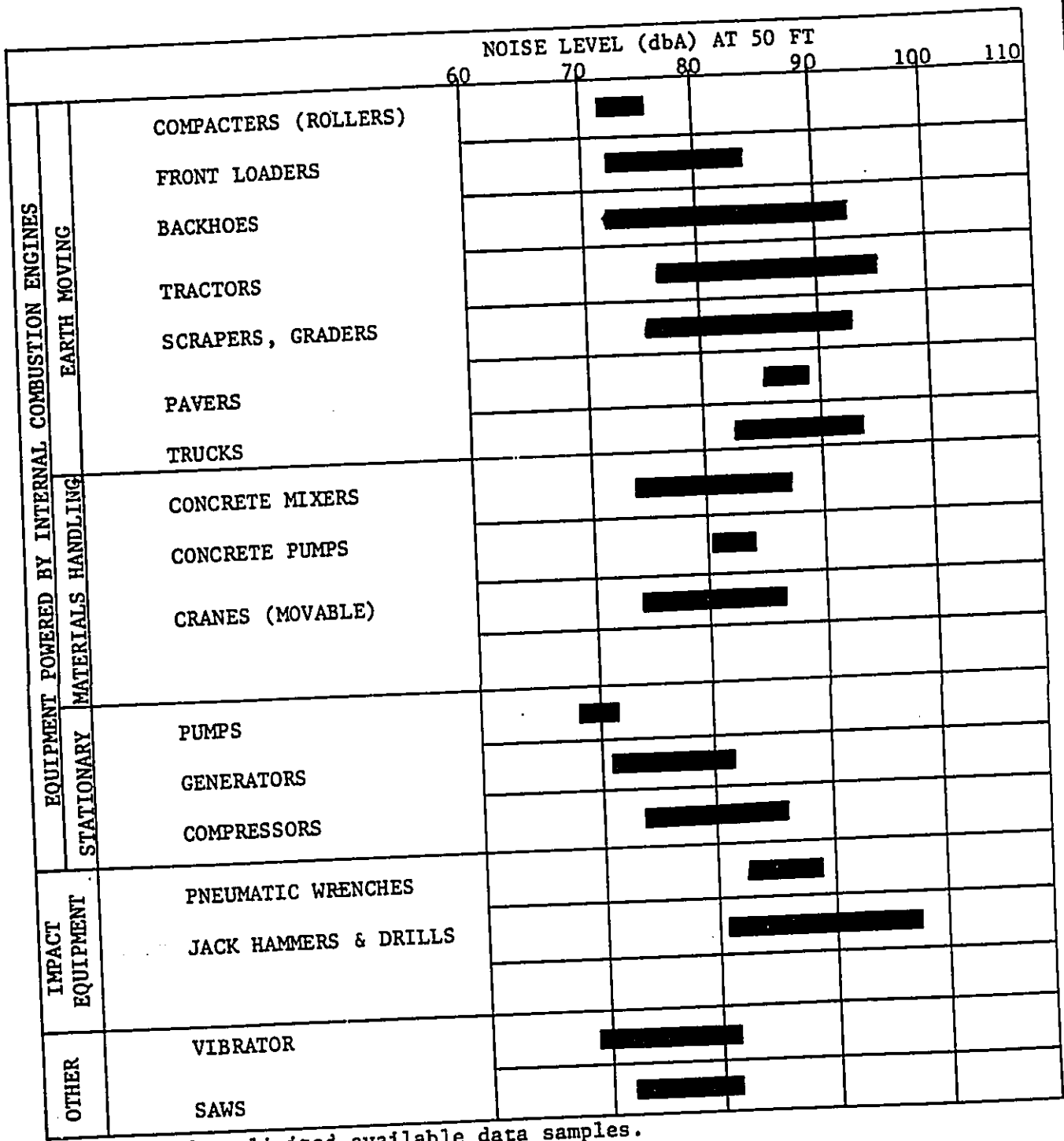
$$L_p = L_{d_2} - [20 \log(d_1/d_2)]$$

where L_p = reduced sound level, dBA

L_{d_2} = sound level at a known distance from the source, dBA

d_1 = specified distance from source, ft

d_2 = known distance from source, ft



NOTE: Based on limited available data samples.

Source: Leffel 1976

FIGURE IV-4
CONSTRUCTION EQUIPMENT NOISE RANGES

Based on the above equation, a tractor with a noise level of 90 dBA at 50 feet (see Figure IV-4) will have a reduced level of 55 dBA a half mile away. A noise level of 55 dBA is below the range of quiet talking (see Table IV-2) and is the permissible noise level within residential districts (Chapter 43 of Title 11, Administrative Rules). The low mechanization requirements of crops such as bananas and papayas would lessen the possibility of exceeding these noise levels. Furthermore, noises will be mitigated by the natural buffers provided by the rolling terrain and mature trees.

Noise from roosters may be considered a nuisance because it occurs early in the morning. This type of noise, however, should be expected by residents who have chosen to live in a rural setting. The bulk of the additional lots will be made available to existing Waiahole and Waikane residents, who should already be aware of the noise levels associated with agricultural areas, if not already accustomed to them. As a precautionary measure, the HHA will make prospective tenants aware of these conditions prior to signing leases. Those wishing to take additional sound attenuative measures may do so at their own option.

DIRECT IMPACTS ON PUBLIC WELFARE

Impacts on public welfare are usually quite subjective because quantifiable standards are not available. Nevertheless, these types of impacts are important to assess because they relate to the quality of life. The factors that will be assessed in this section include rural lifestyle, sense of community, affordable housing, recreation, and crime.

Rural Lifestyle

The factors that distinguish Waiahole Valley as a rural community include a low population density (gross density of less than 0.5 persons per acre), small population (less than 2,500), high open space ratio (greater than 90 percent), predominant agricultural activity, and relatively low median family income that is supplemented by subsistence farming. These rural indices were developed in the Windward Oahu Regional Action Program (DPED, 1978) and reiterated in a study on agricultural land preservation in Windward Oahu (Kenney, 1980).

TABLE IV-2

AVERAGE SOUND LEVELS OF FAMILIAR NOISES

(dBA)

Interior noises

Bedroom at night	30-40
Quiet residence	39-40
Residence with radio	47-59
Small office or store	47-59
Large store	51-63
Large office	57-68
Electric typewriter at 10 ft	62-67
Factory office	60-73
Automobile	64-78
Factory	65-93
School cafeteria	76-85
Railroad car	77-88
Garbage disposal	78-83
Airplane cabin	88-98

Noises 3 ft from source

Whispering	30-35
Quiet ventilating outlet	41-47
Quiet talking	59-66
Noisy ventilating outlet	60-75
Business machine	71-86
Lathe	73-83
Shouting	74-80
Power saw	93-101
Power mower	94-102
Farm tractor	94-103
Power wood planer	97-108
Pneumatic riveter	110-120

Outside noises

Leaves rustling	10-15
Bird call	40-45
Quiet residential street	40-52
150 to 200 ft from dense traffic	55-70
Edge of highway with dense traffic	70-85
Car at 65 mph at 25 ft	75-80
Propeller plane at 1,000 ft	75-84
Pneumatic drill at 50 ft	80-85
Noisy street	84-94
Under elevated train	88-97
Jet plane at 1,000 ft	100-105
Jet takeoff at 200 ft	120-125
50-hp siren at 100 ft	130-135

Based on these indices, the proposed project may cause the following changes to Waiahole Valley community's rural character:

1. Gross population density will increase from the present 0.5 persons per acre to 0.7 persons per acre. This assumes a household size of 3.9 persons (which is the average household size of the existing population), resulting in a 45 percent increase from the present population size.
2. Because most of the additional 33 residential lots have been created between and adjacent to existing homesites, the consumption of open space has been minimal--only 96 percent of the region will remain open space instead of the present 98 percent. The maintenance of the high open space ratio along with the preservation of agricultural activities will mitigate an increased population density, thus help maintain the rural character.
3. The creation of parcels for agriculture and the long-term leases serve to preserve the agricultural lifestyle that exists today. Access to mauka areas that some of the residents use for hunting, hiking, and other recreation and income-supplementing activities will be maintained.
4. All proposed development is aimed toward farmers and residential lots for the low to moderate income households; therefore, the standard of living among the new residents is not expected to be substantially different from the existing residents.

In short, the rural character may be slightly degraded by the increased population density. Mitigation, however, has been provided by the maintenance of a high open space ratio and enhancement of the role of agriculture in the valley. Furthermore, road and utility improvements will be designed according to agricultural subdivision needs rather than residential subdivision standards; road widening in particular will be minimized. Street lighting along the heaviest traveled section of Waiahole Valley Road adjoining the residential district should be provided for safety. Although the light intensity will be the allowable minimum,

some of the ruralness of dark streets will be lost. This is a necessary tradeoff to ensure driver and pedestrian safety.

Sense of Community

The overriding design factor in the formulation of the development plan has been to minimize disruption of existing residents. All residents who were tenants under Mrs. Marks as of March 1977 were entitled to keep their tenancy under HHA. Spot zoning and exemptions will have to be granted from the Land Use Commission (LUC) and the City and County of Honolulu, respectively, to enable pockets of existing residents to remain on lots of one acre (see Chapter II). In addition, the long-term leases have instilled a sense of stability to the community.

Only two leases were eliminated because one family voluntarily decided to move to another parcel within Waiahole Valley and the other lessee was previously evicted for prior lease violations. No forced dislocations or relocations were mandated otherwise.

Forty-two new households will reside in Waiahole Valley as a result of the nine additional agricultural lots and thirty three residential lots. Because the leasing priorities will be given to Waiahole-Waikane households, farmers, and low to moderate income households, the demographic characteristics of Waiahole Valley will not be significantly changed.

A particular concern was the fate of the elderly farmers who desired to keep farming but could not meet the farming requirements stipulated in the long-term agricultural lease. Several families were in this situation. Their fixed incomes and unwillingness to assume financial responsibilities in this late stage of their lives added to the difficulties in taking an agricultural lease. Also, they wanted to continue to reside at their existing dwelling since they were unable to afford moving or building a new home. HHA has handled this predicament by presenting the option of obtaining a residential lease centered at their existing location that is reduced substantially in acreage from an agricultural lease. The residential lease relieves the tenant of the agricultural requirements, such as having to derive a minimum percentage of income from farming the leased property, yet allows sufficient area for backyard gardening.

The only negative impact on the community would be some loss of privacy. The improved access and the publicity of Waiahole Valley may attract visitors.

Affordable Housing

About 84,000 families statewide are eligible for programs requiring construction or delivery of affordable homes. Since present federal, state, and county housing programs reach less than 40,000 families in Hawaii annually, more than half of the maximum demand remains unsatisfied (HHA, 1981). The proposed action will only assist 33 additional households by providing a low-rent, long-term residential lot. HHA will also assist the household in seeking financial assistance for home construction.

Crime

There is a higher probability for increased vandalism of crops as a result of the improved access and street lighting. Community vigilance, fences, and dogs are the best deterrents to this potential problem.

DIRECT FISCAL IMPACTS

Public Perspective

The purpose of analyzing the economic impacts to the public sector is to determine whether the benefits from the proposed development will outweigh the cost of improvements and the cost of providing additional public services.

An exemption has been sought from the City and County's Parks Dedication Ordinance and exemptions will be sought for new residential lots under Sections 359G-4 and 359G-4.1. These exemptions will help minimize infrastructure improvement costs.

The Board of Water Supply's (BWS) pro rata share charges are not applicable since the state will develop and maintain the domestic/irrigation system for new services. Since onsite disposal systems will continue to be used, no sewer charges will be mandatorily incurred. Tenants with closed vault systems may contract private pumping services on a temporal or per call basis. Cesspool owners have the option of contracting a private company or the City and County of Honolulu.

The addition of 33 new single-family residential lots and 9 agricultural lots will have a relatively minimal impact on existing services and utilities.

Schools. The projected enrollment in public schools due to the proposed development can be accommodated with the existing and planned school facilities. According to Department of Education estimates, the project will generate an approximate increase of between 16 and 32 students from grades kindergarten to twelve.

Police Protection. The proposed development should have little effect on police operations, and the demand for police service is expected to be minimal. The Honolulu Police Department recommends that security measures be taken to enhance a safe lifestyle. Street lights will enhance safety.

Fire Protection. Waiahole Valley is presently served by Kahaluu Fire Station, with support services available from Kaneohe and Kaaawa fire stations. The current response time is eight minutes, which is inadequate by state standards. Fire protection will continue to be inadequate until beyond the fiscal year of 1986, when the proposed Kualoa Fire Station is completed. The completion or noncompletion of the project, however, will have little impact on existing residents. The improved roadways may have a positive, albeit minor, effect on improved emergency services access.

Bus Service. The bulk of the additional residences will go to Waiahole-Waikane residents. Thus, there will be only a very limited amount of population growth. The impact on bus ridership is expected to be minimal.

Electric Service. According to Hawaiian Electric Company, no impacts on its existing transmission and distribution facilities in the area are foreseen, and there should be no special problems in providing electric service to the area.

Telephone Service. Hawaiian Telephone Company may need to provide additional telephone lines into the valley to service new residential lots.

State Perspective

The total estimated cost to the state for the proposed Waiahole Valley Agricultural Park and Residential Lots Subdivision is \$18.6 million. The cost will be primarily absorbed by the state, with little impact on the City and County of Honolulu.

Benefits will accrue to the state from the following sources:

1. Lease rents. An ultra-conservative approach was adopted for lease rent revenues--no escalation. At the end of each term, the renegotiated lease would charge the same fees. While the dollar amount would remain constant, its real worth would decline because of the projected long-term inflation rate of 5-7/8 percent. If the leases were renegotiated to account for inflation, base rent incomes would be significantly higher. The variable portion of the agricultural lease rent is based on gross revenues, which are projected to increase 12 percent per annum. The discounted present value (1984) of total projected lease rent revenue is \$20,760,683.
2. Incremental excise tax. This tax is derived from a fixed percentage of gross revenue from the sale of agricultural products. Like the variable portion of the agricultural lease rents, crop values were based on an agricultural feasibility study for Waiahole Valley (Scott, 1981). The tax rate is 0.5 percent of the incremental gross revenue (24 percent of gross revenues), or 0.12 percent of gross. A discount rate of 5-1/8 percent was used. Estimated revenues over the 55-year period of the lease are \$2,548,053.
3. Residual value of valley. The estimated value of this agricultural land is based on its discounted and capitalized net cash flow. A discount rate of 5-7/8 percent and a growth factor of 1.12 were utilized. The discounted and capitalized earnings (rent revenues and excise tax) and discounted and capitalized expenses (bond repayments and maintenance reserve) yield a residual value of \$11,116,526. The future value may be much larger if "higher" land use is allowed instead of agriculture.

According to this study, the implementation of the proposed Waiahole Valley Agricultural Park and Residential Lots Subdivision will result in a positive 1.85 to 1 direct cash inflow-outflow ratio. Figure IV-5 summarizes the direct fiscal impacts to the State of Hawaii. The following, if considered, would increase the cash inflow-outflow ratio of the proposed action:

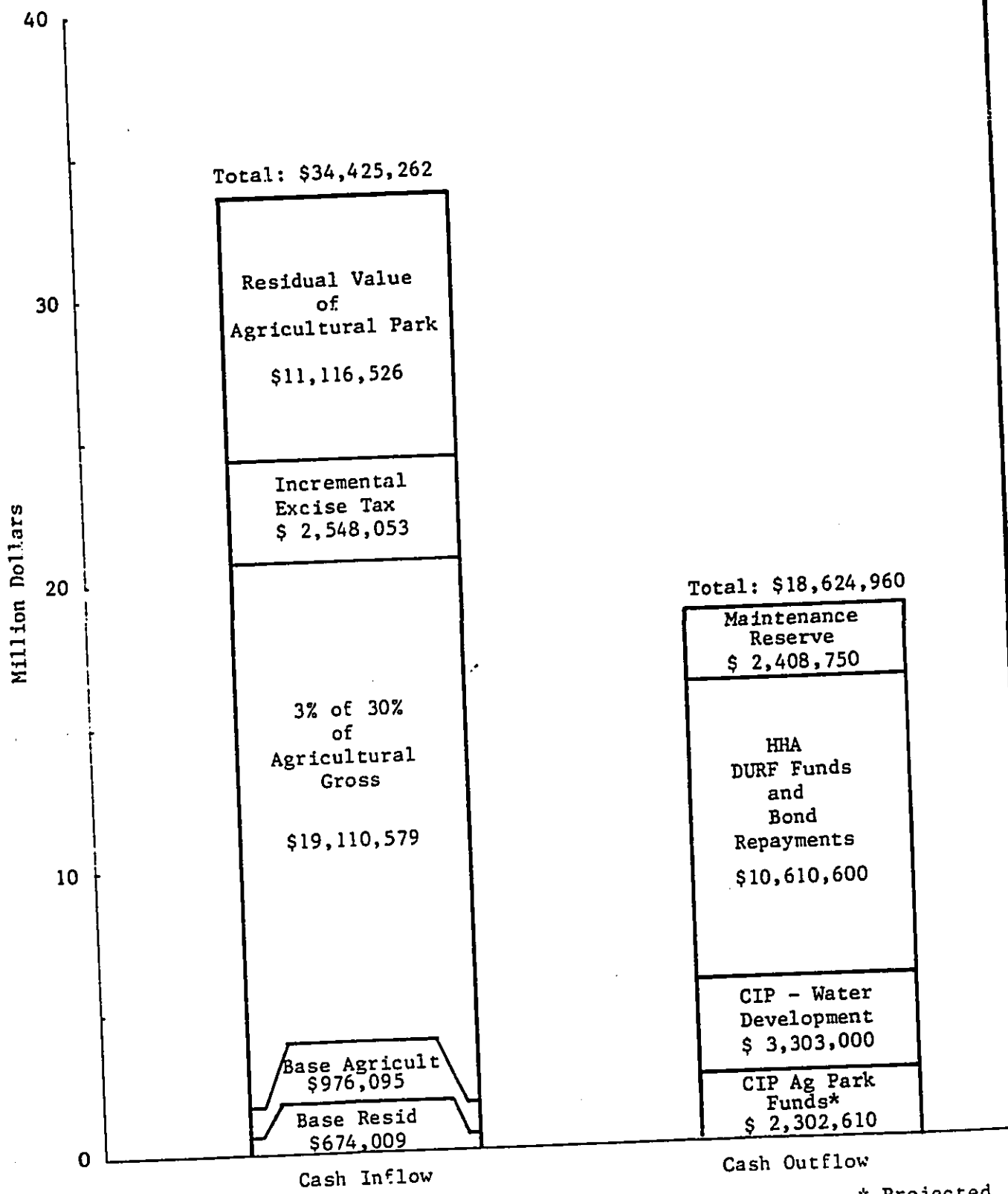
1. Indirect impacts to the state. Indirect benefits (general excise tax collection, individual income tax, state fuel tax collections, etc.) far outweigh indirect costs to the state.
2. Escalated rents. The study used a no-escalation clause to determine the discounted values of residential and agricultural base lease rents. Should an annual increase in base rents be used at the projected inflation rate, the discounted present value would exceed \$5 million.

Private Perspective

The impact to the residential lessees will differ from the agricultural lessees. The financial viability of the farmer is highly dependent on the lease rent formula and the water cost.

Residential Lessee. The residential lessee will incur the following costs:

1. Lease rents. The Hawaii Housing Authority has determined the terms of the residential leases to be as follows:
 - \$500/year first 15 years
 - \$650/year next 10 years
 - Negotiable next 15 year increments
 - Minimum lot size 7,500 sq ft
 - Additional charge of 3.5¢ per sq ft over 7,500 sq ft
2. Housing improvements. New homes may be built on the 33 new residential lots. At 1980 prices, it would cost approximately \$55 per square foot to build a house. To help defray this cost, qualifying valley residents can apply to various government programs administered by the Department of Housing and Urban Development, the City and County Housing and Community Development, or the Hawaii Housing Authority.



Cash Inflow-Outflow Ratio 1.85:1
 Source: Environment Capital Managers, Inc., 1981,
 as amended in 1984 by M&E Pacific, Inc. * Projected

FIGURE IV-5
DIRECT FISCAL IMPACT ANALYSIS - 1984 DOLLARS

Farmers. Farmers must deal with the following operating and fixed costs (Scott, 1980):

1. Operating costs
 - a. Labor
 - b. Water and other miscellaneous
 - c. Gross income tax (0.5 percent)
 - d. Lease rent (\$100 plus 0.9 percent of gross plus house site at \$500/yr.)
2. Fixed costs
 - a. Interest on operating capital
 - b. Depreciation and interest on buildings and equipment

Of these costs, the proposed agricultural park development has control on two of the cost items--the lease rent and the water cost. The lease rent has been agreed upon between HHA and the residents to be \$100 per acre per year plus 0.9 percent of the gross annual farm income; an additional \$500/year per 7,500 sf lot for the first 25 years will be assessed for the housing portion of the lot, if any. The water cost has not yet been determined. The present subsidized cost for water in agricultural parks is about \$0.08/1,000 gallons plus \$2.50 per month service charge. As a conservative assessment, a feasibility study of agricultural development in Waiahole Valley (Scott, 1981) based its analysis on a water rate of \$0.24/1,000 gallons.

In the feasibility study, viable crops were selected for analysis on the basis of (1) adaptability, (2) comparative costs of production in relation to competing areas, and (3) sales potential. Crop selection was also influenced by what crops are being successfully grown today and what crops the residents expressed interest in growing. Costs and returns for bananas, papayas, sweet potatoes, cucumbers, tomatoes, snap beans, taro, prawns, and dendrobiums were analyzed. Sweet corn, melon, chinese peas, and other miscellaneous vegetables could also be feasibly grown in the valley. In the future, citrus, avocado, mango, and other fruit trees may be grown, but probably not on a commercial scale.

A summary of costs and returns for each recommended crop is presented in Table IV-3. Most crops require about 5 acres in order to provide a viable operation for a farm family. With multicropping, 3 acres of land

TABLE IV-3

PROJECTED GROSS AND NET RETURNS PER FARM TO FACTORS OF PRODUCTION FOR SPECIFIED CROPS
WAIHAOLE VALLEY AGRICULTURAL PARK

Crop	Acres Per Farm ^{a/}	Gross Returns	Net Returns to Mgt, Labor & Risk	Net Returns to Management & Risk	Net Returns to Risk
Bananas	5	\$44,000.00	\$30,943.05	\$22,753.05	\$19,673.05
Papayas	5	26,875.00	16,130.10	6,005.10	4,123.85
Tomatoes	5	84,000.00	58,773.00	39,715.50	33,835.50
Snap Beans	5	42,000.00	30,298.20	23,548.20	20,608.20
Cucumbers	5	45,000.00	31,118.30	12,893.30	9,743.30
Sweet Potatoes	5	49,500.00	37,042.15	28,379.65	24,585.35
Misc. Truck Crops	5	45,000.00	35,650.00	25,650.00	22,500.00
Flowers & Foliage	1½	125,000.00	65,260.67	42,010.67	33,260.67
Taro	5	25,000.00	16,121.50	6,652.15	4,812.15
Prawns	5	67,500.00	35,899.35	14,592.35	9,867.35

^{a/} Farm sizes may differ from those in the engineering report for Waihaole Valley Agricultural Park. Size adjustments have been made to better reflect the size of farm required to provide an adequate standard of living for a farm family.

Source: Frank Scott, 1981.

would perhaps be sufficient. A one-acre farm would be considered a part-time enterprise for any crop other than dendrobiums.

Excluding labor and management expenses, the five-acre papaya and taro farms would provide an annual income of slightly in excess of \$16,000. The feasibility analysis for taro was based on the assumption of no water costs since the water would be diverted from the stream. The proposed water system would allow this practice to continue, thus preserving the viability of taro farming.

SECONDARY AND CUMULATIVE IMPACTS

The impacts described in this section affect areas beyond the Waiahole Valley project area boundary.

One of the major secondary impacts of the proposed project is its potential growth-inducing effects. These effects involve land use changes in the surrounding areas and the project's impact on the regional population.

Cumulative impacts are also examined since individual effects may be limited but may synergistically create a significant impact when considered with other developments in the region. Of particular concern in the windward district are the cumulative impacts upon water supply, traffic, and Kaneohe Bay water quality.

Growth

A project can induce changes in the surrounding land uses if services provided by the project have an overcapacity that can accommodate growth in the surrounding areas. A project can alter the property values of surrounding areas because of improvements and other amenities created by the project. A project can also induce land use changes by providing employment opportunities or by generating adverse environmental impacts such as noise, odor, or other "undesirable" characteristics.

The proposed action in Waiahole Valley is not expected to create changes by any means. Services have been designed to accommodate only the needs of the planned development. The roads have been deliberately designed at agricultural standard width in recognition of the basic needs

of a rural community and to discourage high traffic. No sewage treatment plant will be provided; cesspools will be used.

Characteristics of surrounding lands are not expected to change due to the implementation of the project because existing land uses within the project area will not be significantly changed and infrastructure improvements will not accommodate growth in surrounding areas.

Employment opportunities will be generated for farmers in the long-run and for construction workers in the short-run. The temporary employment for construction will not require convenient employment housing. Most of the farm labor will be comprised primarily of Waiahole residents. The number of commuting labor is not expected to be significant.

Dust, noise, and odor are typical agricultural or rural environmental effects that are adverse to suburban development. These effects are confined to the valley and do not intrude upon surrounding areas.

The Koolaupoko region had a 1980 population of 109,373 (DPED, 1981). The addition of about 200 new residents to Waiahole Valley accounts for less than a one percent increase over the existing population. Most of the growth in the region, according to the Development Plan for Koolaupoko, will be concentrated in the existing population centers of Kaneohe and Kailua, with the other areas remaining relatively sparsely settled in a rural setting. The proposed action is consistent with the City and County's development policy since the rural nature of the Waiahole area will be preserved.

The socioeconomic composition of the region will not be affected by the proposed action because most of the new residents will come from the valley itself or the surrounding areas. Even if there are new residents from urban areas, the relatively small proportion of the population increase in Waiahole will not have a significant impact on the socioeconomic composition of the region.

The development trend established by the proposed action in the Koolaupoko region may initiate a regional development slowdown rather than encouraging it further. The agricultural park designation is a long-term commitment of the land to agricultural use and the preservation of its rural character. A regional nondevelopment trend would relieve some of the stress on Kaneohe Bay and its watersheds.

Traffic

No significant adverse traffic impacts will occur with the implementation of the action. Additional vehicular traffic volume generated from the proposed 33 additional residences should be relatively minor. Such an insignificant increase in traffic volume should not or cause any congestion or require any road widening.

Water Supply

The availability of excellent quality for domestic water supplies has not been a problem in the Windward Water District (Makapuu Point to Kahuku). The Waiahole Ditch-tunnel system has been exporting about 26 mgd to Oahu Sugar Company's fields in Leeward Oahu until recent increases in electrical costs have made pumping unfeasible. Since Oahu Sugar Company plans a corresponding reduction in planted acreage, the cessation of pumpage will not have any other impacts on Leeward Oahu water supplies. The proposed action will not affect the BWS's system.

Kaneohe Bay Water Quality

The proposed action will cause some increase in the sediment and nutrient loads transported to Kaneohe Bay via Waiahole Stream. Waiahole Stream is one of nine major streams that contribute sediment and nutrients to Kaneohe Bay. Kaneohe Bay has been classified as AA by the DOH in recognition of its high natural and recreational values (Chapter 54 of Title 11, Administrative Rules, Department of Health). Degradation of the water quality has been of concern primarily because of the rampant urbanization within the drainage basin and discharge of raw sewage. Although the sewage point sources of pollution have been eliminated, nonpoint source pollution via streams still impose a stress on Kaneohe Bay. This section evaluates the contribution of Waiahole Stream as a result of the proposed action relative to the contribution of other streams in the drainage basin.

Sediment. Sedimentation can directly impact corals through smothering and the reduction of light transmittance as a result of increased turbidity or indirectly impact corals through the reduction of exposed hard substrate for young coral planulae (see Figure IV-6). In addition,

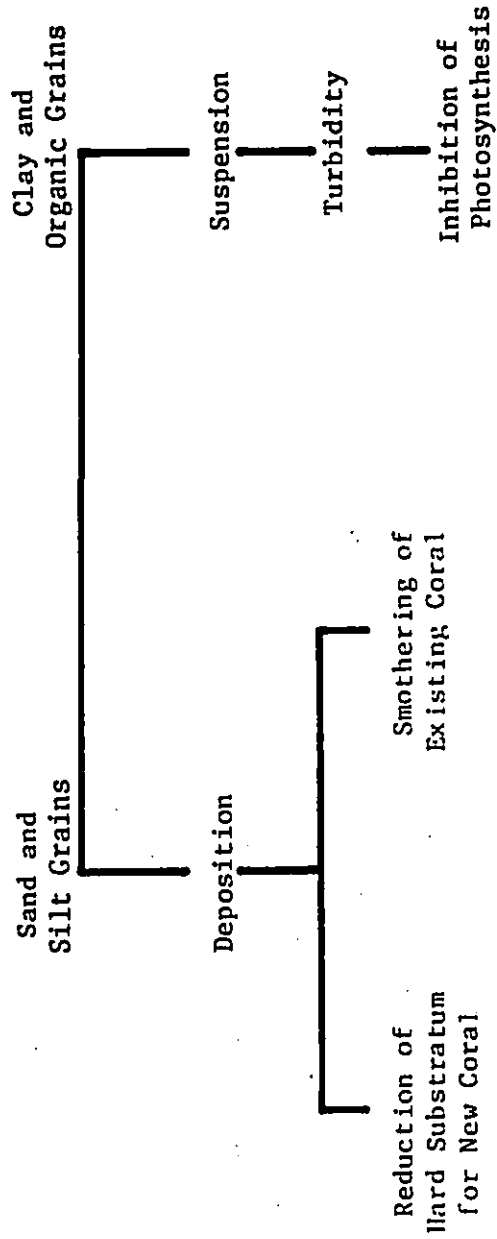


FIGURE IV-6

KANEOHE BAY SEDIMENT PROBLEM

Source: Kaneohe's Sediment Problem - Part II: Nature of Damage and Possibilities for Control, Paul Bartram, 1975.

nutrients, pesticides, and heavy metals attached to sediment particles are transported to the receiving waters via erosion.

Soil erosion is one of three major causes of sedimentation in Kaneohe Bay. The other two sources are dredged spoils and carbonate material from sand transport and reef erosion. The most significant source is carbonate material, which was estimated to comprise 63 percent of the infilling that occurred during a 49-year period, from 1927 to 1976 (Hollet, 1977). Land erosion contributed 27 percent and dredged spoils contributed 11 percent.

The area most affected by nonpoint source runoff has been the southern sector of the bay. Approximately seven times as much sediment has been deposited in the southern sector versus the middle and northern sectors. Nearshore sedimentation, however, has been evident in all sectors. Two previous studies (Hollet, 1977 and Smith and Kam, 1973) have delineated this zone of substantial nearshore nonpoint source sedimentation caused by land erosion (see Figure IV-7). The sedimentation in the vicinity of Waiahole Stream is typical of shoreline areas throughout Kaneohe Bay.

The rate of sedimentation caused by land erosion (expressed in tons per year) has been estimated by three methods:

1. Measurement of sediment accumulation in the receiving water over a known time interval;
2. Measurement of sediment concentrations in streams; and
3. Measurement of the erosion rates within the watershed and application of a "delivery ratio" factor to account for losses and gains in transit.

A variation of the second method adjusted the stream loading to account for the significant contributions from episodic storms. The various methods of estimation are compared in Table IV-4.

The highest sediment yield estimate for the entire Kaneohe Bay drainage basin of 131,000 tons per year (T/yr) was determined through the sediment accumulation method (Roy, 1970). A follow-up study that utilized the same method halved the previous estimate to 69,300 T/yr (Hollet, 1977). The difference could be attributed to the possibility that the

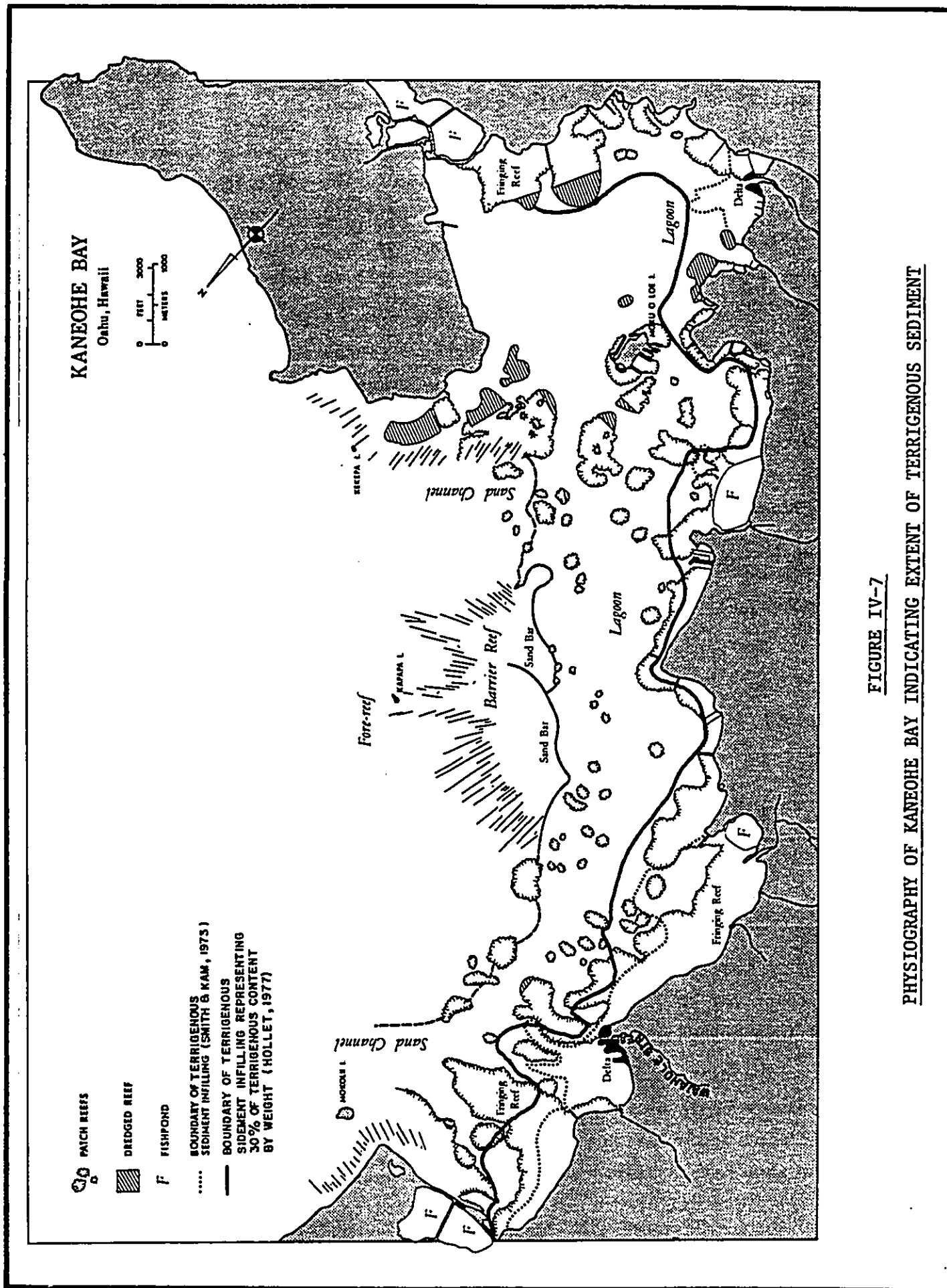


FIGURE IV-7
PHYSIOGRAPHY OF KANEOHE BAY INDICATING EXTENT OF TERRIGENOUS SEDIMENT

TABLE IV-4
PAST ESTIMATES OF ANNUAL LAND-DERIVED SEDIMENT LOADING INTO KANEHOE BAY
AND PERCENT CONTRIBUTION FROM WAIHAOLE STREAM

Method	Investigator	Estimated Sediment Yield (T/yr)		Percent Contribution from Waiahole Stream to Kaneohe Bay
		Kaneohe Bay	Waiahole Stream	
Direct measurement of sediment accumulation	Roy (1970)	131,000	-	-
	Hollet (1977)	69,300	-	-
Stream loading	Jones et al. (1971) Ocean Engineering Consultants (1973) Fan (1973)	37,000	4,800	13%
		37,430	4,930 17	13%
Stream loading from Jones et al. (1971) adjusted for average loads contributed by less frequent floods (Fan, 1973)	Bartram (1975)	92,500	-	-
Erosion rate (Universal Soil Loss Equation adjusted by delivery ratio)	Bartram (1975)	35,000	-	-
	Dolt (1978)	32,880	-	-
	Present study	-	4,900 (existing) 5,375 (future, short-term) 4,914 (future, long term)	15% (of 32,880) 16% (of 32,880) 15% (of 32,880)

previous study did not account for the lower shoaling rate of the northern sector and that representative samples were not taken. The other two methods produced comparable estimates--37,000 T/yr (Jones et al. 1971) and 33,000 to 35,000 T/yr (DOH, 1978; Bartram, 1975). Only one study accounted for the disproportionate contribution from episodic storm events. An estimate of 92,500 T/yr was derived through the integration of comprehensive stream data from Jones et al. (1971). This figure was considered the best estimate of sediment yield (SLTH, 1975) prior to the most recent study by Hollet.

The relative contribution of Waiahole Stream has been estimated through the second and third methods. Stream sediment loads have been measured by Fan (1973), Jones et al. (1971), and Ocean Engineering Consultants, Inc. (1973). The estimates by Jones and Ocean Engineering Consultants, Inc. are comparable--4,800 T/yr and 4,930 T/yr respectively. Fan estimated only the suspended portion; the bedload that contained the silt and sand size particles was not measured. The suspended sediment concentration was measured as 2 ppm, which converts to a sediment yield of 17 T/yr¹. Fan's study, however, also emphasized the variability of sediment concentration. One stream had a range of 2 to 787 ppm, with a normal level of 10 ppm. Fan's estimate should probably be considered as a lower limit.

Using the erosion method, sediment yield from Waiahole Valley was calculated to be 4,900 T/yr. This rate is comparable to the estimate by Jones et al. (1971) and Ocean Engineering Consultants, Inc. (1973). The largest source of sediment in Waiahole Valley is the erosion of the forest and idle farm lands (93 percent). Agricultural lands contribute the balance of the existing sediment yield (see Figure IV-8). The high sediment contribution from the forested areas is consistent with a previous study (Yim and Dugan, 1975) that compared runoff from wet forest areas with agricultural areas. The steep slopes and sparse undergrowth of the wet forest area accounts for the high sediment content of the runoff.

¹ According to Fan, 1973, the conversion is $D = QC \times 1.125 \times 10^{-4}$,
where: D = sediment yield (T/hr)
Q = discharge (cfs)
C = sediment concentration (ppm)

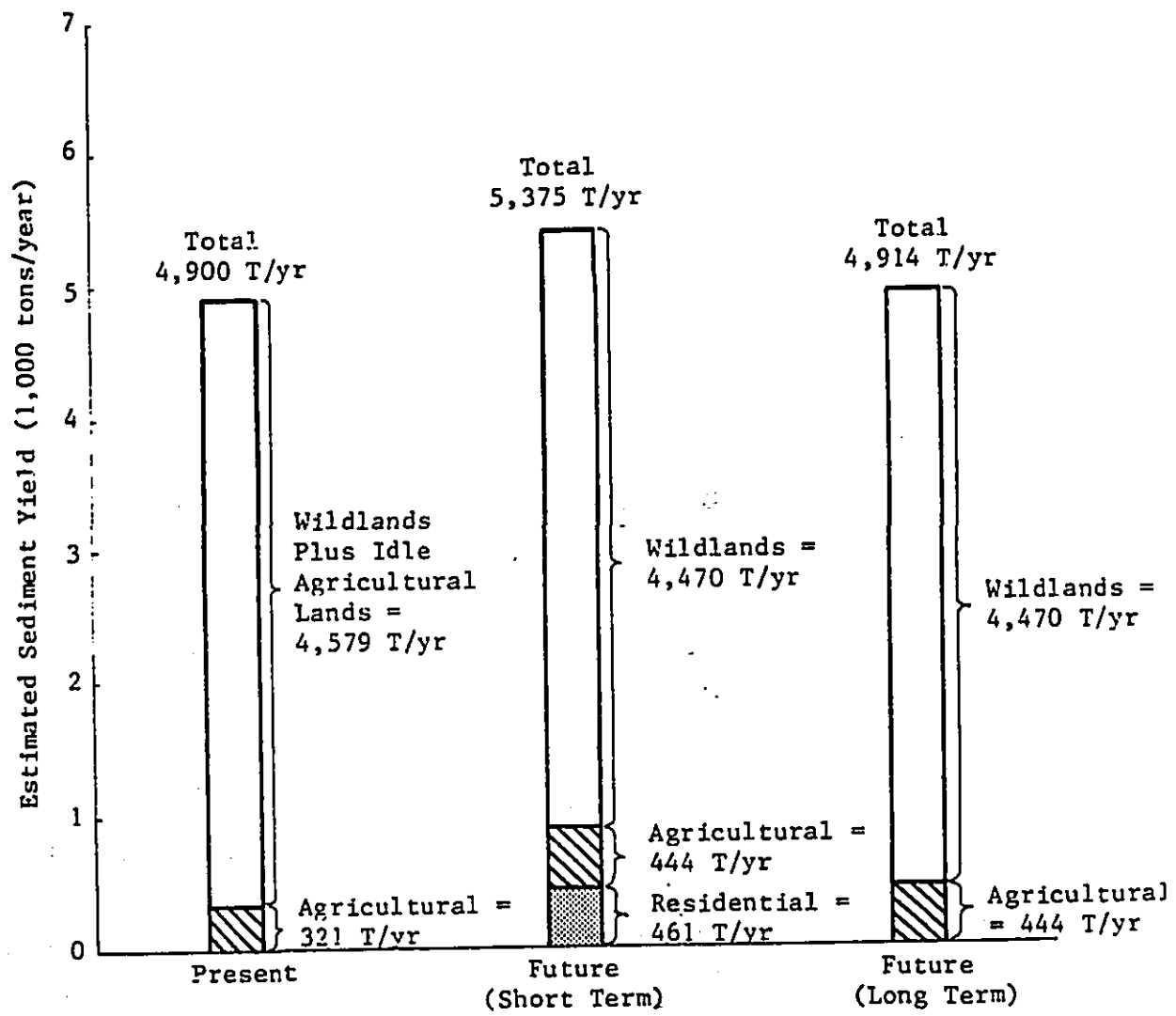


FIGURE IV-8

ESTIMATED SEDIMENT YIELD FROM WAIHAOLE VALLEY

Because the third method considered land use characteristics in estimating sediment yield, it was the only method capable of predicting future sediment yield resulting from the proposed land use changes in the watershed. Using the guidelines developed by the U.S. Soil Conservation Service (1975), future sediment yield with the proposed land use changes in Waiahole Valley has been estimated to be 4,914 T/yr in the long run and 5,375 T/yr during the construction period.

During the construction period, grading operations will generate an additional estimated 461 T/yr of sediment into Kaneohe Bay, or about 9 percent of the total existing sedimentation rate of the Waiahole Valley drainage basin. This rate will be subject to extreme fluctuations and will remain high for only a limited duration. Sediment erosion caused by construction activities will be primarily generated from scarified land and unprotected road cuts. These short-term sediment emissions generated by construction activities are over and above the long-term agricultural and watershed sediment yields.

The long-term 123 T/yr increase of agricultural sediment yield will be offset by a reduction of 109 T/yr due to the conversion of wildlands to agricultural use. The largest source of sediment runoff still remains wildland areas.

The net long-term increase in sediment yield due to the development will be 14 T/yr, a one percent increase over existing conditions. During the construction period, there will be an estimated 475 T/yr more than existing conditions, a temporary 9.6 percent increase.

To assess the relative significance of these increases, the sediment yield from Waiahole Valley should be compared to the sediment yield for the entire Kaneohe Bay drainage basin. The present sediment yield from Waiahole Valley constitutes about 15 percent of the total sediment yield into Kaneohe Bay. A short-term future sediment yield of approximately 5,400 T/yr raises the relative contribution from Waiahole to 16 percent, assuming that the sediment contribution from all other streams draining into Kaneohe Bay will remain constant.

This incremental increase should be compared with the threshold limits of coral tolerance to sedimentation and turbidity. Unfortunately, marine biologists have not been able to quantify definitive limits.

Studies of natural reef systems in Guam have determined that corals can withstand relatively heavy continuous sedimentation (Randall and Birkland, 1978). Corals subject to sedimentation possess mechanisms such as polyp extension and mucous generation to shed sediment (Hubbard and Pocock, 1972).

Most damage to coral reefs in Kaneohe Bay has resulted from episodic storm events (Banner, 1968). Based on data from Kamoalii Stream, Bartram (1975) estimated that about 40 percent of long-term sediment movement occurs during floods that take place once every two years or more. The elevated competence of the storm flow flushes the stream bed of silt and sand size particles.

To mitigate the effects of storm events, erosion control practices specified in the grading permit should be strictly enforced, especially during the rainy winter months. Implementation of these practices should control erosion to an acceptable level during the construction period. Technical assistance to the farmers for erosion control on agricultural lands will be provided by the SCS. Among the practices recommended for erosion control and soil conservation on agricultural lands are the use of crop residues on the soil, minimum tillage on slopes, crop rotation, terracing, strip cropping, contouring, and diversions (Lochs, 1974).

Nutrient Loading. Eutrophication due to excessive nutrients has been a concern, especially in the southern sector of the bay because of its low flushing rate. Former sewage discharges into Kaneohe Bay had been creating an ecological imbalance that favored benthic encrusting algae at the expense of corals. The recovery of the bay since the termination of sewage discharge is presently being monitored.

Agricultural runoff is a continuous source of nutrients. The major constituents of fertilizer are nitrogen, phosphorus, and potassium. Approximate application rates for commonly grown crops in Waiahole Valley are shown in Table IV-5.

The plant uptake of potassium appears nearly equivalent to the amount applied; however, both nitrogen and phosphorus are considerably less efficiently absorbed and a good percentage remains in the soil (Green and Young, 1972). Phosphorus movement is negligible in nearly all

TABLE IV-5

APPROXIMATE MAXIMUM CROP FERTILIZER APPLICATIONS

Crop	Nitrogen Fertilizer (lbs/acre-yr)	Phosphorous Fertilizer (lbs/acre-yr)	Potassium Fertilizer (lbs/acre-yr)	Number of Applications Per year
Banana	800 urea	100 treble super phosphate	900 muriate of potash	6
Papaya	750 urea	750 treble super phosphate	900 muriate of potash	12
Taro ^{a)}	435 urea	900 super phosphate	385 muriate of potash	b)
Truck crops ^{c)}	670 urea	850 treble super phosphate	800 muriate of potash	d)
Estimated Total Application	2655	2600	3185	

Source: Scott, 1981

a) 15 month cycle.

b) One third of the fertilizer is applied before planting when the field is dry. Two to 3 months later, the patch is drained and another one third is broadcast. The last one third is applied 5 to 6 months after planting, using the same method as for the second.

c) General guideline, requirements for specific crops will vary.

d) Fertilizer applied before planting and in mid-growing cycle.

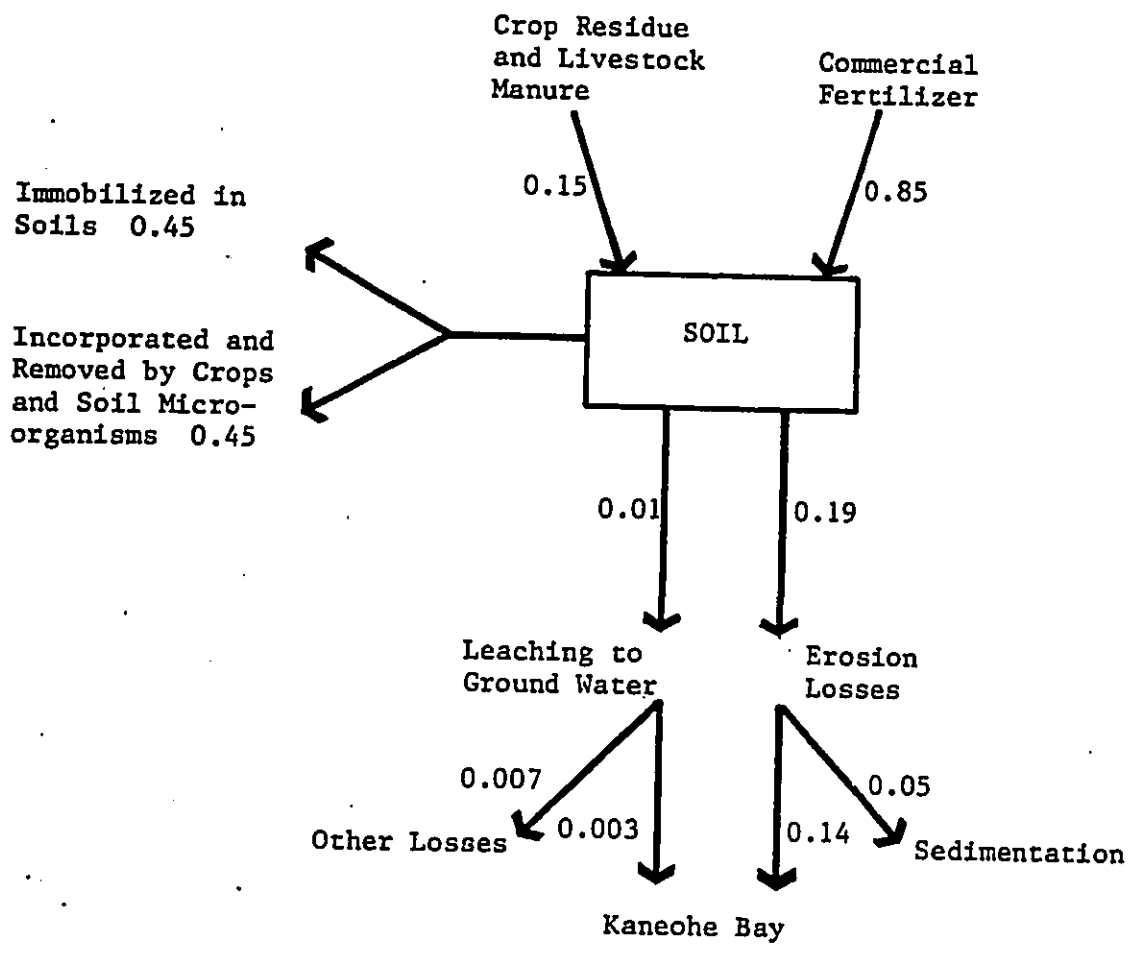
Hawaiian soils, but nitrogen moves relatively rapidly when it is in the nitrate form. Of the three major fertilizer constituents, therefore, nitrogen in the form of nitrate is the primary concern.

The possible pathways for phosphorus movement are diagrammed on Figure IV-9. The proportions are based on the best available knowledge and are not the result of field measurements. Because of the high adsorption of phosphorus, the primary pathway for phosphorus to affect surface water quality is through erosion.

The possible pathways of nitrate include leaching, adsorption, and interaction with "native" nitrogen. The Waikane and Alaeloa soils have relatively low cation exchange capacities; therefore, adsorption is low and nitrate moves almost with the moving water front. Permeability is moderately rapid in these soils, further contributing to nitrate movement. The depth to the water table, however, is greater than five feet, even in the wet weather season, allowing more time for adsorption to occur in the downward movement of the water (see Table IV-6). Wells in irrigated areas with soils similar to Waikane and Alaeloa had nitrate levels below 5 ppm (Tenorio et al. 1969). Although this level is greater than the 1.1 ppm of uncontaminated basal water, it is still considerably below the maximum contaminant level of 10 ppm in the drinking water regulations.

The Hanalei and Pearl Harbor soils have low permeability and high cation exchange capacity. Nitrate movement through these soils is therefore impeded. The shallow water table, however, may enable some nitrate to enter the groundwater.

Interaction with the "native" nitrogen may cause changes in the nitrate level independent of the time the fertilizer is applied. The native nitrogen may be replaced by the fertilizer nitrogen in the dynamic biological transformation of soil organic fractions. Thus, even though the applied fertilizer nitrogen may not be leaching in great amount, native nitrogen instead may be leaching in fairly large amounts after a crop is removed. Mineralization and nitrification may also contribute to nitrate increase in the percolate after crop removal (Green and Young, 1972). Improvements in nitrogen efficiency by applying fertilizer at optimum times and rates will keep the nitrate levels in the groundwater low, thus minimizing nitrate transport to Kaneohe Bay.



- SOURCES: 1) Brady, N.C., THE NATURE AND PROPERTIES OF SOILS, McMillan Pub. Co. N.Y., 1974.
 2) Green, R.E., R.H.F. Young, HERBICIDE AND FERTILIZER MOVEMENT IN HAWAIIAN SOILS. Hawaii Ag., Exp. Station, #1269.

FIGURE IV-9
 SCHEMATIC OF PHOSPHOROUS TRANSPORT PROCESSES IN WAIAHOLE VALLEY*

*Decimal fractions are approximate and vary with season, crop cover and weather conditions.

TABLE IV-6

SOIL CHARACTERISTICS PERTINENT
TO FERTILIZER AND PESTICIDE MOVEMENT

Soil Type	Depth to Water Table	Permeability	Cation Exchange Capacity ¹	K-factor Erodibility ²
Waikane Silty Clay	low - >5'	moderately rapid - 2.0 - 6.3	low	low - .10
Pearl Harbor Clay	high - 1 - 4'	very slow <.06	high	moderately low - .17
Hanalei Silty Clay	high - 0 - 5'	moderate .63 - 2.0	high	moderately low - .17
Alaeloa Silty Clay	low - >5'	moderately rapid - 2.0 - 6.3	low	moderately low - .15

¹ Estimation based on iron oxide, kaolinitic, or montmorillonite.

² Source: C&C Department of Public Works, Soil Erosion Standards and Guidelines, 1975.

Source for all other figures: USDA, Soil Conservation, Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii, 1972.

A summary of the nitrate movement is shown on Figure IV-10 for fertilizer inputs. The proportions indicated are not based on field measurement but are the best estimates based on the literature.

The present nitrogen loading contribution of Waiahole Stream to Kaneohe Bay is approximately 2 percent of the total loading (see Table IV-7). Proposed agricultural expansion in Waiahole Valley will increase the contribution relative to the total nitrogen loading by an additional 1 percent. For phosphorus, the present average load delivered by Waiahole Stream represents about 1 percent of the total load in Kaneohe Bay. Proposed agricultural expansion will increase the relative contribution by less than 1 percent. This incremental difference for nitrogen and phosphorus loading is not significant relative to the entire drainage basin.

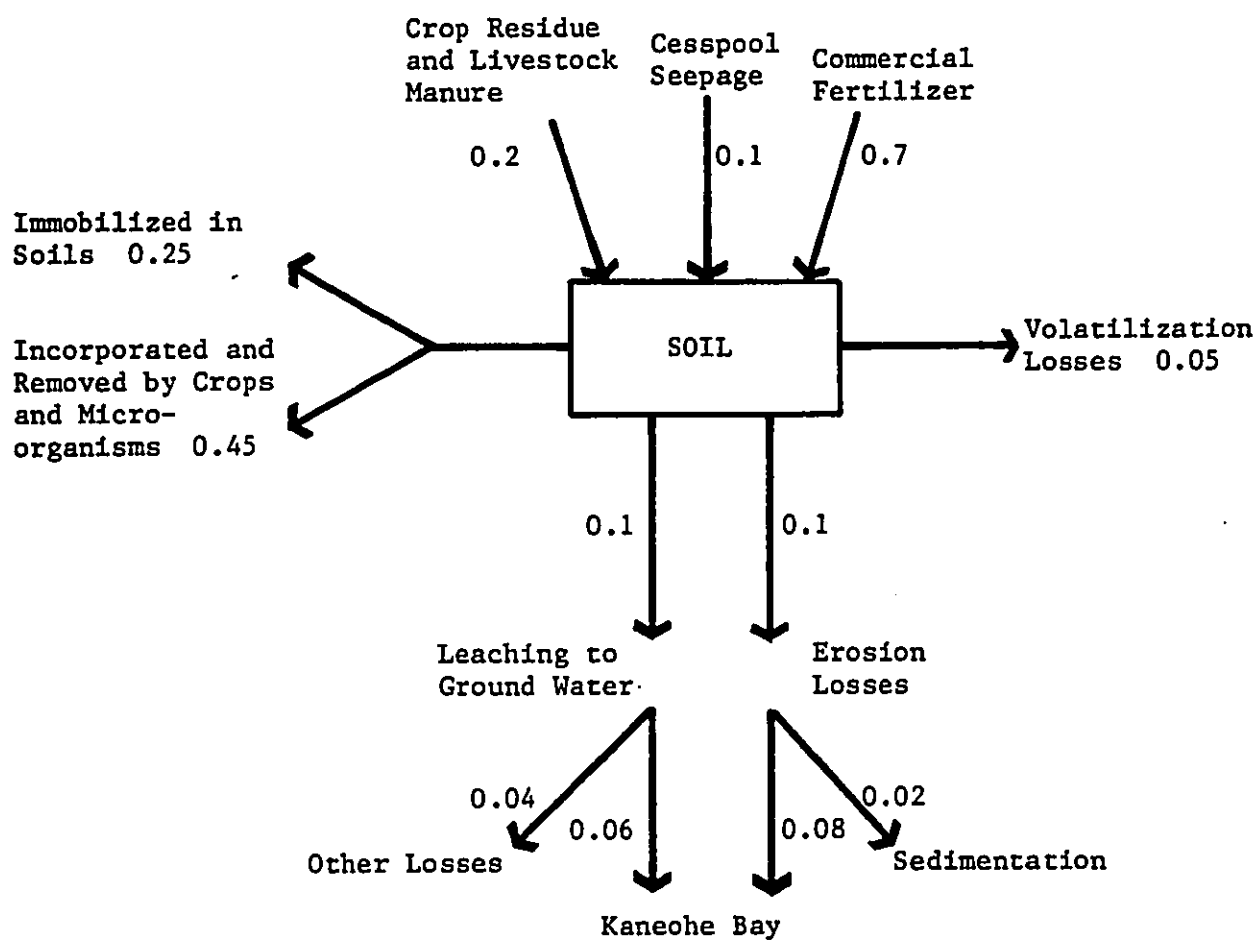
Because potassium, phosphorus, and nitrogen are adsorbed to some extent to soil particles, soil erosion management discussed previously would also mitigate nutrient impacts.

Pesticides. Possible herbicides and insecticides that may be used in Waiahole are listed in Table IV-8. This list is based on the crops recommended by Frank Scott. None of the pesticides are of the highly persistent chlorinated hydrocarbons type. Chlorinated hydrocarbons are used now primarily for urban use in treating ground termites and as a fungicide in the pineapple industry; its use has been virtually eliminated in agriculture through the substitution of less persistent pesticides, such as organophosphate insecticides and carbamate herbicides.

The downward movement of pesticides is affected by the following factors:

1. The solubility of the pesticides in water.
2. The amount of water passing downward through the soil.
3. The adsorptive relationship between the pesticide and the soil. Adsorption appears to be directly related to organic matter content.

Malathion and diazinon are the major insecticides recommended for agricultural crops in Hawaii. Both are organophosphate based; however, diazinon is approximately ten times more persistent in the soil than



- SOURCES: 1) Brady, N.C., THE NATURE AND PROPERTIES OF SOILS, McMillan Pub. Co. N.Y., 1974.
- 2) Green, R.E., R.H.F. Young, HERBICIDE AND FERTILIZER MOVEMENT IN HAWAIIAN SOILS, Hawaii Ag., Exp. Station, # 1269.

FIGURE IV-10
SCHEMATIC OF NITROGEN TRANSPORT PROCESSES IN WAIHOLE VALLEY*

*Decimal fractions are approximate and vary with season, crop cover and weather conditions.

TABLE IV-7

COMPARISON OF TOTAL STREAMS AND WAIAHOLE STREAM LOADINGS
OF NITROGEN AND PHOSPHORUS TO KANEOHE BAY^a

	<u>Total Streams</u>	<u>Waiahole Stream- Present</u>	<u>Waiahole Agricul- tural Park Stream^b</u>
Average Discharge (mgd)	68.9	9	9
Total Nitrogen			
Average Conc. (mg/l)	0.56	0.24	0.30
Mass Emission (lb/day)	319	18	23
Annual Loading (tons)	58.3	3.3	4.2
Total Phosphorous			
Average Conc. (mg/l)	0.12	0.06	0.07
Mass Emission (lb/day)	67.3	4.35	5.52
Annual Loading (tons)	12.3	0.79	1.01

^a Kaneohe Bay Water Resources Data Evaluation, U.S. Army Engineer District, Honolulu, 1976.

^b Estimated from increased Agricultural Land Utilization, i.e.

- i. present agriculture acreage = 251
- ii. proposed agriculture park acreage = 320
- iii. percent agriculture land increase = 27%
- iv. increased nutrient loss with normal farming activity is estimated to equal the increased land usage.

TABLE IV-8
COMMONLY USED PESTICIDES
FOR USE AT WAIHAOLE

Pesticide	Crop							Persistence* In the Soil, Weeks	Toxicity* Acute Oral LD ₅₀ for Rats, mg/kg	Threshold Limit for Toxicity Symptoms in Humans** in Air, mg/m ³
	Banana	Papaya	Tomato	Snap Bean	Cucumber	Sweet Potato	Taro			
<u>Herbicides</u>										
CDEC			X	X	X			3-5	850	N/A
Diuron	X							32	3400	N/A
Paraquat	X	X						1-2	157	0.5
<u>Insecticides</u>										
Diazinon	X							10-12	300-850	N/A
Malathion	X	X	X	X	X	X		1-2	2800	10.0
<u>Fungicide</u>										
Captan								1-2	9000	Not Air-Borne

N/A Not available.

* Data from State of Hawaii Department of Agriculture, 1969.

** Threshold limits from Durham, 1976.

malathion. Diazinon is used to control soil-borne insects and is strongly adsorbed by soil colloids, which prevent leaching to groundwater. Malathion is used to control plant-surface insects. Its high volatility and rapid decomposition by soil microorganisms lead to a short persistency and low probability of environmental pollution.

Diuron is the most persistent of the commonly used farm herbicides. It is part of the phenylurea herbicide group and is characteristically immobile and nonvolatile in the soil. Moist soil conditions and exposure to sunlight tend to speed the decomposition of diuron. Although this herbicide has a persistency of over half a year, its insolubility and immobility in the soil prevent it from being leached with percolating water. Paraquat and CDEC are two other commonly used pesticides for weed control on Hawaiian farms. Both are short-lived because of rapid microbial decomposition and are not prone to rapid leaching.

Fungicides are used as a seed or rootstock pretreatment and field treatment for the control of soil-borne fungi. The principal fungus disease in Waiahole Valley is the Pythium sp. (corm rot), which attacks taro corms and is ubiquitous in the valley soils. Captan (40 WP) has been found to provide effective control of this plant disease. Taro is grown in flooded field conditions with running water. Contamination of stream water by Captan, however, is minimal because it is applied during drained field conditions, has short persistence, and is rapidly fixed on soil aggregates.

In comparison to pesticide loss by leaching from agricultural fields, operator practices such as pesticide formulation, field application, and cleaning of application equipment have been shown to be the major sources of contamination by pesticides (Coutts, 1980). Accidental spills during pesticide formulation and loading of application equipment have resulted in localized groundwater contamination by chlorinated hydrocarbon pesticides on Oahu (Mink, 1981). Exceeding recommended application rates and direct application of pesticides to stream and drainage water also pose possible pollution hazards on the groundwater, Waiahole Stream, and Kaneohe Bay. An operator training and certification program developed by the Department of Agriculture should reduce the occurrence of misuse and

accidents from occurring. When used in the recommended dosages, insignificant impact to the groundwater, stream, or Kaneohe Bay should result from pesticide usage.

DETERMINATION OF SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Tradeoffs are inherent in many of the proposed actions; that is, beneficial impacts may accrue in exchange for adverse impacts. These tradeoffs are apparent in Table IV-9, which summarizes the impacts of the proposed action.

The significance of the adverse impacts depends on the risks being incurred in terms of the following:

1. The risks of irreversibly committing a sensitive resource;
2. The risks of jeopardizing public health or safety;
3. The risks of afflicting the public welfare; and
4. The risks of inducing secondary or cumulative impacts in the surrounding areas of the project.

Mitigation measures reduce the level of risk.

Besides a risk-benefit assessment, another significant tradeoff assessment is cost-benefit. From the public's standpoint, do the benefits of the project outweigh the costs? From the affected individual's standpoint, are the financial impacts fair?

Risk-Benefit Assessment

A summary of the risk-benefit tradeoffs is provided in Table IV-10 and is discussed below.

Irreversible Commitment of Resources. The resources of concern include conservation land archaeological, and possibly stream resources. The probability of adversely affecting these resources is low due to the limited disturbance proposed. Nevertheless, the following mitigation measures will further reduce the risks:

1. Conservation land. Erosion control during construction and restoration upon completion should be conditions of the Conservation District Use Permit. Because the impacts will be

TABLE IV-9

SUMMARY OF IMPACTS OF THE PROPOSED ACTIONS

Impacts	PROPOSED ACTIONS										
	Subdivision	Lease Agreements	Water System	Wastewater System	Road Improvements	Drainage	Electrical/Telephone	Agricultural Activity Fert./Pest.	Irrigation		
Direct Impacts											
Sensitive Resources											
Groundwater Quantity	N	N	+	-	N	0	N	-			0
Stream Quality	N	N	0	+	N	0	N	-			0
Flow	N	N	0	-	0	0	N	-			0
Agricultural Lands	N	N	+	0	0	0	N	-			0
Conservation Lands	+	+	+	0	0	0	N	+			0
Endangered Species	0	N	-	0	0	0	N	0			0
Archaeological	0	N	0	0	0	0	0	0			0
Public Health & Safety	0	N	0	0	-	0	0	0			0
Flood Hazards	0	N	0	0	0	0	N	0			0
Unstable Slopes & Soils	0	N	N	0	0	+	N	N			N
Drinking Water Quality	N	N	+	0	0	0	N	N			N
Sanitation	N	N	N	+	N	0	N	0			N
Air Quality	-	N	N	+	N	0	N	N			N
Noise	0	N	N	0	-	N	N	-			N
Public Welfare											
Rural Lifestyle	+	+	+	+	+	0	0	N			+
Sense of Community	+	+	N	N	N	N	N	N			N
Affordable Housing	+	+	N	N	N	N	N	N			N
Recreation	N	N	N	N	N	N	N	N			N
Crime	N	N	N	N	N	N	N	N			N
Fiscal											
Public Perspective (benefit-cost)	+	+	+	+	+	+	+	+			0
Private Perspective											
Residents	N	+	+	+	N	N	0	N			0
Farmers	N	+	+	+	N	N	0	0			+
Secondary and Cumulative Impacts											
Growth	0	N	0	0	0	0	0	0			0
Water Supply	0	N	+	0	0	0	0	0			N
Transportation	0	N	N	N	N	N	N	N			0
Kaneohe Bay Water Quality	0	N	0	0	0	0	0	0			0

+ Beneficial Impact
 - Adverse Impact
 0 No Impact
 N No Applicable

TABLE IV-10

RISK-BENEFIT TRADEOFFS

Proposed Action	Risks	Benefits
Subdivision	None	<ol style="list-style-type: none"> 1. <u>Resource Commitment.</u> Preservation of agricultural lands 2. <u>Public Welfare.</u> Preservation of rural lifestyle 3. <u>Public Welfare.</u> Minimal disruption to existing community by accommodating existing boundaries 4. <u>Secondary/Cumulative Impact.</u> As an agricultural park, growth will be controlled rather than stimulated; therefore, impacts on regional land use, water, and traffic patterns are minimal
Lease	None	<ol style="list-style-type: none"> 1. <u>Resource Commitment.</u> Long-term commitment to agricultural use of land 2. <u>Public Welfare.</u> Affordable lease terms 3. <u>Public Welfare.</u> Minimal disruption to existing community by giving priority to Waiahole-Waikane residents
Water System	<ol style="list-style-type: none"> 1. <u>Resource Commitment.</u> Low risk of disruption of conservation land due to waterline and reservoir construction in conservation zone; no endangered species affected (see mitigation measures, Table IV-11) 2. <u>Resource Commitment.</u> Very low risk of exceeding minimum streamflow requirements in Waiahole Stream below proposed intake 	<ol style="list-style-type: none"> 1. <u>Public Health.</u> Safe drinking water will be provided 2. <u>Public Welfare.</u> Sufficient water will be provided to support the projected domestic and irrigation needs 3. <u>Public Welfare.</u> Streamflow sources for taro farmers will be enhanced 4. <u>Secondary Impacts.</u> Existing regional water supply system (BWS and Waiahole Water Co.) will not be affected

Table IV-10, Cont.

Proposed Action	Risks	Benefits
Wastewater	<ol style="list-style-type: none"> 1. <u>Public Health</u>. Low risk of contaminating shallow groundwater; not a drinking water source 2. <u>Public Health</u>. Low risk of contaminating stream; will conform to DOH standards 	<ol style="list-style-type: none"> 1. <u>Public Health</u>. Cost-effective waste disposal that will alleviate defective cesspool problems
Roads	<ol style="list-style-type: none"> 1. <u>Resource Commitment</u>. Low risk of destroying subsurface archaeological site; reconnaissance surveys were undertaken to assess probability of significant sites being present 2. <u>Public Welfare</u>. Short-term inconveniences to residents during construction (see mitigation measures, Table IV-11) 	<ol style="list-style-type: none"> 1. <u>Public Welfare</u>. Roadways improved and realigned while maintaining rural conditions
Drainage	None	<ol style="list-style-type: none"> 1. <u>Public Safety</u>. Cost-effective method to minimize flooding of roads and properties
Utilities	None	<ol style="list-style-type: none"> 1. <u>Public Safety</u>. Improved service, including street lights
Recreation	<ol style="list-style-type: none"> 1. <u>Public Welfare</u>. Some loss of privacy 	<ol style="list-style-type: none"> 1. <u>Public Welfare</u>. Inland recreation area of regional value provided
Agricultural Activity	<ol style="list-style-type: none"> 1. <u>Resource Commitment/Public Health</u>. Low risk to groundwater, stream, and Kaneohe Bay water quality from fertilizer, pesticide, and sediment 2. <u>Public Health</u>. Risk to residents upwind and near agricultural activity from pesticide drift (see mitigation measures, Table IV-11) 	<ol style="list-style-type: none"> 1. <u>Resource Commitment</u>. Preservation of agricultural lands and open space 2. <u>Public Welfare</u>. Preservation of rural lifestyle

confined to construction activities, these conditions can also be incorporated into the contract specifications.

2. **Archaeological resources.** An archaeological salvage plan for potentially impacted sites has been implemented prior to construction (Appendix B). Additionally, archaeological concerns during trenching for the water lines will be addressed in the construction documents.
3. **Stream.** Tenants utilizing stream withdrawal for irrigation needs will need to comply with all regulatory requirements. Under Chapter 176D, HRS, the DLNR is responsible for the establishment of minimum streamflow standards for Windward Oahu streams, as defined in Chapter 167 of Title 13, DLNR Administrative Rules. No stream alteration permit will be issued by the DLNR unless minimum streamflow standards are adhered to.

The long-term productivity of agricultural lands and groundwater sources is preserved.

Public Health and Safety. Risks to public health are primarily due to the use of pesticides. Risks can be reduced by working with farmers in seeking improved practices for pest and soil erosion control.

Public Welfare. Risks of disrupting the community have been mitigated through close communication with the residents. The subdivision plan and lease agreement reflect this "give and take" between the community and the state.

Secondary and Cumulative Impacts. Land use, population, and lifestyle will not change significantly from present conditions. No risks are involved with cumulative or secondary impacts due to the low density proposal.

Risk-Benefit. The risks to resources, public health/safety, and public welfare from direct, secondary, or cumulative impacts of the proposed project are very low. On the other hand, benefits to the residents and the public are substantial.

Cost-Benefit

The cost-benefit analysis discussed earlier in this chapter indicated a positive return to the public. The lease agreements are very affordable to the residents and farmers who will be affected.

Unavoidable Adverse Impacts

Most of the adverse impacts are mitigable to acceptable levels. Those adverse impacts that are unavoidable are either negligible or are deliberate policy tradeoffs. Mitigation measures and unavoidable impacts are summarized in Table IV-11.

TABLE IV-11

SUMMARY OF MITIGATION MEASURES-UNAVOIDABLE ADVERSE IMPACTS

ADVERSE IMPACTS	MITIGATION MEASURE	UNAVOIDABLE	IMPLEMENTATION
Limited Number of Affordable Housing	Applicants will be subject to DLNR regulatory control	X	(Policy tradeoff)
Potential Streamflow Reduction-Impact on stream fauna	Restoration of disturbed-land areas; best management practice for erosion control		Specify as a permit condition in minimum streamflow permit (DLNR).
Waterline Construction in Conservation District			Specify as permit condition in Conservation District Use Permit (DLNR). Specify in construction contract (HMA).
Degradation of Stream, Ground-water & Kaneohe Bay Water Quality			Implementation of the following mandated through lease agreements:
1. Wastewater leachate	Select less mobile fertilizers; minimize application during rainy periods	X	(Negligible)
2. Fertilizers	Application by certified operators and according to label instructions		Technical assistance (UH Cooperative Extension Service).
3. Pesticides			Promote operator certification program (State Dept. of Agriculture, USDA Soil Conservation Service).
4. Drainage discharge		X	(Negligible)
5. Agricultural erosion	Information provided to farmers on best management practices		Technical assistance (USDA Soil Conservation Service).
Road Construction			
1. Loss of agricultural land from realignment	Noise - compliance with noise regulations Dust - sprinkling as required Traffic - barriers, guards, detours, and other safeguards	X	(Negligible)
2. Temporary inconvenience			Specify in construction contracts (HMA).
3. Potential archaeological resources	Qualified archaeologist hired to conduct pre-construction exploratory surveys and monitor construction		Excavation of impacted sites prior to construction and specify in construction contracts (HMA).
Street Lights - Rural Character		X	(Policy tradeoff for driver and pedestrian safety).

CHAPTER V

ALTERNATIVES TO THE PROPOSED ACTION

The previous chapter identified the beneficial and adverse impacts that will result from the proposed action. Alternatives to the proposed action have been examined in this chapter to determine whether beneficial impacts can be enhanced even further and/or adverse impacts can be minimized. Each identified alternative meets the project objectives set forth in Chapter I, with the exception of the "no action" alternative. The "no action" alternative is a necessary reference point to assess whether any action at all is justified.

Planning for the Waiahole project proceeded in three steps. The first step identified the range of feasible alternatives in a study entitled, Alternative Programs for the Development of Waiahole Valley (Architects Hawaii, 1978). This range of alternatives was then narrowed to two alternatives for more detailed study in a report entitled, Preliminary Engineering Report on the Waiahole Valley Agricultural Park (Calvin Kim and Associates, 1980). These development scheme alternatives will be briefly described and compared in terms of their environmental impacts. Because of the number of options related to water development, a separate set of alternatives had been developed (Russ Smith Corp., 1980). After comments were received on the Draft EIS, the water system was modified to reflect additional constraints.

DEVELOPMENT SCHEME ALTERNATIVES

The range of alternatives developed in the Architects Hawaii report (1978) consisted of six alternatives. These alternatives ranged from minimal development to the maximum allowed by existing zoning. The development schemes are summarized in Table V-1 in terms of the land use (agriculture, residential, commercial, recreation), infrastructure development, land cost recovery rating and project costs. The proposed preferred alternative described in Chapter I has been subsequently modified, thus does not exactly correspond with any of the original six

TABLE V-1

RANGE OF DEVELOPMENT SCHEME ALTERNATIVES

DEVELOPMENT SCHEMES

Land Use	Level of Development					
	Minimum SCHEME A	SCHEME B	SCHEME C	SCHEME D	SCHEME E	Maximum SCHEME F
Agriculture	Expanded (390 acres)	5 acres removed for residential (385)	25 acres removed (365)	20 acres removed (370)		
Residential	31 exist tenancies (10 acres)	56 new units + 31 existing (13 acres)	181 new units + 31 existing (44 acres)	Single family - 12 new + 31 exist. (43 acres)		
Commercial	Pol factory site (1 acre)			Multi-family - 70 new (7 acres)	Expanded (2 acres)	Public vacation cabins (20 acres)
Recreation	None					
<u>Infrastructure</u>						
Roads	Crushed coral	Paved/crushed coral				
Wastewater	Cesspools/Vaults		Centralized	Centralized	Centralized/cesspools/vaults	
Drainage	Kam Hwy drainage channel; pump					
Electrical/telephone	Extension of service to all residents					
<u>Land Recovery</u>	35%	41%	51%	61%	65%	79%
<u>Project Cost (1978, est.)</u>	\$2,634,000	\$3,788,000	\$6,682,000	\$8,311,000	\$8,496,200	\$8,789,700

Source: Architects Hawaii, Ltd.

planning alternatives. The land cost recovery rating compares the annual income from lease rents to the annual payment due on the \$6.6 million used to purchase Waiahole Valley. Income from the sale of water to BWS has not been included since this is not a viable alternative as discussed in the subsequent section on water development. The project cost estimates, which do not include the acquisition cost, are outdated but are included for comparative purposes.

The "low development" schemes of A and B are similar to the proposed action. However, the "full development" schemes of C through F propose to vastly increase the amount of residential units through cluster development. The increased housing units in cluster arrangement (schemes C to F) have the following advantages over the proposed action:

1. A greater supply of affordable housing is provided while still allowing for large acreages in agriculture;
2. The increased lease rents may improve the benefit-cost ratio; and
3. Recreation opportunity is optimized.

These benefits accrue to the general public at the expense of the following adverse impacts, which will be felt mostly by the existing residents:

1. The rural character will be degraded.
2. Some agricultural land will be lost.
3. The sense of community may deteriorate as a result of the large influx of unfamiliar people.
4. Secondary impacts may be significant as a result of the increased traffic.
5. Increased construction activity will create greater nuisances in terms of noise, dust, and traffic disruption.
6. Public hazards increase as a result of some residential units within the flood plain.

7. Probability increases for agricultural/residential incompatibilities, such as odors and pesticide drift.

The full development schemes of C through F increase rather than minimize the adverse impacts compared to the low development schemes similar to the proposed action. Opportunities being foreclosed, however, are more affordable housing and perhaps a higher cash inflow-outflow ratio.

Upon evaluation of the six alternatives, the HHA Commission eliminated schemes C through F and determined that a combination of schemes A and B should be examined in greater detail. Schemes A and B embrace a minimal concept of development and promote agriculture. Based on this concept, two more detailed alternatives were developed. One of these alternatives is the proposed action. The other alternative (Alternative I) differs by placing all residential lots within the existing urban district in the event LUC approval is unsuccessful (see Chapter II).

The "no action" alternative assumes that subdivision will be based on existing tenancies and long-term leases will be given to qualified tenants. However, no improvements will be provided.

Several beneficial aspects will result should there be no action. The existing lifestyle of the Waiahole residents and those neighboring the proposed project site will be preserved. There will be no inconveniences created by construction or the displacement of people. The rural atmosphere of the community will remain. Groundwater demands will not change since no additional withdrawals will occur. No extra costs will be incurred to the state government in this alternative.

Except for the project costs, the proposed action has about the same benefits as the "no action" alternative. By doing nothing, however, the following opportunities, which are offered by the proposed action, will be foreclosed:

1. No additional affordable residential lots will be provided.
2. Full agricultural potential may not be realized.
3. Drinking water quality, roads, and drainage will remain substandard.

4. Many residents will remain without electricity or telephone.
5. The cash inflow-outflow ratio will probably be negative because of the lower revenues from lease rents and agricultural production-related taxes.

The environmental impacts of all of the original planning alternatives are compared in Table V-2. The listing of the major concerns was derived from the adverse impacts identified in Chapter IV and the tradeoff analysis among alternatives presented earlier in this chapter. Although the "no action" alternative preserves certain desirable conditions, it does not correct other adverse conditions that exist. The proposed action has the least adverse impacts. The full development alternative maximizes benefits to the general public but has the most severe adverse impacts.

WATER RESOURCES ALTERNATIVES

Description of Alternatives

Five alternatives were examined in detail by the Russ Smith Corporation to find a suitable solution to the domestic and irrigation water problem.

1. Upper Waianu Valley Development. A tunnel would be constructed at the 400-foot elevation in Waianu Valley to provide sufficient water suitable for both domestic and irrigation use. Separate irrigation and domestic systems would not be necessary.
2. Lower Waiahole Valley Development. Construction of a pump station 300 feet mauka of Kamehameha Highway would withdraw 2.2 mgd of irrigation water from Waiahole Stream. Of the 0.5 mgd supplied by the McCandless system, 0.2 mgd would be filtered and chlorinated for domestic use and the remaining 0.3 mgd for irrigation use.
3. Upper Waiahole Valley Development. This alternative would provide 2.2 mgd of water for irrigation purposes by constructing an intake on Waiahole Stream. An additional 0.3 mgd of

TABLE V-2

COMPARISON OF ENVIRONMENTAL IMPACTS FOR
ALTERNATIVE DEVELOPMENT SCHEMES

	<u>No Action</u>	<u>Proposed</u>	<u>Alternative I</u>	<u>Full Development*</u>
<u>Concerns</u>				
<u>Resources</u>				
Agricultural lands	0	+	+	-
Groundwater supply	0	0	0	-
Stream & Groundwater Quality	-	-	-	-
<u>Public Health/Safety</u>				
Air quality	-	0	0	-
Drinking water quality	-	+	+	+
Flood hazards	0	0	0	-
<u>Public Welfare</u>				
Rural character	0	0	0	-
Sense of community	0	0	0	-
Relocation	0	0	-	0
Affordable housing	-	+	+	++
Recreation opportunity	0	+	+	++
Electrical/Telephone	-	+	+	+
<u>Cumulative Impact</u>				
Traffic	0	0	0	-
K-bay water quality	0	0	0	0
<u>Fiscal Impacts</u>				
Cost/benefit	-	+	+	++

+ beneficial impact

- adverse impact

0 no impact

* schemes C through F combined.

irrigation water and 0.2 mgd of domestic water would be supplied by the McCandless system.

4. Modified Upper Waiahole Valley Development. This alternative would provide 1.5 mgd for irrigation purposes through the construction of an intake at Waiahole Stream. Less irrigation water would be required because existing taro-auwai irrigation systems will not be augmented. Two groundwater wells will supply 0.2 mgd for drinking water.
5. Waiahole Dual-Use Groundwater Development. This alternative would provide 0.7 mgd for irrigation use and 0.1 mgd for domestic use, supplied by two 0.8 mgd wells (one standby) through a common distribution line. Cultivated acreage and irrigation frequencies proposed by an earlier agricultural study (Scott, 1981) were adjusted to be consistent with current subdivision lot boundaries and more realistic irrigation application frequencies. Tenants may individually opt for stream-source irrigation if they can demonstrate negligible environmental impact through compliance with pertinent regulatory requirements. This is the proposed water system.

The first three alternatives were proffered in the Draft EIS, with the Upper Waiahole Valley alternative as the preferred proposal (Table V-3). Legal difficulties regarding alterations of the existing McCandless water line and concerns regarding minimum stream flow modified the initial preferred proposed alternative (Modified Upper Waiahole Valley Development). Taro requirements would then be met by existing stream flow-through auwai irrigation systems. Since the McCandless water line will no longer be needed for Waiahole Valley domestic use, this additional amount of water would overflow into Waiaru Stream like the present excess, thus taro farm water supplies would actually be augmented.

Cost constraints required further modifications of the preferred design proposal, resulting in a single source and a common dual-use distribution system as described previously. Furthermore, irrigation

irrigation water and 0.2 mgd of domestic water would be supplied by the McCandless system.

4. Modified Upper Waiahole Valley Development. This alternative would provide 1.5 mgd for irrigation purposes through the construction of an intake at Waiahole Stream. Less irrigation water would be required because existing taro-auwai irrigation systems will not be augmented. Two groundwater wells will supply 0.2 mgd for drinking water.
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Cost constraints required further modifications of the preferred design proposal, resulting in a single source and a common dual-use distribution system as described previously. Furthermore, irrigation

TABLE V-3

COMPARATIVE DESCRIPTION OF WATER DEVELOPMENT ALTERNATIVES

	Alternatives					
	Upper Waianu Valley Domestic Irrigation	Lower Waiahoie Valley Domestic Irrigation	Upper Waiahoie Valley Domestic Irrigation	Modified Upper Waiahoie Valley Domestic Irrigation	Waiahoie Dual-Use Domestic Irrigation	
<u>Water Source</u>						
McCandleless System	0.2	0.1	0.2	0.1	0.1	
Stream Water and Springs		2.2		2.2	1.5	
Groundwater		2.2		0.2	0.7	
<u>Capital Costs</u>						
Domestic System	\$1,030,000	\$1,030,000	\$1,030,000	\$2,260,000	\$2,900,000 (combined irrig/domes)	
Irrigation System	\$5,038,000	\$2,058,000	\$2,921,000	\$2,387,000		
<u>Operational</u>						
(c/1,000 gal) (net)	49.9	36.5	30.4	42.2 (28.8)*	6.7 (2.4)*	

* If divided by 2.2 MGD as the other three alternatives.

quantities were adjusted to reflect current agricultural conditions, lessening the impact on the existing ecosystem. The Waiahole Dual-Use Groundwater alternative will result in the lowest capital expenditure and the lowest net system operational cost.

Assessment of Environmental Impacts

In Chapter IV, the following concerns were identified relative to the proposed system: construction in conservation lands, reduced streamflow, and water cost. Other considerations for water development in Waiahole Valley include the dike groundwater source and impacts to the Waiahole Ditch system. The environmental impacts of the five systems are compared in Table V-4 in terms of these concerns. Each concern is discussed below.

Dike Groundwater Source. Tapping this source now would preclude it as a future drinking water source. Also, tunneling would probably affect the supply of water to both the Waiahole Ditch system and Waiahole Stream. Only the Upper Waianu Valley alternative would directly affect the dike groundwater source. The lower level wells of the Modified Upper Waiahole Valley and the Waiahole Dual-Use Groundwater alternatives would tap groundwater and have indirect impacts on dike groundwater. Through surface water/groundwater interflow, the net effect of the Waiahole Dual-Use Groundwater alternative would be beneficial, increasing the amount of water in the hydrologic system.

Streamflow Reduction. A reduction of streamflow could affect native diadromous stream fauna as well as the taro farmers. Both Upper and Lower Waiahole Valley alternatives would result in an overflow to Waianu Stream which would maintain or enhance the present streamflow. The Lower Valley alternative, however, would reduce the streamflow near the stream mouth. Both Upper Waiahole Valley alternatives would reduce flow in a sector of Waiahole Stream. The reductions would not be significant, particularly for the Modified Upper Waiahole Valley alternative. The Upper Waianu Valley alternative would reduce flow in Waianu Stream by diverting the McCandless source and some groundwater

TABLE V-4

COMPARISON OF ENVIRONMENTAL IMPACTS FOR WATER DEVELOPMENT ALTERNATIVES

Concerns	Alternatives					Waiahole Dual-Use Groundwater
	Upper Waianu Valley	Lower Waiahole Valley	Upper Waiahole Valley	Modified Upper Waiahole Valley		
Resource						
Groundwater	-	0	0	-		+ ^a
Streamflow Reduction						
Biological	-	-	0	0		+
Taro Farmers	-	-	+	0		+
Conservation Land	-	-	-	-		-
Waiahole Ditch Water	-	0	0	0		0

Fiscal^b

Capital Cost

Operational Cost

+ Beneficial impact
- Adverse impact

0 No impact

^a Beneficial in terms of net hydrologic impact.

^b Ranking of costs: 1 = lowest; 4 = highest.

that feed Waianu Stream. The Waiahole Dual-Use Groundwater alternative should likely result in net gains in both Waiahole and Waianu streams, depending on the number of agricultural lessees opting to tap the stream as a source of irrigation water.

Conservation Land. Construction activities will necessitate clearing the vulnerable conservation land for pipelines and other facilities. Except for the Lower Waiahole Valley alternative, the other alternatives would require further construction in the conservation district for tunneling, dam construction, and additional pipelines.

Waiahole Ditch. The Waianu Valley tunneling could penetrate the dikes that supply the Waiahole ditch system. Lowering the ditch flow would violate the legal rights of the Waiahole Water Company, unless they have agreed to a compensation.

Capital Cost. The Waianu Valley alternative has the highest cost and the Dual-Use Waiahole Groundwater alternative, the proposed alternative, has the lowest cost.

Operational Cost. Operational costs are based on estimated electrical and maintenance costs plus 40-year amortized capital costs. Operational costs have been used herein for a comparative evaluation of the relative feasibility of each of the proposed alternatives. Tenant water rates should not be expected to fully reflect these costs, particularly the amortized capital recovery costs.

The Waiahole Groundwater Dual-Use alternative has the lowest per gallon cost, followed by the Upper Waiahole Valley alternative, followed by the Lower Upper Waiahole Valley alternative, followed by the Modified Upper Waiahole Valley alternative. The operation and maintenance costs of the Waiahole Dual-Use Groundwater and Modified Upper Waiahole Valley alternatives are weighted differently. These alternatives appear higher in relative operational costs per water volume because their total costs are divided by a smaller water volume than the other alternatives. After adjustment for flow volume, the proposed alternative is even lower in comparative cost.

In summary, construction in the conservation district is unavoidable for any alternative. Streamflow in the critical Waianu tributary will not be impacted by the proposed system; the Waianu and Lower Waiahole Valley alternatives have the potential to reduce this flow. The proposed system has the lowest capital cost and the lowest operational cost. Therefore, the Waiahole Dual-Use Groundwater alternative has the least overall impact for the maximum amount of benefits.

CHAPTER VI
UNRESOLVED ISSUES

The letters and responses are included in Appendix C. In addition to correspondence, several meetings were held with the Waiahole residents and the Waiahole-Waikane Community Association to solicit further input.

Based on all the comments received, the major issues listed in Table VI-1 were identified and have been addressed in the EIS. Three issues remain unresolved at this time because the information is not available. These issues relate to the water system:

1. Official confirmation of Waiahole Water Company's lease reapportionment;
2. Determination of which agency or organization will operate and maintain the water system; and
3. Water rate costs for both domestic and irrigation usage.

It is premature at this time to set water rates for the Waiahole water system until the operating agency or organization is determined. Furthermore, estimated water rate costs estimated herein should not be utilized to determine water rates. Feasibility analyses attempted in Chapter IV were based on assumed water costs; comparative analyses in Chapter V included amortized capital recovery costs.

Should the DLNR accept responsibility for water system operation and maintenance, it should be noted that the DLNR presently has no mechanism for collecting domestic water fees to establish a revolving maintenance fund for the water system. Such an action would likely require legislative amendment of DLNR statutes.

TABLE VI-1

WAIHAOLE VALLEY AGRICULTURAL PARK EIS - MAJOR ISSUES

Issue	Affected Party	Resolved	Unresolved	Comments
<u>Socioeconomic</u>				
1. Lease Agreement	Existing and future residents/ farmers	X		HMA has addressed these concerns in the lease agreements (see Chap 1).
- Long-Term				
- Rent				
- Lot Boundaries				
- Lease Priorities				
<u>2. Water System</u>				
- Cost	Farmers, especially taro farmers		X	There will be sufficient water available to farmers (see Chap 1). Development and maintenance water cost to farmers and procurement of Waiahole Water Co. lease reapportionment remain unresolved. Rural lifestyle will be preserved (see Chap IV)
- Adequacy				
<u>3. Rural/Agricultural Life-style</u>				
- Population Density	Residents/farmers; general public	X		Rural lifestyle will be preserved (see Chap IV)
- Improvement Standards (road width, curb & gutter, etc.)				
<u>4. Dislocation</u>				
	Existing residents who are elderly or non-farming residents	X		Only one (voluntary) relocation has occurred.
<u>5. Agricultural/Residential Compatibility</u>				
- Noise	Neighboring farmers and resident	X		The land use plans minimize incompatibilities by clustering the residential area (see Chap IV).
- Odor				
- Pesticide Spraying				
<u>6. Cost/Benefit of Public Funds</u>				
	General public	X		Cost-benefit ratio is positive (see Chap IV).
<u>Physical/Biological</u>				
<u>1. Water Quality (Streams & Kaneohe Bay)</u>				
- Wastewater Disposal	General Public, residents/farmers	X		Cumulative impact to Kaneohe Bay is insignificant (see Chap IV).
- Fertilizer/Pesticide				
- Erosion				
<u>2. Minimum Stream Flow</u>				
- Native Stream Fauna	General public, taro farmers, biota	X		Taro farmers will benefit from enhanced streamflows (See Chap IV). Minimum flow to support aquatic fauna will be maintained (see Chap IV).
- Taro farmers				

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A P P E N D I X A

EXISTING TENANCIES BY TAX MAP KEY

APPENDIX A

EXISTING TENANCIES BY TAX MAP KEY

Leases in Waiahole Valley generally were unrecorded and described in general terms or sketches. Boundaries were apparently established by mutual agreement between neighbors and Mrs. Marks. Two types of leases were granted. Areas averaging one-half acre or less were leased for residential use. Larger areas up to 41 acres were leased for farming activities. The leases were revocable, with the exception of the long term lease to Jean Charlot and his heirs. A tabulation of the known tenancies is listed in Table A-1, with the locations shown on Figure A-1. These same tenancies are cross-referenced as encumbrances on lots of the proposed subdivision (Table A-2).

Six noncontiguous parcels of land were acquired by the state from Elizabeth Marks. The total area of the land involved is approximately 590 acres. Parcel 1, which is the major parcel, totals 558.118 acres. The other parcels are located along Waiahole Homestead Road. Parcel 2 (0.247 acres) and Parcel 5 (0.838 acres) are nonconforming agricultural lots. Parcel 4 (0.682 acres) is in the Conservation District. Parcel 3 (18.799 acres) and Parcel 6 (12.028 acres) have portions that are classified "Conservation", with the remainder classified "Agriculture" (see Figure A-2).

TABLE A-1

EXISTING TENANCIES IN WAIHAOLE VALLEY (MAUKA)APRIL 1, 1984

<u>Existing Tenancy No.(s)</u>	<u>Existing Tenant</u>	<u>Existing Lot Size (acres)</u>	<u>Existing Use</u>
17	Roque Valparaiso	0.57	HS
18, 22	Labriano Garcia	40.66	A/HS
19	Wenceslao Batalona	4.00	A/HS
20	Filimon Cordero	1.96	A/HS
21, 27	Jacintha Etheredge	2.82	A/HS
23	Chula Clark	2.00	A/HS
24	Anthony Garcia	0.41	HS
25	James Salas	0.34	HS
26	Gaudencio Garibilez (J. Galut)*	3.75	A/HS
28, 29	Masuo Moriwaki	4.50	A/HS
30	Bernard Lam Ho	0.23	Store
31-33	Calvin and Charlene Hoe	0.37	Poi Factory
34	Benigno Dano	0.07	HS
35	Richard Miura	1.10	A/HS
36	Joseph Clarke	0.50	A/HS
37	Juan Paglinawan	0.23	HS
38	Marcus Recarte	0.23	HS
39, 39A	Jose Royos	1.07	A
40, 41, 42	Isaac Manalo	0.48	HS
43	Delmer Plunkett	0.11	HS
44	Daniel Kadowaki	0.35	HS
45	Frank Shiroma	0.23	HS
46	John Torres	0.23	HS
47	Richard Miura	0.34	HS
48	Douglas Taira	1.33	A/HS
49	Yoshiharu Oshima	0.65	HS
50	Seikichi Teruya	5.60	A/HS
51	Takeichi Tokunaga	0.14	HS
52	John Tolentino	0.20	HS
53	Henry Roxburgh (J. Panoncial)*	0.09	HS
55, 59, 60	Harold Tsuhako	8.33	A/HS
56	Patrick Dumadag	2.85	A/HS
57	Douglas Gernler	0.34	HS
58	Albert Badiyo (G. Nakamoto)*	1.42	A/HS
61	Clarence and Louise Kane	0.45	A/HS
63	Mary Macaheleg	2.25	A/HS
64, 92	Roy Kawelo (#92, G. Pires)*	9.30	A/HS
65	George Matayoshi	10.50	A
66	Elizabeth Kawaa	0.14	HS
67	Kathy Leleo (D. Lopes)*	0.14	HS
68, 69, 76	Valentin Baga	6.16	A/HS
70	Naomi Lopes	1.11	A/HS

Table A-1, Cont.

<u>Existing Tenancy No. (s)</u>	<u>Existing Tenant</u>	<u>Existing Lot Size (acres)</u>	<u>Existing Use</u>
71, 91	Francis Lau	11.81	A
72, 72A	Naomi Lopes	1.00	A/HS
74	David Chinen	5.86	A
75	Anki Sadoyama	1.33	A/HS
77	Simeon Apilando	3.00	A/HS
78	Benjamin Carvalho	1.00	A/HS
79	Lawrence Uyemura	0.45	HS
80	Marjorie Antone	5.00	A/HS
81	Walter Antone	0.43	HS
82	Max and Abbie Oneha	2.25	A/HS
83, 88	Tsutomu Oshima	9.00	A/HS
84, 150	Fraiola, Hoe, Reppun	8.00	A/HS
85	Herbert Denning	13.75	A/HS
86, 87	Anthony Fraiola (K. Kamiyama)*	1.42	A/HS
89	Dick Bates	3.16	A
90	Valentine Texeira	9.00	A
93	Erlindo Guillermo	2.00	A/HS
94, 96	Benny Lagapa	2.83	A
95, 127	Theodore Lagapa	1.16	A
97	Joseph Matsukawa	9.91	A
98	Gaudencio Garabitez (J. Galut)*	4.90	A/HS
99	Deogracias Garcia	3.59	A/HS
100	Erlindo Guillermo	0.63	HS
101	Ceprino Olegario	4.00	A/HS
102	Primataro Salaum (O. Aporan)*	0.85	A/HS
103	Jesus Cano	0.07	HS
104	Francisco Sausal	2.00	A/HS
108	Rey and Maureen Bolivar	2.40	A/HS
109	Lucio Cortuna	0.35	HS
110	Pearl Clark	1.00	A/HS
111	Leonard Picanco	0.28	HS
112	Bryson Fernandez (L. Pacheco)*	0.30	HS
114, 115	Kosuke Ige	3.79	A/HS
116	Guy Nakamoto	0.50	A/HS
152	Philemon Pilanca	0.45	HS
153, 161	Seisuki Serikaku	10.50	A
156A	Yoshiharu Oshima	1.82	A
157,158,159	Jean Charlot	8.35	A/HS
160	Edward Spencer	6.00	A/HS

HS = House site
A = Agriculture

* Former lessees of recent transfers are listed in parenthesis following existing lessee.

WAIAHOLE
VALLEY
AGRICULTURAL
PARK

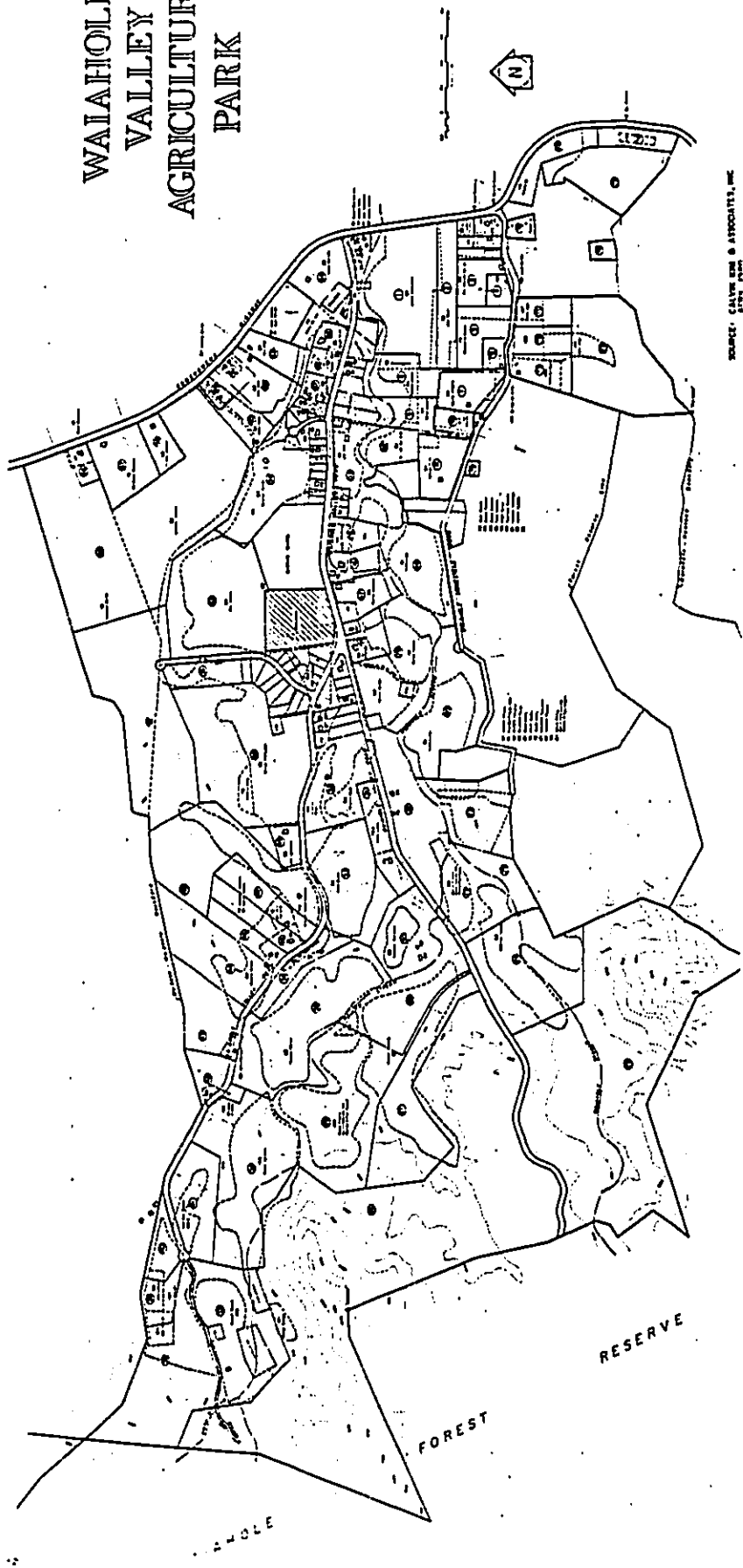


FIGURE A-1
EXISTING TENANCIES

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TABLE A-2
ENCUMBERED LOTS OF PROPOSED SUBDIVISION

<u>Lot No.*</u>	<u>Tenant</u>	<u>Lot Size (acres)</u>	<u>Proposed Use</u>
1	Labriano Garcia	43.256	A/HS
2	Roque Valparaiso	1.000	HS
3	Wenceslao Batalona	1.000	HS
5	Filimon Cordero	1.000	HS
6	Chula Clark	4.043	A/HS
7	Anthony Garcia	1.000	HS
8	James Salas	1.000	HS
9	Gaudencio Garibilez	1.000	A/HS
10	Jacintha Etheredge	3.358	A/HS
11	Masuo Moriwaki	4.559	A/HS
12	Benigno Dano	0.424	HS
13	Richard Miura	0.724	HS
14	Joseph Clarke	0.345	HS
17	Jose Royos	1.000	A/HS
18	Isaac Manalo	0.512	HS
19	Delmer Plunkett	0.537	HS
20	Daniel Kadowaki	0.795	HS
21	Frank Shiroma	0.273	HS
22	Frank Torres	0.425	HS
25	Seikichi Teruya	1.000	A/HS
31	Yoshiharu Oshima	0.721	HS
33	Roy Kawelo	12.778	A/HS
34	Walter Antone	0.520	HS
40	George Matayoshi	16.044	A
41	Anki Sadoyama	46.678	A/HS
42	Simeon Apilando	1.000	A/HS
44	Benjamin Carvalho	1.000	A/HS
45	Lawrence Uyemura	1.000	HS
46	Marjorie Antone	1.000	A/HS
47	Philemon Pilanca	1.000	HS
48	Jean Charlot	3.807	A/HS
49	Jean Charlet	2.000	A
52	Edward Spencer	5.558	A/HS
54	Yoshiharu Oshima	2.000	A
55	Seisuki Serikaku	14.950	A
56	Tsutomu Oshima	12.931	A/HS
57	Max Oneha	2.293	HS
58	David Chinen	10.015	A
59	Valentin Baga	6.211	A/HS
61	Kathy Leleo	0.307	HS
62	Elizabeth Kawaa	0.282	HS
63	Mary Macaheleg	0.718	HS
68	Clarence and Louise Kane	0.434	HS
72	Naomi Lopes	1.562	A
73	Anthony Fraiola	5.777	A/HS

Table A-2, Cont.

<u>Lot No.*</u>	<u>Tenant</u>	<u>Lot Size (acres)</u>	<u>Proposed Use</u>
74	Herbert Denning	15.030	A/HS
75	(Proposed reservoir site)	1.000	Reservoir
76	Gloria Fraiola et al.	25.936	A/HS
81	Dick Bates	5.870	A
83	Naomi Lopes	3.977	A/HS
84	Harold Tsuhako	3.779	A/HS
85	Albert Badiyo	10.470	A/HS
86	Douglas Gernler	0.450	HS
90	Patrick Dumadag	0.383	HS
92	Henry Roxburgh	0.655	HS
97	John Tolentino	0.239	HS
99	Takechi Tokunaga	0.269	HS
104	Douglas Taira	0.707	HS
105	Richard Miura	0.311	HS
106	Marcus Recarte	0.252	HS
107	Juan Paglinawan	0.298	HS
108	Joseph Matsukawa	15.305	A
109	Calvin and Charlene Hoe	0.468	Poi Factory
110	Bernard Lam Ho	0.282	Store
111	Leonard Picanco	1.000	HS
112	Bryson Fernandez	1.000	HS
113	Pearl Clark	1.000	HS
114	Ray and Maureen Bolivar	3.153	A/HS
115	Lucio Cortuna	1.000	HS
117	Deogracias Garcia	1.000	HS
118	Erlindo Guillermo	1.000	HS
119	Benny Lagapa	2.751	A
120	Ceprino Olegario	2.749	A/HS
121	Primataro Salaum	1.000	HS
122	Jesus Cano	1.000	HS
123	Theodore Lagapa	3.796	A
124	Erlindo Guillermo	2.697	A
125	Roy Kawelo	2.636	A
126	Francis Lau	16.108	A
127	Francisco Sausal	1.000	A/HS
130	Kosuke Ige	0.846	A/HS
131	Kosuke Ige	3.434	A
132	Guy Nakamoto	2.889	A/HS

* Lot numbers indicated on Figure I-3.

DELINEATION OF PROJECT AREA BY TAX MAP KEYS

AREAS INCLUDED IN PROJECT AREA

Parcel 1 (includes all tenancies except 69 to 78)

TMK:	4-8-01:6	11.261 acres	
	4-8-07:5	2.687 acres	
	4-8-08:10	0.820 acres	
	4-8-08:12	0.680 acres	
	4-8-08:16	0.462 acres	
	4-8-08:18	1.810 acres	
	4-8-09:1	37.984 acres	
	4-8-10:2	35.744 acres	
	4-8-10:3	26.430 acres	
	4-8-11:1	16.940 acres	
	4-8-11:2	23.250 acres	
	4-8-12:1	41.910 acres	
	4-8-12:2	35.200 acres	
	4-8-12:3	1.300 acres	
	4-8-12:5	204.650 acres	
	4-8-12:10	75.660 acres	
	4-8-12:19	2.860 acres	
	4-8-12:20	8.350 acres	
	4-8-12:21	0.580 acres	
	4-8-12:22	<u>0.250 acres</u>	558.118 acres

Parcel 2 (tenancy 78)

TMK:	4-8-07:4	0.247 acres	0.247 acres
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Parcel 3 (tenancies 71, 72, 73, and 77)

TMK:	4-8-07:1	18.799 acres	18.799 acres
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Parcel 4 (tenancy 76)

TMK:	4-8-01:3	0.682 acres	0.682 acres
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Parcel 5 (tenancy 70)

TMK:	4-8-01:4	0.838 acres	0.838 acres
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Parcel 6 (tenancies 69, 74, and 75)

TMK:	4-8-01:1	12.028 acres	<u>12.028 acres</u>
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Total 590.450 acres

AREAS EXCLUDED FROM PROJECT AREA

Parcel 1

Less Exclusion 1	TMK:	4-8-08:17	0.755 acres
Less Exclusion 2		4-8-08:15	0.555 acres
Less Exclusion 3		4-8-08:14	0.657 acres
Less Exclusion 4		4-8-08:13	0.770 acres
Less Exclusion 5		4-8-09:9	0.250 acres
Less Exclusion 6		4-8-09:10	5.830 acres
Less Exclusion 7		4-8-09:11	0.256 acres
Less Exclusion 8		4-8-11:3	0.256 acres
Less Exclusion 9		4-8-12:11	0.228 acres
Less Exclusion 10		4-8-12:17	0.250 acres
Less Exclusion 11		4-8-12:15	0.804 acres
Less Exclusion 12		4-8-12:14	1.540 acres
Less Exclusion 13		4-8-12:16	0.256 acres
Less Exclusion 14		North Branch	2.237 acres
		South Branch	4.890 acres
		"A" Parcel Fronting App. 1425	0.103 acres
		Parcel Fronting School	0.912 acres
		Parcel Fronting Gr 2703	0.247 acres
		Mountain Road	0.057 acres
		Planimetered Portion	0.700 acres
		Parcel Between Gr 4689 (1-2)	0.313 acres
Less Lots 6, 7, Ld. Ct. App. 72	TMK:	4-8-12	0.524 acres
Less Ld. Ct. App. 1425		4-8-10:1	4.883 acres
Less Lots 6, 8, 9, Ld. Ct. App. 69		4-8-09	0.294 acres
Less Lots 1, 2, Ld. Ct. App. 1803		4-8-09:3, 5	<u>0.660 acres</u>
		Total	28.227 acres

W A J K A N E

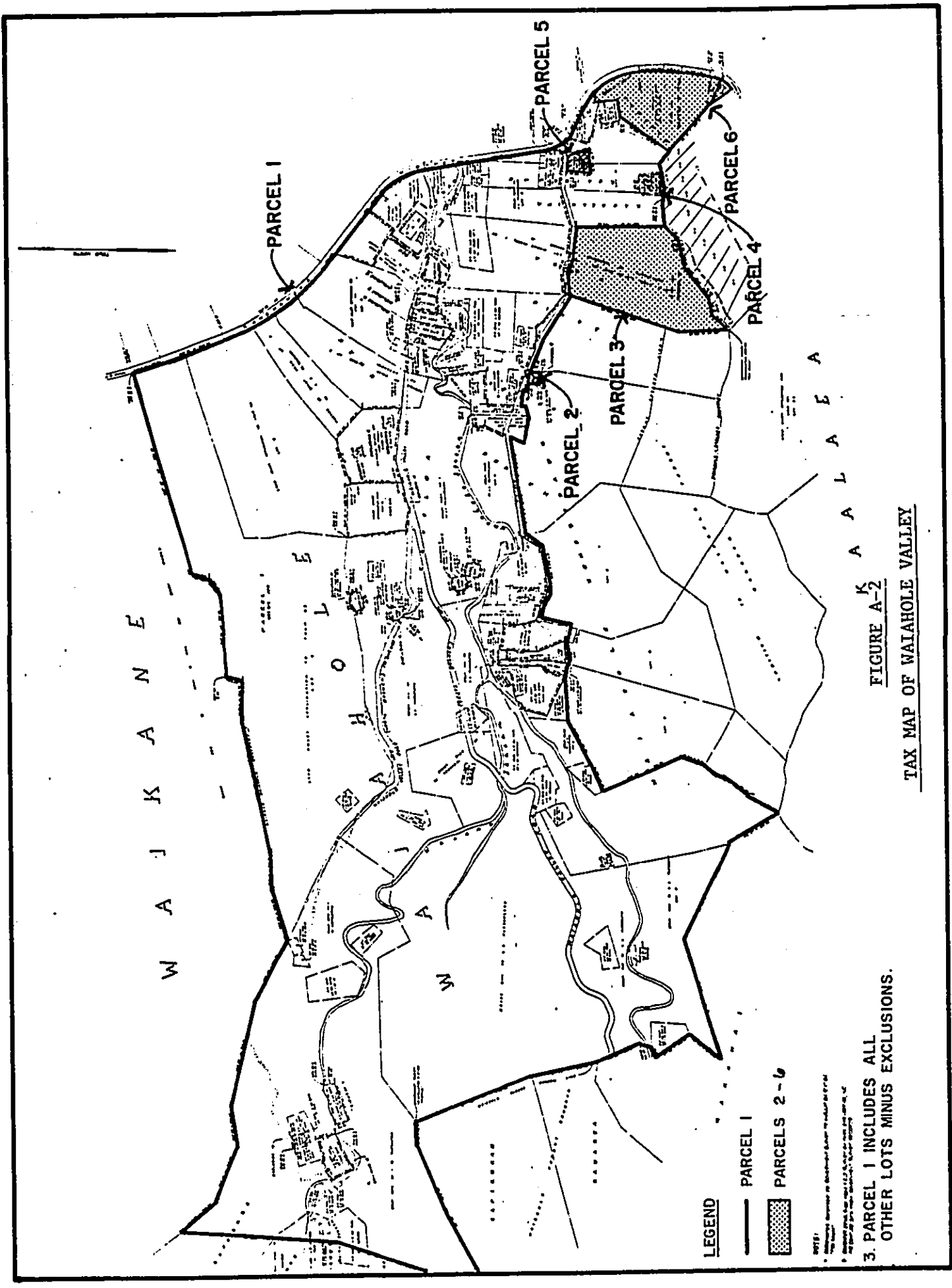


FIGURE A-2
TAX MAP OF WATAHOLE VALLEY

A P P E N D I X B

REPORT ON FIELDWORK
FOR
ARCHAEOLOGICAL STUDIES

EXECUTIVE SUMMARY

FLAKES AND FIELDS: ARCHAEOLOGY IN WAIAHOLE VALLEY
MAPPING AND EXCAVATION FOR THE WAIAHOLE VALLEY AGRICULTURAL PARK
AND RESIDENTIAL LOTS SUBDIVISION, OAHU, HAWAII

Six archaeological sites in Waiahole Valley, Oahu were mapped, tested, and/or excavated in anticipation of construction activities related to the development of the Waiahole Valley Agricultural Park. Grading and realignment of Waiahole Valley Road will adversely affect five archaeological sites in the area around Waianu Stream bridge. Placement of boulder riprap along the banks of lower Waiahole Stream for erosion control purposes will have minor impacts on one site located just mauka of Kamehameha Highway.

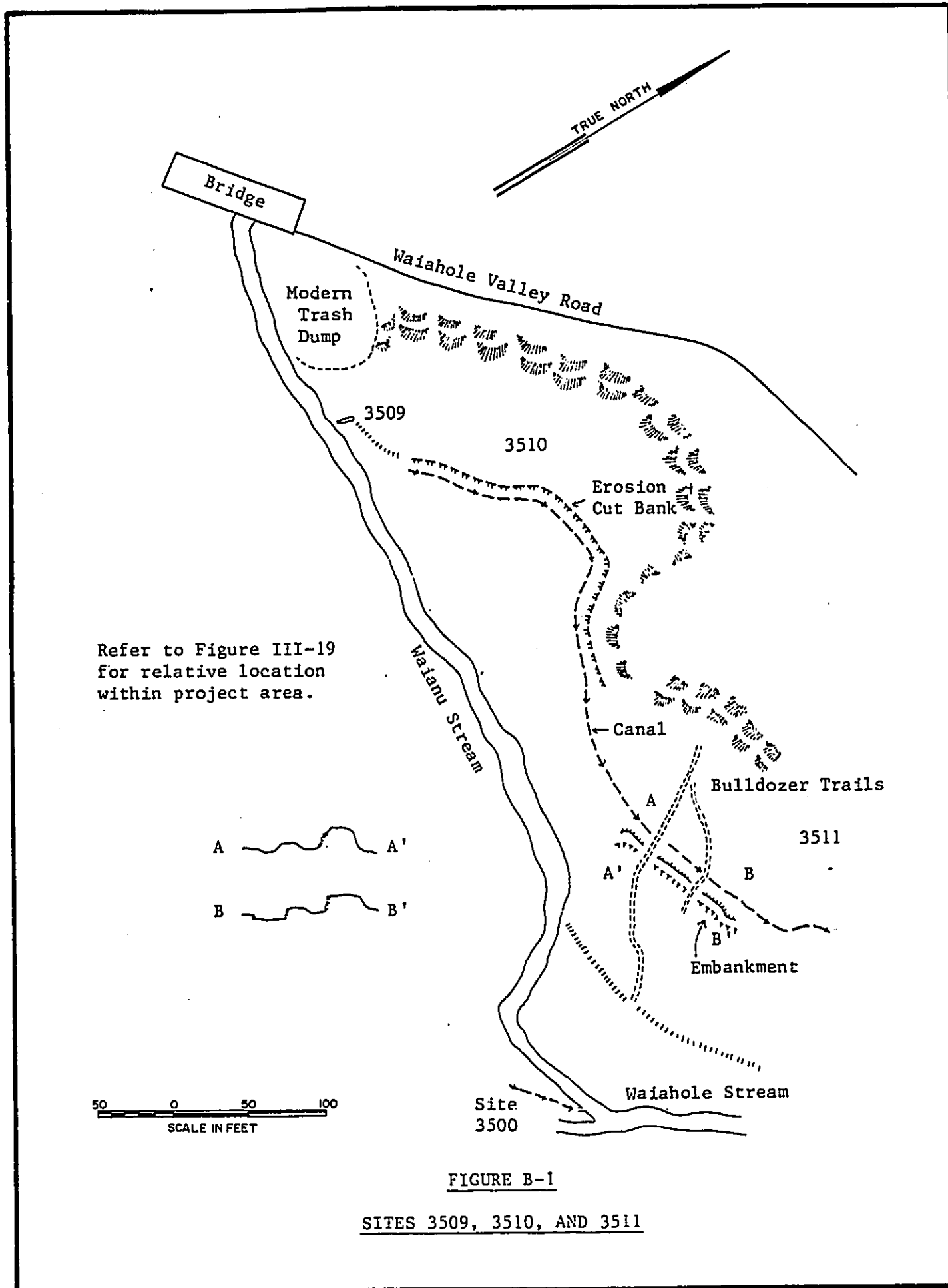
The present report is a preliminary statement of the results of the archaeological investigations, following completion of field work. Still to be completed are compilation of site maps, laboratory processing of collected material, and specialized laboratory analyses for age determinations, soils interpretation, and faunal identification.

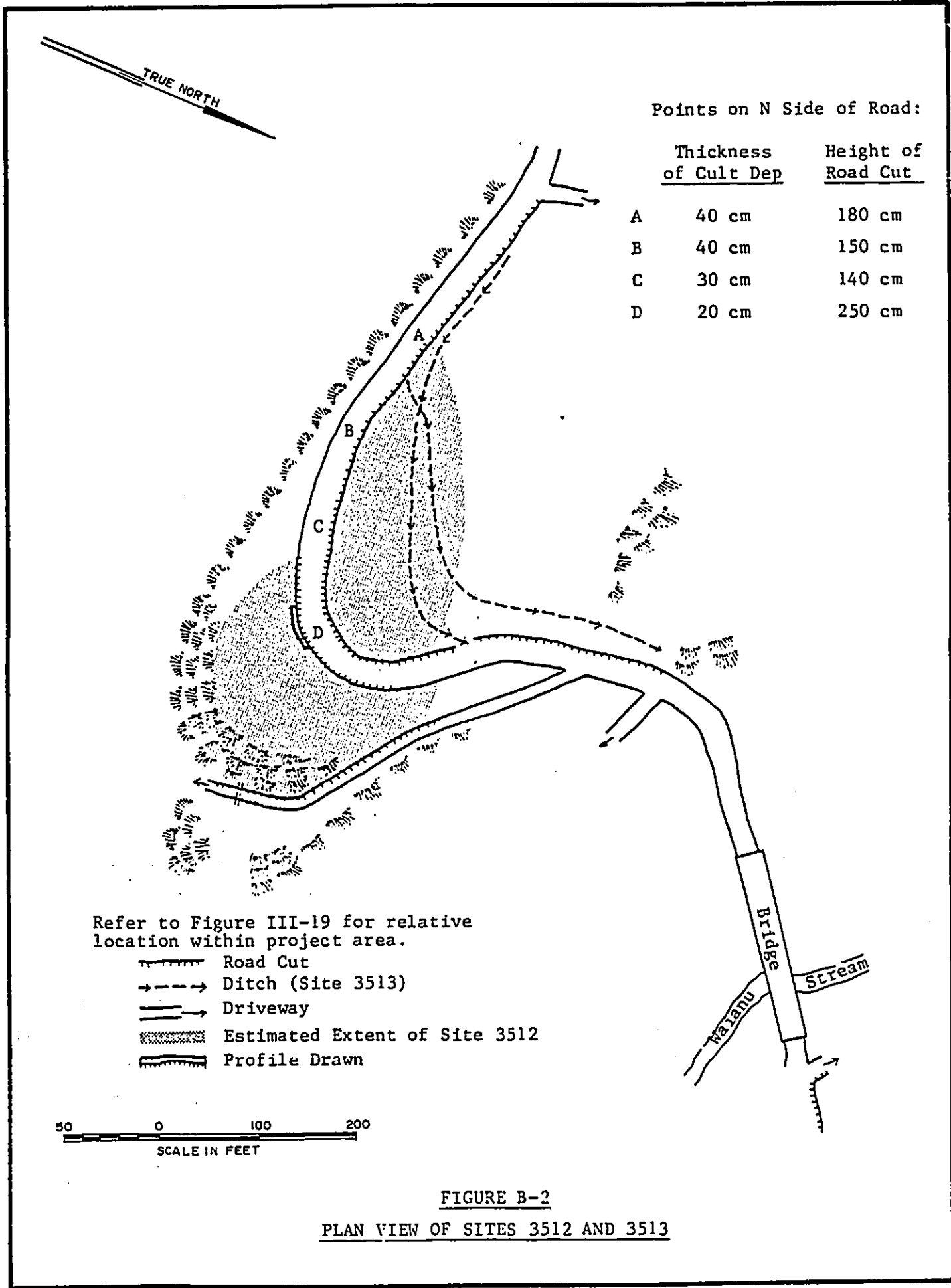
The focus of excavations in this project was Site 3512 for two reasons; (1) the site appeared to contain the most substantial cultural deposits of those which will be affected, and (2) engineering plans indicated that the site will be entirely destroyed. Mapping and test excavations were carried out in sites 3510, 3513, and 3526; mapping of sites 3509 and 3511 was also done (Figures III-19, B-2, and B-3).

Laboratory analysis is currently being conducted on collected material. Six charcoal and 17 volcanic glass samples have been submitted to specialized laboratories for age determinations. Faunal, artifact, and lithic analyses are also being done.

SUMMARY OF RESULTS

Archaeological work on the six impacted sites have clarified initial interpretations which were made following the 1982 reconnaissance survey. In almost all cases, the general interpretations continue to hold true, although specific aspects of site content, function, and nature have been understandably redefined.





Site 3512 appears to be an habitation-agricultural complex with at least two distinct occupational events. The earlier event is related to the agricultural use of the hill slope, with some possible intermittent habitation or specialized activities also taking place. The later event is an intensive habitation activity in which wood-working was certainly occurring; this event was probably associated with continuing agricultural use of the hill slope. Data for this site comes from four trenches, five test pits, 16 profiles of natural slope exposures, and clearing and profiling of the road cut.

It is our estimation that the sampling of the main site area of 3512 (about 20% of the core area) provides an adequate basis for stratigraphic interpretation, a sufficient sample of artifactual material, and substantial material for chronometric age determination. It is thus concluded that the data recovery from this site is sufficient for most standard archaeological inference based on present convention.

Site 3513, which cuts through site 3512, was interpreted to be a 19th century irrigation ditch carrying water to the rice fields at the front of the valley. Upon closer examination of the canal, a reexamination of historical maps, and conversations with local residents, it appears that the 3513 canal may actually be more recent and that the rice canal is located on the northwest side of the knoll. One test pit was dug across the canal.

Site 3510 is a possible agricultural area located on the makai side of the Waianu Stream bridge. Construction activities for this area are directed toward road development. Fill material from the site 3512 knoll will be dumped on top of this stream flat to raise it to same elevation as the existing road. It does not appear that any grading or excavation of the area will be done as part of construction.

Examination of soils in site 3510 suggest irrigation field deposits which may also have been impacted by lateral stream cutting and filling. Such a situation is not inconceivable considering the location of this site at the confluence of Waiahole and Waianu streams. There is no evidence of any habitational activities. Excavation consisted of one test pit and two profiles of the erosional cut along the stream-side of the site.

Site 3509 is a low concrete and cobble feature which probably served as a footing or apron for an earlier bridge across Waianu Stream. It will be buried by road fill from site 3512. Photographs were taken of the feature.

Site 3511 appears to be an irrigation-related structure, possibly used as a levee to protect fields from flooding, located on the stream flat at the confluence of Waiahole and Waianu streams. It is in poor condition, with only sections of the retaining wall facings still intact. This site actually falls outside of the immediate area of construction impact (approximately 240 feet from the center line of the proposed road). A Brunton compass and tape map was made of the site.

Site 3526 is a probable irrigation agricultural deposit exposed in the bank of lower Waiahole Stream. This site will be impacted by stream bank erosion protection measures; approximately 2,000 cubic yards of the southern bank of Waiahole Stream will be cut back to a stable, straight slope and covered with boulder riprap for erosion protection.

The uppermost stratum of the five profiles which were examined in site 3526 indicate disturbances of the agricultural soils by historical and/or modern farming activities. The impact of farming is also evident in the numerous artifacts which can be found by walking through the cultivated fields adjacent to the stream (basalt flakes and stone tools have been found in every farm field in Waiahole which has been archaeologically surveyed). Three detailed profiles, one facing of the stream bank, and one test pit were dug at this site. Surface artifacts were collected from along the stream bank.

Impact from construction activities on site 3526 are evaluated to be minimal for three reasons: (1) the deposits are agricultural and thus do not contain data which are unique to this particular locale; (2) being agricultural, the deposits probably extend considerably beyond the present impact area; and (3) the deposits have been presumably disturbed by plowing.

RECOMMENDATIONS BASED UPON FIELD WORK

The archaeological work carried out to mitigate the adverse effects of the agricultural park development has produced a quantity of data which can contribute to understanding the prehistory and archaeology of Waiahole Valley. While further excavation, particularly in site 3512, would be

ideal, it is felt that the extent of the present investigations is adequate to mitigate the impacts of planned construction.

Thus, based on the results of field work only, recommendation is made for no further work on any of the archaeological sites examined during this project. However, this is a preliminary evaluation which may be modified following completion of the laboratory analysis, particularly for age determinations.

A recommendation for monitoring during road construction and utilities installation was made as a result of the 1982 survey (see Tomonari-Tuggle 1983:51). This recommendation is still pertinent to the development of the agricultural park and residential lots subdivision. The primary job during construction will be the recording of stratigraphic data from exposed profiles in utility trenches and the recording of features uncovered by road grading. Recordation should include photographs, drawings, and notes.

The Department of Anthropology at the University of Hawaii will serve as the repository for the recovered artifacts. A copy of the completed final report will be made available to the public at the State Historic Sites Office.

POTENTIAL SITES

The bulk of the proposed water line will be laid within the existing roadway. Previously undiscovered archaeological resources outside of roadway and subsurface remains, if encountered during construction, will be brought to the attention of the state Historic Sites Office so the proper mitigation measures may be taken.

A P P E N D I X C

C O M M E N T S A N D R E P L I E S

RECEIVED JUN 19 1980 JK

HAWAIIAN TELEPHONE COMPANY

P.O. BOX 2700 • HONOLULU, HAWAII 96811 • TELEPHONE (808) 537-7111 • CABLE: TELHAWAII

May 14, 1980

Mr. James S. Kumagai, Ph.D.
M&E Pacific, Inc.
Pacific Trade Center
Suite 600
170 South King Street
Honolulu, Hawaii 96813

Dear Mr. Kumagai:

EIS for the Agricultural Park
in Waialeale Valley

The Hawaiian Telephone Company has no comments to offer at this time. However, we would appreciate the opportunity to review and comment on the DRAFT EIS when it is completed.

Sincerely,

Richard Mau
Richard Mau
Engineering and Construction
Staff Manager

M&E Pacific, Inc.

Environmental Engineers

Pacific Trade Center, Suite 600
170 South King Street
Honolulu, Hawaii 96813
(808) 537-2651 Telex 7430085

May 27, 1980

Mr. Richard Inou
Staff Manager
Hawaiian Telephone Company
Engineering and Construction
P.O. Box 2200
Honolulu, Hawaii 96841

SUBJECT: EIS for the Waialeale Valley Agricultural Park

Thank you for your reply letter dated May 14, 1980, regarding the proposed Waialeale Valley Agricultural Park.

A notice of the draft EIS availability for public inspection will be published in the Environmental Quality Commission newsletter.

James S. Kumagai

JAMES S. KUMAGAI, Ph.D.
Vice President

XI/ep

11



The Chamber of Commerce of Hawaii
Established 1850

M&E Pacific, Inc.
Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430085

May 14, 1980

James S. Kumagai, Ph.D.
Vice President
M&E Pacific, Inc.
Pacific Trade Center
Suite 600
190 South King Street
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

Thank you for your April 25 letter asking The Chamber of Commerce of Hawaii to comment on the proposed Waiahole Valley Agricultural Park. Unfortunately, we do not have a policy on this issue and so have no statements to make at this time.

Robert B. Robinson
Robert B. Robinson
President

RBR:shk

May 27, 1980

Hr. Robert B. Robinson, President
The Chamber of Commerce of Hawaii
735 Bishop Street
Honolulu, Hawaii 96813

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated May 14, 1980, regarding the proposed Waiahole Valley Agricultural Park.

James S. Kumagai
JAMES S. KUMAGAI, Ph.D.
Vice President

KJ/ep

Chamber of Commerce of Hawaii
Honolulu, Hawaii 96813
President: James S. Kumagai
Vice President: Robert B. Robinson
Secretary: James S. Kumagai
Treasurer: Robert B. Robinson
Members: [List of names]
The Chamber of Commerce of Hawaii is a non-profit organization established in 1850 to promote the economic development of Hawaii. It is composed of representatives from various business and professional groups in the state. The Chamber's primary function is to represent the interests of its members and to provide a forum for the discussion of public policy issues affecting the economy of Hawaii. It also provides a wide range of services to its members, including information, advice, and representation before government agencies. The Chamber is committed to the highest standards of integrity and ethical conduct in all of its activities.

735 Bishop Street Honolulu, Hawaii 96813 (808) 531-4111

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Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430085

M&E Pacific, Inc.

Environmental Engineers

RECEIVED MAY 12 1980

P.O. Box 50004
Honolulu, Hawaii
96850

Soil
Conservation
Service

United States
Department of
Agriculture



Dr. James S. Kumagai
Vice President
M&E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

May 8, 1980

May 27, 1980

Mr. Jack P. Kanals
State Conservationist
U.S. Department of Agriculture
Soil Conservation Service
P.O. Box 50004
Honolulu, Hawaii 96850

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated May 8, 1980, regarding the proposed Waiahole Valley Agricultural Park.

Your comment concerning information on Agricultural Lands of Importance to the State of Hawaii will be included in the subject EIS.

James S. Kumagai

JAMES S. KUMAGAI, Ph.D.
Vice President

KI/ep

Dear Mr. Kumagai:

Subject: EIS for the Agricultural Park in Waiahole Valley

We reviewed the EIA attached to the EIS preparation notice for the Agricultural Park in Waiahole Valley. We note that the EIA does not contain any information on Agricultural Lands of Importance to the State of Hawaii. Waiahole Valley contains many acres of prime, unique and other important agricultural lands. Since the EIA did not have a project location map, we were not able to identify the classes of agricultural land in the project area.

If you need information on Agricultural Lands of Importance to the State of Hawaii, please contact Mr. Otis Gryde, District Conservationist, at 546-8326.

We hope that our comment will help you in preparing the EIS.

Sincerely,

Jack P. Kanals
JACK P. KANALS
State Conservationist

cc: Otis Gryde, DC, Honolulu Field Office



DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU JK

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK P. PASTOR
DIRECTOR

GEORGE S. MORIGUCHI
CHIEF PLANNING OFFICER

DGP4/80-1139 (CT)

M&E Pacific, Inc.
Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

May 15, 1980

Dr. James S. Kumagai, Vice President
M&E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

Environmental Impact Assessment for the Waiahole
Valley Agricultural Park, Dated February 1, 1980,
Comments Requested April 25, 1980

We have reviewed the environmental impact assessment and
have no comments.

Thank you for affording us the opportunity of reviewing
the impact assessment.

Sincerely,

George S. Moriguchi
GEORGE S. MORIGUCHI
Chief Planning Officer

GSM:fmt

May 27, 1980

Mr. George S. Moriguchi
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated May 15, 1980, regarding the proposed
Waiahole Valley Agricultural Park.

James S. Kumagai
JAMES S. KUMAGAI, Ph.D.
Vice President

KI/ep

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
MAILING DIVISION (1011)
1555 ALI'OLE DRIVE, HONOLULU, HAWAII 96813

May 15, 1980

STP 8.6252

RECEIVED MAY 21 1980
JK
MAIL ROOM

RECEIVED FROM
JAMES S. KUMAGAI
JAMES S. KUMAGAI
JAMES S. KUMAGAI
JAMES S. KUMAGAI

M & E Pacific, Inc.
Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex: 7430065

Dr. James Kumagai, Ph.D.
Vice President
M&E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

Preparation of EIS for Waiahole
Valley Agricultural Park

Thank you for giving us the opportunity to review and comment on the environmental impact assessment for the above-captioned agricultural park. Since the proposed development is adjacent to Kamehameha Highway, we recommend that your environmental impact statement include a discussion of the traffic impact at the road access which may be required. This should include actions for minimizing the impact to the agricultural park that may result from the possible widening of Kamehameha Highway.

Very truly yours,
Jonathan K. Shimada
Jonathan K. Shimada
Deputy Director

May 27, 1980

Dr. Jonathan K. Shimada
Deputy Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated May 15, 1980, regarding the proposed Waiahole Valley Agricultural Park.

Your comments regarding traffic impacts and Kamehameha Highway widening impacts will be included in the subject EIS.

James S. Kumagai
JAMES S. KUMAGAI, Ph.D.
Vice President
KI/ep

COUNCIL OF MINISTERS
GOVERNMENT



STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 1780
HONOLULU, HAWAII 96813

OFFICE OF THE SUPERINTENDENT

May 12, 1980

RECEIVED MAY 15 1980

JJK

M & E Pacific, Inc.
Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

May 19, 1980

Mr. Charles G. Clark
Superintendent
Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your letter dated May 12, 1980, regarding the proposed Waiahole Valley Agricultural Park.

Your comments concerning the effect of the project on public schools will be addressed in the draft environmental impact statement.

James S. Kumagai
JAMES S. KUMAGAI, Ph.D.
Vice President

EW/ep

Mr. James S. Kumagai
M & E Pacific, Inc.
190 S. King Street, Suite 600
Honolulu, Hawaii 96813

Dear Sir:

SUBJECT: EIS for Agricultural Park in Waiahole Valley

In response to your inquiry on the effect the proposed Waiahole Valley Agricultural Park would have on our public schools, we anticipate that projected enrollment from the 35 units can be accommodated with existing and planned school facilities.

SCHOOL	GRADE	APPROXIMATE ENROLLMENT
Waiahole Elementary	K-6	10 - 20
King Intermediate	7-9	3 - 6
Castle High	10-12	3 - 6

Should there be any questions, please contact Mr. Howard Iau at 548-5704.

Sincerely,

Charles G. Clark
CHARLES G. CLARK
Superintendent

CGC:HL:j1

cc: Windward District

AN EQUAL OPPORTUNITY EMPLOYER

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

GEORGE R. ARIYOSHI
GOVERNOR



STATE OF HAWAII
MARINE AFFAIRS COORDINATOR
OFFICE OF THE GOVERNOR
P. O. BOX 2840
HONOLULU, HAWAII 96803

May 8, 1980

James S. Kumagai, Ph.D.
Vice President
M&E Pacific, Incorporated
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, HI 96813

Dear Dr. Kumagai:

I received your letter dated April 25, 1980 on May 2, 1980, requesting my comments on the Environmental Impact Assessment for the Agricultural Park in Waiahole Valley.

After reviewing the matter, I have no objection to the EIA.

Sincerely yours,

John P. Craven
John P. Craven
Marine Affairs Coordinator

JPC/ht

JOHN P. CRAVEN, PH. D., J.D.
MARINE AFFAIRS COORDINATOR

M&E Pacific, Inc.
Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

May 19, 1980

Mr. John P. Craven
Marine Affairs Coordinator
Office of the Governor
P.O. Box 2840
Honolulu, Hawaii 96803

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your letter dated May 8, 1980, regarding the proposed Waiahole Valley Agricultural Park.

This correspondence is to confirm your response indicating that your agency has no comment on the subject EIS.

James S. Kumagai
JAMES S. KUMAGAI, Ph.D.
Vice President

JW/ep

RECEIVED MAY 15 1980

BUILDING DEPARTMENT

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
415 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK J. FISH
DIRECTOR

HOWARD M. SHIMA
DIRECTOR AND BUILDING SUPERINTENDENT

PB 80-343

M&E Pacific, Inc.

Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

May 19, 1980

Mr. Howard M. Shima
Director and Building Superintendent
Building Department
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your letter dated May 12, 1980 (reference: PB 80-343), regarding the proposed Waiahole Valley Agricultural Park.

This correspondence is to confirm your response indicating that your agency has no comment on the subject EIS.

Please be informed that we have no comments to offer on

the subject E.I.S.

Very truly yours,

HOWARD M. SHIMA
Director and Building Superintendent

AF:jo
cc: J. Harada

C-4

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

JAMES S. KUMAGAI, Ph.D.
Vice President
m/ep

RECEIVED MAY 7 1980

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 521-5151



FRANK P. FAY
DIRECTOR
FRANK Y. HIRATA
MANAGING DIRECTOR

JK (1)

GERRY CHUNG
DIRECTOR
MORIAM TAKAHASHI
SECRETARY

M&E Pacific, Inc.
Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7420063

May 7, 1980

May 6, 1980

M&E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: EIS for the Agricultural
Park in Waiahole Valley

We have reviewed the description of the proposed
Waiahole Valley Agricultural Park Project and have no
comment.

Thank you for forwarding the description for our
comment.

Very truly yours,

Richard Nagasawa
Richard Nagasawa

Mr. Richard Nagasawa
Department of Housing and
Community Development
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your letter dated May 6, 1980, regarding the proposed
Waiahole Valley Agricultural Park.

This correspondence is to confirm your response indicating that
your agency has no comment on the subject EIS.

James S. Kuniyoshi

JAMES S. KUNIYOSHI, Ph.D.
Vice President

RS/ep

ENVIRONMENTAL PREPARATION NOTICE REVIEW PERIOD

The following organizations offered comments in response to the EIS Preparation Notice. Their letters and the respective responses to their comments are reproduced on the following pages.

GEORGE S. ARITOMI
ATTORNEY AT LAW



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS
P. O. BOX 631
HONOLULU, HAWAII 96809

May 13, 1980

DIVISIONS:
CONSERVATION
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

RECEIVED MAY 15 1980

JK

M & E Pacific, Inc.
Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

May 27, 1980

Mr. James J. Yamashiro
State Parks Administrator
Department of Land and Natural Resources
Division of State Parks
P.O. Box 621
Honolulu, Hawaii 96809

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated May 13, 1980, regarding the proposed Waiahole Valley Agricultural Park.

Your comments concerning recreation and public access to the upper valley will be included in the subject EIS.

James S. Kumagai
JAMES S. KUMAGAI, Ph.D.
Vice President

KI/ep

Dr. James S. Kumagai
Vice President
M & E Pacific, Inc.
Pacific Trade Center
Suite 600
190 South King Street
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

SUBJECT: EIS for the Agricultural Park in Waiahole Valley

Thank you for the opportunity to review the Environmental Impact Assessment for the Waiahole Valley Agricultural Park.

We note that potential public recreation opportunities are not addressed in the assessment, although 163 acres are being reserved for open space or conservation and we assume a portion of the acquired land abuts previously State owned land located in the mauka portion of the valley. The recreation value of this land should be evaluated, particularly for public hiking opportunities. A related concern is the need to provide public access to mauka State owned foothill land.

Please let us know if you have any questions.

Very truly yours,

James G. Yamashiro

JAMES G. YAMASHIRO
State Parks Administrator
Division of State Parks

RECEIVED MAY 12 1980

BERNICE P. BISHOP MUSEUM

P.O. Box 19000 - St. Honolulu, Hawaii 96819 • Telephone 817-1511
May 6, 1980

James Kumagai, Ph.D.
M&E Pacific Inc.
Pacific Trade Center
Suite 600
190 South King Street
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

I have read your draft Environmental Impact Assessment for the Waiahole Valley Agricultural park which you sent to us for review.

I concur with your determination that a full environmental impact statement is necessary before this project is initiated, especially in view of extensive land use changes that will be involved in the project area.

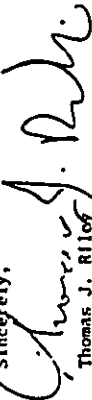
The archeology of windward Oahu is still poorly known, despite the fact that archeologists have been doing intensive work on Oahu for many years. Just recently excavations at Kawaimui marsh near Kaliua yielded some of the earliest radiocarbon dates for any of the Hawaiian Islands so far. They were the first early dates from inland sites, the others having come from coastal sites near freshwater streams.

It is very likely that Waiahole, located in an area quite suitable for forms of early Polynesian agriculture, would have been a place of early settlement as well. Full attention should be given in the environmental impact statement to the need for developing an understanding of the prehistory of this part of the Hawaiian Islands.

I would urge that the EIS, from its inception to its completion, emphasize this aspect of the impacts on the valley from development as an agricultural park as well as the other environmental, economic and social impacts to the area and its inhabitants.

Thank you for your time and consideration in this.

Sincerely,



Thomas J. Riley
Staff Archaeologist

TJR:pb

M&E Pacific, Inc.
Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

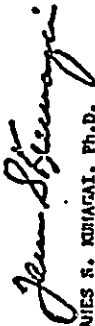
May 27, 1980

Mr. Thomas J. Riley
Staff Archaeologist
Bernice P. Bishop Museum
P.O. Box 19000-A
Honolulu, Hawaii 96819

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated May 6, 1980, regarding the proposed Waiahole Valley Agricultural Park.

As part of this EIS, an archaeological and flora/fauna field survey will be implemented and results of this survey will be included in the subject EIS.



JAMES S. KURIYAMA, Ph.D.
Vice President

KI/ep

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



RECEIVED MAY 15 1980

TELEPHONE
TE4/80-1350

M & E Pacific, Inc.
Environmental Engineers

Pacific Trade Center, Suite 470
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

May 15, 1980

Dr. James S. Kumagai
Vice-President
M & E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

Subject: Your Letter Dated April 25, 1980 Regarding
Environmental Impact Statement for the
Agricultural Park in Waiahole Valley

We have reviewed the Environmental Impact Assessment for
the Agricultural Park Project and find that there is no
mention of the City's bus service to the area. For your
information, bus service is available on Kanehama High-
way with a base headway of thirty-minutes in each direction.

We thank you for providing us this opportunity to review
and comment on the project.

Very truly yours,

Akira Fujita
AKIRA FUJITA
Acting Director

May 27, 1980

Mr. Akira Fujita
Acting Director
Department of Transportation Services
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated May 15, 1980, regarding the proposed
Waiahole Valley Agricultural Park.

Your comments concerning the City's bus services to the Waiahole area will
be included in the subject EIS.

James S. Kumagai

JAMES S. KUMAGAI, Ph.D.
Vice President

KI/ep



RECEIVED MAY 12 1980

JK

DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
BUILDING 730
FT SHAFTER, HAWAII 96858

M&E Pacific, Inc.
Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

FODED-PV

8 May 1980

Mr. James S. Kumagai
M&E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

Dear Mr. Kumagai:

In response to your letter of 25 April 1980 informing us of your intent to prepare an environmental impact statement (EIS) for the Waiahole Valley Agricultural Park, we suggest that you or your client, the Hawaii Housing Authority, coordinate your development plans with Mr. Stanley Arakaki, Chief, Operations Branch, telephone 438-9258, concerning the need for a Department of the Army permit. Our experience suggests that numerous, small wetland areas may exist in your project area, and we note that Waiahole and Uvau-Waiana Streams also flow through the valleys. The discharge of fill material into the streams and any wetlands will require a Department of the Army permit. We suggest that your development plans avoid the discharge of fill material into the streams or wetlands.

You may wish to consider land use activities that are compatible with wetland preservation, such as the cultivation of wetland crops. If the placement of fill into the streams or wetlands cannot be avoided, we suggest that you use the smallest quantity of fill possible and that the material be larger than silt size to avoid bioassay testing of the fill material. We thank you for the opportunity of participating in the EIS preparation process.

Sincerely,

B. R. Schlapak
B. R. SCHLAPAK
Colonel, Corps of Engineers
Deputy Division Engineer

May 27, 1980

Colonel Benjamin R. Schlapak
Deputy Division Engineer
Department of the Army
Pacific Ocean Division
Corps of Engineers
Building 730
Fort Shafter, Hawaii 96858

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your letter dated May 8, 1980, regarding the proposed Waiahole Valley Agricultural Park.

The proposed action will not entail the discharge of fill material into streams or wetlands. Your comments concerning the preservation of existing streams and wetlands in the valley will be included in the subject EIS.

James S. Kumagai

JAMES S. KUMAGAI, Ph.D.
Vice President

KJ/ep

RECEIVED MAY 12 1980

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1415 SOUTH BERETANIA AVENUE
HONOLULU, HAWAII 96813 AREA CODE (808) 938-4111



FRANCIS KEALA
Chief

OUR REFERENCE MS-JW

May 7, 1980

Dr. James S. Kumagai, Vice President
M & E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT FOR THE
AGRICULTURAL PARK IN WAIHOLE VALLEY

We have reviewed the environmental impact assessment for the proposed project and have concluded that it will have little affect on police operations. The addition of 35 single family dwellings will add about 144 residents and their vehicles to this area, based on the median household size of 4.1 members shown in the 1977 study of Waihole Valley. The increased demand for police services in the area is expected to be minimal.

However, we believe that it would be in the best interest of the new and existing leaseholders to consider environmental security in making improvements to existing homes or building new ones. The adequacy of lighting and the design of doors, windows, and locks can minimize opportunities for burglary and break-in, enhancing a safe life style in the valley.

Sincerely,

FRANCIS KEALA
Chief of Police

M&E Pacific, Inc.
Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

May 27, 1980

Mr. Francis Keala
Chief of Police
Police Department
1455 South Beretania Street
Honolulu, Hawaii 96814

SUBJECT: EIS for the Waihole Valley Agricultural Park

Thank you for your letter dated May 7, 1980, regarding the proposed Waihole Valley Agricultural Park.

Your comments concerning police services and household security measures will be included in the subject EIS.

JAMES S. KUMAGAI, Ph.D.
Vice President
KI/ep

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 531-3051 Telex 7430065

M & E Pacific, Inc.

Environmental Engineers

RECEIVED MAY 12 1980

United States Department of the Interior

ENVIRONMENTAL SURVEY
Water Resources Division
P.O. Box 50166
Honolulu, Hawaii 96850



May 9, 1980

Dr. James Kumagai, Vice-President
M & E Pacific, Inc.
Pacific Trade Center Bldg.
6th Floor
190 S. King Street
Honolulu, Hawaii 96813

Dear Jimmy:

In response to your letter of April 25, we have reviewed the Environmental Impact Assessment for the Waiahole Valley Agricultural Park and have the following comments:

1. The final Environmental Impact Statement should adequately address the potential suitability of the surface and ground water resources of the Waiahole Valley for both domestic and agricultural use.
2. The Environmental Impact Statement should fully analyze the probable effects of increasing the density of cesspools and septic tanks within the valley, especially the effect on the ground water.

Thank you for giving us the opportunity to review this assessment.

Aloha,

Benjamin L. Jones
Benjamin L. Jones
District Chief



ONE HUNDRED YEARS OF EARTH SCIENCE IN THE PUBLIC SERVICE

C-18

May 27, 1980

Mr. Benjamin L. Jones, District Chief
U.S. Department of the Interior
Geological Survey
Water Resources Division
P.O. Box 50166
Honolulu, Hawaii 96850

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your letter dated May 9, 1980, regarding the proposed Waiahole Valley Agricultural Park.

Your comments concerning (1) surface and ground water resources, and (2) cesspools and septic tanks will be included in the subject EIS.

James S. Kumagai
JAMES S. KUMAGAI, Ph.D.
Vice President

KJ/ep

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
GEN:SC:TH:RE:TA:MA:IA
HONOLULU, HAWAII 96813

RECEIVED MAY 21 1980



FRANK F. FASI, Mayor
YOSHIE H. FUJIKAWA, Chairman
DAT QUON FANG, Vice Chairman
RYOICHI HIGASHIMURA
TENEKITA R. JURINSKY
WALLACE S. MIYAHARA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

JK

May 16, 1980

KAZU HAYASHIDA
Manager and Chief Engineer

Dr. James S. Kumagai
Vice President
M & E Pacific, Inc.
Suite 600
Pacific Trade Center
190 South King Street
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

Subject: Your Letter of April 25, 1980,
Requesting Comments on the
Environmental Impact Assessment
for the Waiahole Valley
Agricultural Park, Oahu

We request that the following be addressed in the
environmental impact statement:

1. The source of water for both domestic and agricultural uses including water demands,
2. The effects sewage disposal will have on groundwater resources, and
3. Potential use of a dual water system where water of non-potable quality is used for irrigation.

In addition to the above three items, the developer will be subject to the following:

1. A water master plan and all construction plans must be submitted to us for review and approval.

Dr. James S. Kumagai

-2-

May 16, 1980

2. A decision on committing water for the project will be made at the time the subdivision application is reviewed by the Department of Land Utilization.

3. Should the project be served from our system, the water service limit will be dependent upon the configuration of the subdivision and the location of the water service connection.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

M&E Pacific, Inc.

Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex: 7430065


May 27, 1980

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

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your letter dated May 16, 1980, regarding the proposed Waiahole Valley Agricultural Park.

Your comments will be included in the subject EIS. The State by previous agreement with BWS will develop the water system in Waiahole Valley to provide both domestic and irrigation water to residents.



JAMES S. KUMAGAI, Ph.D.
Vice President

KI/ep

Memorandum - 2
March 27, 1980

4. It has been assumed (page 31) that the project will be exempt from parks dedication fees and water pro rata share charges. It is also proposed to include Maialole Stream in lots adjacent to it, rather than separate it out as a drainage easement lot. These matters should be cleared with the appropriate authorities before the development plan is finalized.
5. Scheme A includes 15 non-conforming agricultural lots (Fig. 6), and Scheme B includes 10 non-conforming agricultural lots (Fig. 11). These non-conforming agricultural lots would be less than the 2-acre minimum suggested for a self-supporting agricultural operation (page 28). The principal justification for this approach is that it would minimize disruption of existing tenancies. However, substandard agricultural lots may be inconsistent with the objectives of the agricultural park program.
6. In order to develop the project, it is proposed to seek various exemptions from City and County standards by following the provisions of Section 359C-4 and -4.1, HRS, relating to development of housing. Since the proposed project is primarily for an agricultural park, comparable provisions for exemption of agricultural parks from the City and County standards (Sec. 171-118, HRS) should also be cited.
7. For maximum clarification of alternatives, a "Scheme C" should be proposed which would (a) separate the agricultural park area per se from the total development and (b) provide 5-acre minimum lots within the agricultural park area. Lots smaller than two acres should be accommodated in residential or quasi-residential areas.

We have some additional detailed questions concerning some of the figures in Appendix A, but these can be discussed directly with the consultant who prepared that section.

JOHN FARIAS, JR.
Chairman, Board of Agriculture

cc: Department of Land and Natural Resources

177-1 583



HAWAII OFFICE OF AGRICULTURE
Apr 14 7 33 AM '80

FRANKLIN Y. SUNN
DIRECTOR
WILLIAM A. HALL
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING
HAWAII HOUSING AUTHORITY
P. O. BOX 17887
HONOLULU, HAWAII 96817

April 9, 1980

MEMORANDUM

TO: Mr. John Farias, Jr., Chairman
Board Of Agriculture

ATTN: Mr. Paul Schwind

FROM: Mr. Franklin Y. K. Sunn, Director
Hawaii Housing Authority

SUBJECT: Waialoha Agricultural Park--Preliminary Engineering Report

Thank you for your review and comments on the above reference subject.

Your concerns will be addressed in the final Engineering Report, essentially by the following:

1. "Portions" of Waialoha Valley will be designated as an agricultural park;
2. "Lessees" within the agricultural park will be required to derive a major portion of their income from the premises;
3. The AMISH map will be incorporated;
4. HHA will use its preemption powers regarding parks dedication fees. Water pro rata charges and drainage easement lots will be addressed;
5. Non-conforming lots may be changed or removed from the agricultural park area;
6. Agricultural park exemption provisions will be included;
7. A Scheme C will be devised.

Again, thank you for your assistance. We will forward you a final draft of the Preliminary Engineering Report when completed.

Franklin Y. Sunn
Executive Director

M&E Pacific, Inc.

Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex: 7430065

May 27, 1980

Mr. John Farias, Jr.
Chairman, Board of Agriculture
Department of Agriculture
1428 South King Street
Honolulu, Hawaii 96814

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your letter dated May 12, 1980, regarding the proposed Waiahole Valley Agricultural Park.

Your comments will be included in the subject EIS.



JAMES S. KUMAGAI, Ph.D.
Vice President

KI/ep

RECEIVED MAY 22 1980



STATE OF HAWAII
DEPARTMENT OF HEALTH

P. O. BOX 3278
HONOLULU, HAWAII 96813

May 20, 1980

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 531-3051 Telex: 7430065

M&E Pacific, Inc.
Environmental Engineers

GEORGE A. L. THOMAS
DIRECTOR OF HEALTH
VICTOR S. THOMPSON, M.D.
DEPUTY DIRECTOR OF HEALTH
HERBERT H. THOMPSON, M.D.
DEPUTY DIRECTOR OF HEALTH
JAMES S. THOMPSON, M.D.
DEPUTY DIRECTOR OF HEALTH
TAMARA THOMPSON
DEPUTY DIRECTOR OF HEALTH

IN REPLY, PLEASE REFER TO
FILE: EPHS-SS.

Dr. James S. Kumagai
Vice President
M&E Pacific, Inc.
190 S. King St., Suite 600
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

Subject: Request for Comments on Proposed Environmental Impact Statement
(EIS) for Waiahole Valley Agricultural Park, Oahu, Hawaii

Thank you for allowing us to review and comment on the subject proposed
EIS. We submit the following comments for your information and consideration:

Drinking Water

The proposed EIS should address the possibility of the proposed individual
wastewater systems adversely affecting potential groundwater resources.

Sewage Disposal

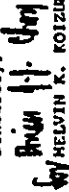
We are unable to make any comments or recommendations in regard to the proposed
individual wastewater systems without the following information:

1. Tax map key for the subject project area; and
2. Proposed subdivision plot plan.

The subject land area is very large and the topography varies significantly
from one section to another. Moreover, a significant portion of the project area
is swamp land with high water tables.

We realize that the statements are general in nature due to preliminary plans
being the sole source of discussion. We, therefore, reserve the right to impose
future environmental restrictions on the project at the time final plans are
submitted to this office for review.

Sincerely,


MELVIN K. KOIZUMI
Deputy Director for
Environmental Health

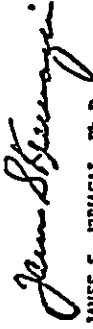
May 27, 1980

Mr. Melvin K. Koizumi
Deputy Director for Environmental Health
Department of Health
State of Hawaii
P. O. Box 3378
Honolulu, Hawaii 96801

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated May 20, 1980 (File: EPHS-SS),
regarding the proposed Waiahole Valley Agricultural Park.

Your comments concerning possible adverse effects of the proposed
individual wastewater systems on groundwater will be included in the
subject EIS. Final plans will be submitted for review upon completion.



JAMES S. KUMAGAI, Ph.D.
Vice President

KJ/ep

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430085

RECEIVED MAY 12 1980 JK

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



FRANK P. FAR
MAYOR

May 7, 1980

RAMON DURAN
DIRECTOR

M&E Pacific, Inc.
Environmental Engineers

May 27, 1980

Mr. Ramon Duran, Director
Department of Parks and Recreation
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Dr. James S. Kumagai, Ph.D.
Vice President
M&E Pacific, Inc.
190 South King Street, Suite 600
Pacific Trade Center
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

SUBJECT: ENVIRONMENTAL IMPACT ASSESSMENT FOR THE
WAIHOLE VALLEY AGRICULTURAL PARK

We have no objections to the development of the agricultural park. However, please be apprised that the proposed development of 35 single-family homes will be subject to compliance with the Park Dedication Ordinance 4621.

Thank you for the opportunity to review your assessment.

Warm regards.

Sincerely,

Ram
RAMON DURAN, Director

RD:lm

Thank you for your reply letter dated May 7, 1980, regarding the proposed Waiahole Valley Agricultural Park.

Your comment concerning compliance of the single-family houses with Park Dedication Ordinance 4621 will be included in the subject EIS.

James S. Kumagai

JAMES S. KUMAGAI, Ph.D.
Vice President

ES/ep

GEORGE R. ANTOUSHI
GOVERNOR OF HAWAII



RECEIVED MAY 27 1980
JKZ

DIVISIONS:
CONTINGENCES
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FISH AND GAME
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

May 23, 1980

Dr. James S. Kumogai
Vice President
M & E Pacific, Inc.
190 S. King Street
Honolulu, HI 96813

Dear Dr. Kumogai:

This is in response to your letter of April 25, 1980, requesting comments on an Environmental Impact Statement to be developed by your firm for an agricultural park in Waiahole Valley on Oahu.

Inasmuch as the development of an agricultural park will concern a water source, we suggest that the EIS address the potential impacts of the project upon the physical, chemical and biological parameters of the Waiahole Stream. We would appreciate the opportunity to review and comment on the forthcoming EIS.

Thank you very much for the opportunity to comment on this matter.

Yours truly,
Kenji Ego
KENJI EGO, Director
Division of Fish and Game

KE:RNY:rfm

M & E Pacific, Inc.
Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 571-2051 Telex 7430065

June 5, 1980

Mr. Kenji Ego, Director
Department of Land and Natural Resources
Division of Fish and Game
State of Hawaii
1151 Punchbowl Street
Honolulu, Hawaii 96813

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated May 23, 1980, regarding the proposed Waiahole Valley Agricultural Park.

Your comments will be included in the subject EIS. A notice will be published in the Environmental Quality Commission newsletter indicating the availability of the draft EIS for public inspection.

James S. Kumogai
JAMES S. KUMOGAI, Ph.D.
Vice President
KJ/ep

RECEIVED MAY 9 1980
DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 (808) 531-4111



Dr. James S. Kumagai, Vice President
Page 2

Thank you for the opportunity to comment at this stage of the environmental assessment. We will provide more detailed comments after the draft EIS is released.

Very truly yours,

[Signature]
TYRONE T. KUSAO
Director of Land Utilization

TTK:sl

TYRONE T. KUSAO
DIRECTOR
80/EC-4 (SE)
LU4/80-1970

May 8, 1980

Dr. James S. Kumagai, Vice President
H & E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

Environmental Impact Assessment
For the Waiahole Valley Agricultural Park
Ohu, Hawaii

We have reviewed the above assessment, and concur with your decision to prepare a full Environmental Impact Statement.

We suggest however, that you devote more intensive investigations in the following areas:

1. Impact of supplying 2.5 MGD for irrigation water on existing streamflow.
2. Compatibility of proposed wastewater systems and soils types, in addition to use of any ground water disposal system in relation to the Board of Water Supply's "No-Pass" line.
3. Study of possible impacts of increased erosion and chemical pollutants on Kaneohe Bay.

Also, at what stage of EIS Preparation will the proposed studies on flora/fauna and archaeological sites be incorporated into the document?

We would like to remind you that a small portion of the makai segment lies within the Special Management Area and will require a Shoreline Management Permit.

M&E Pacific, Inc.

Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex: 7430065

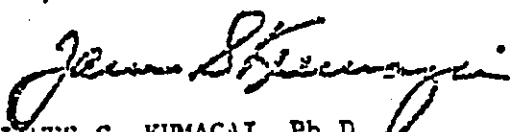
June 5, 1980

Mr. Tyrone T. Kusao, Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated May 8, 1980, regarding the proposed Waiahole Valley Agricultural Park.

Your comments will be addressed in the subject EIS. Studies on flora/fauna and archaeological sites will be incorporated into the draft EIS. Also the need to obtain a shoreline management permit will be included in the EIS.


JAMES S. KUMAGAI, Ph.D.
Vice President

RW/ep



University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (HAW) 948-7261

Office of the Director

James Kumagai
M & E Pacific, Inc.
Pacific Trade Center
190 South King Street, Suite 600
Honolulu, Hawaii 96813

Dear Mr. Kumagai:

Environmental Impact Assessment
Maialoha Valley Agricultural Park
Oahu

The Environmental Center of the University of Hawaii has received the above cited environmental impact assessment. Thank you for the information.

We do not have any comments to make at this time. We look forward, however, to reviewing the Draft Environmental Impact Statement when it becomes available.

Yours truly,

Doak C. Cox
Doak C. Cox
Director

DCC/cy

cc: John Sorensen

AN EQUAL OPPORTUNITY EMPLOYER

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

M & E Pacific, Inc.
Environmental Engineers

June 5, 1980

Mr. Doak C. Cox, Director
Environmental Center
University of Hawaii
2550 Campus Road, Crawford 317
Honolulu, Hawaii 96822

SUBJECT: EIS for the Maialoha Valley Agricultural Park

Thank you for your reply letter dated May 21, 1980, regarding the proposed Maialoha Valley Agricultural Park.

A notice will be published in the Environmental Quality Commission newsletter indicating the availability of the draft EIS for public inspection.

James S. Kumagai
JAMES S. KUMAGAI, Ph.D.
Vice President
EK/ep

CI

RECEIVED MAY 28 1980

KZ



GEORGE R. ANTONONI
GOVERNOR OF HAWAII

DIVISIONS:
CONSTITUTIONS
FISH AND GAME
FORESTRY
LAND MANAGEMENT
NATURAL RESOURCES
WATER AND LAND DEVELOPMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS
P. O. BOX 931
HONOLULU, HAWAII 96809

May 21, 1980

Mr. James S. Kumagai
M & E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

Dear Mr. Kumagai:

Subject: EIA for the Agricultural Park in Waiahole Valley

Our office has reviewed the Environmental Impact Assessment for the Agricultural Park in Waiahole Valley, and we would like to offer the following comments and recommendations for your consideration:

Our records do not indicate the presence of historical, cultural, architectural and/or archaeological resources on this property which are listed on the Hawaii Register and/or the National Register of Historic Places, or that have been determined eligible for inclusion on the National Register of Historic Places.

It is highly probable that sites exist in the proposed area of development, but as yet, have not been identified. Valleys with small farms, such as Waiahole Valley, often contain previously unrecorded sites of historic significance that might be destroyed by continued use of the area. It is incorrect to believe that only unfarmed areas have the potential to contain significant archaeological sites, as your EIA implies.

Therefore, we recommend that an archaeological reconnaissance be conducted by a qualified archaeologist within the project area, and that the final report of this research be forwarded to this office for review and evaluation. Based on our meeting of April 18, with Mr. Ken Ishizaki of your office, it is our understanding that a reconnaissance will be conducted and the results considered in the final EIS.

Sincerely yours,

Ralston Nagata, Director
Historic Sites Section

C-30

M & E Pacific, Inc.
Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex: 7430085

June 5, 1980

Mr. Ralston Nagata, Director
Historic Sites Section
Department of Land and Natural Resources
Division of State Parks
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated May 21, 1980, regarding the proposed Waiahole Valley Agricultural Park.

A field archaeological reconnaissance will be done for this EIS. A copy of the archaeological survey report will be forwarded to your office for review and comments.

JAMES S. KUMAGAI, Ph.D.
Vice President

RN/ep

RECEIVED MAY 30 1980

DEPARTMENT OF PUBLIC WORKS

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK P. PAUL
DIRECTOR

WALLACE MIYAHIRA
DIRECTOR AND CHIEF ENGINEER

ENV 80-159

May 28, 1980

Dr. James S. Kumagai
M & E Pacific, Inc.
Pacific Trade Center, Suite 600
190 S. King Street
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

Subject: EIS Preparation Notice, Waiahole Valley
Agricultural Park, Koolaupoko, Oahu, Hawaii

Presently, there are no municipal sanitary and storm sewers in the affected area. The limits of the Ahuimanu-Kahaluu sewer system as shown in the City 208 Plan do not extend into the Waiahole Valley. The method of wastewater disposal will continue to be individual household systems including cesspools or septic tanks.

All roads, public or private, should conform to the standards in the Subdivision Rules and Regulations. If the proposed subdivision roads are to remain private, we recommend a minimum AC pavement width of 20 feet with concrete or AC curbs or AC swale. A drainage system should be constructed where required.

According to the 208 Plan, non-structural measures should be utilized whenever possible, so that storm runoff after development does not greatly exceed predevelopment conditions. We also recommend that best management practices for agricultural activities be employed possibly requiring lessees to become cooperators of the Soil and Water Conservation District.

Very truly yours,

Wallace Miyahira
WALLACE MIYAHIRA
Director and Chief Engineer

M & E Pacific, Inc.

Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex: 7430065

June 9, 1980

Mr. Wallace Miyahira
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated May 28, 1980, (ENV 80-159), regarding the proposed Waiahole Valley Agricultural Park.

Your comments will be included in the subject EIS.

James S. Kumagai
JAMES S. KUMAGAI, Ph.D.
Vice President
JM/ep

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3031 Cable: M&E/PAC

M&E Pacific, Inc.
Environmental Engineers

RECEIVED MAY 30 1980
DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT
KJ
KJ
FRANK SERRANO
Branch Director



May 23, 1980

Ref. No. 1357

James S. Kumagai, Ph.D.
Vice-President
M&E Pacific, Inc.
Pacific Trade Center, Suite 600
Honolulu, Hawaii 96813

Dear Mr. Kumagai:

Subject: Waiahole Agricultural Park Environmental Impact Assessment,
Waiahole Valley, Oahu

We have reviewed the subject Environmental Impact Assessment and offer the following comments for your consideration.

Based on the stated information, the proposed project will include the development of 35 new single-family housing leases plus leases for 24 existing residences encompassing a total area of 16 acres. An effort should be made to clarify under what authority these residential leases will be developed and whether a district boundary amendment or other pertinent land use approvals and permits are required by law.

Further, an effort should be made to assess whether the proposed project is consistent with appropriate objectives, policies and Priority Directions of The Hawaii State Plan. In this review, an explanation should be made to clarify the relationship of the subject project with respect to the total State program for the development of agricultural parks on Oahu.

Thank you for the opportunity to review and comment on this document.

Sincerely,

Hideto Kono

cc: Mr. Richard O'Connell, Office
of Environmental Quality Control

June 9, 1980

Mr. Hideto Kono, Director
Department of Planning
and Economic Development
State of Hawaii
P. O. Box 2359
Honolulu, Hawaii 96804

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated May 23, 1980, (ref. no. 1357), regarding the proposed Waiahole Valley Agricultural Park.

Your comments will be included in the subject EIS.

JAMES S. KUMAGAI, Ph.D.
Vice President

JK/ep

P. O. Box 309 CT, Kaneohe, HI 96749
Branch Office



May 21, 1980

Hawaii Housing Authority
1002 North School Street
Honolulu, HI 96817

Dear Sir or Madam:

RE: Comments concerning Waiahole Valley Agricultural
Park Environmental Impact Assessment

Thank you for sending us the EIA for the proposed Waiahole Agricultural Park.

After an initial review we feel this project could be very beneficial to Waiahole residents and to neighboring communities. The proposed project seems to be consistent with the community's stated desire to maintain its rural distinction and farming practices. It also may serve as a potential model for other communities which have expressed a need for agricultural park development.

The following questions and comments are submitted for your early consideration.

1. In view of the Board of Water Supply's plans to increase water withdrawals from Windward sources for Leeward residents, we suspect the agricultural park plans will be jeopardized by a lack or loss of water for present and expanded agricultural uses. Is there enough water for Leeward residents and for increased agricultural and irrigation in Waiahole Valley? We would like to review pertinent factual supply and demand data on this water issue in the forthcoming EIS.
2. How will streams and stream-flows be affected by the proposed project?
3. Concerning housing construction: We ask that you seriously consider a "self-help" type of housing project to help lower cost to the home owners, increase local employment opportunities, and increase the agricultural park project's self-reliance and community's comradeship.
4. It is asserted (in the EIA) that agricultural productivity will be improved. How will this goal be accomplished? What sort of programs or arrangements will boost agricultural

404 PIKONI STREET HONOLULU HAWAII 96816 TELEPHONE 571-1700

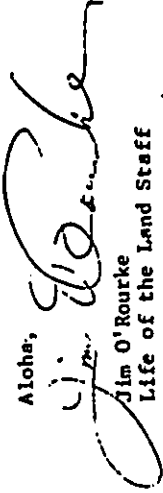
page 2

productivity and economic viability of Waiahole Valley?

5. What are the lease requirements that will encourage or assure continued use of the lots for agriculture?
6. In relation to the previous question: How many housing lots will be allowed for non-agricultural supported residents? What restrictions or requirements will these leases have?
7. Concerning potential agricultural pollutants: The mitigating measures should also include programs to increase the understanding and use of organic farming methods, which would further eliminate many unavoidable pollutant discharges into nearby Kaneohe Bay.

Thank you for allowing us this opportunity to comment. We would like to remain a consulted party on this project.

Aloha,



Jim O'Rourke
Life of the Land Staff

JO:mb
cc: M&E Pacific, Inc.

M&E Pacific, Inc.

Mr. Jim O'Rourke
June 10, 1980
Page 2

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex: 743005

M&E Pacific, Inc.
Environmental Engineers

June 10, 1980

Mr. Jim O'Rourke
Life of the Land
404 Piikoi Street
Honolulu, Hawaii 96814


SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated May 21, 1980, regarding the proposed Waiahole Valley Agricultural Park.

Our replies correspond to your numbered comments:

1. We will address both the agricultural and domestic water needs for the Waiahole Valley. However, we will not be addressing the adequacy of water supplies for Laeward Oahu.
2. The effects on the stream and stream flows will be addressed in the EIS.
3. A "self-help" type of housing project is an alternative; however, the method of constructing the housing in Waiahole Valley will most likely be left to the residents.
4. In order to accomplish the agricultural productivity goals, the formation of a Waiahole Valley Agricultural Production and Marketing Association is discussed in the EIS. Programs from the following agencies are also available to aid the farmers: College of Tropical Agriculture and Human Resources, Department of Land and Natural Resources, State Department of Agriculture, U.S. Soil Conservation Service, Department of Planning and Economic Development, and U.S. Department of Agriculture.
5. While the terms of the leases are not yet finalized, long term leases will be available to the residents. The State will monitor the lessees' activities to insure all requirements are being met. The major requirements being developed are as follows:
 - a. The property shall be used only for agricultural purposes.
 - b. The lessee shall derive the major portion of his total annual income from his activities on the premises.

- c. The lessees must comply with all Federal and State laws regarding environmental quality control.
- d. Other terms and conditions as may be set by the Board of Land and Natural Resources and the Hawaii Housing Authority.
6. The project calls for approximately 35 additional residential lots. These lots will be available, on a priority basis, first to the residents of Waiahole Valley (mauka of Kam Highway). These lots will also have long term leases.
7. Whether organic farming methods will be implemented will be left to the farmers of Waiahole Valley.



JAMES S. KUMAGAI, Ph.D.
Vice President
KI/RW/ep

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430085

M&E Pacific, Inc.
Environmental Engineers

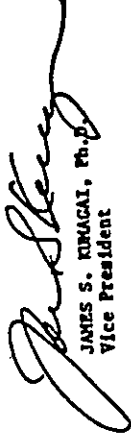
June 12, 1980

Dr. John C. McCain
Manager, Environmental Department
Hawaiian Electric Company, Inc.
Box 2750
Honolulu, Hawaii 96840

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated June 4, 1980, regarding the proposed Waiahole Valley Agricultural Park.

Your comments will be addressed in the subject EIS.


JAMES S. KIMAGAI, Ph.D.
Vice President

JW/ep

RECEIVED JUN 9 1980



HAWAIIAN ELECTRIC COMPANY, INC.
Box 2750 / Honolulu, Hawaii / 96840

ENV 2-1
NV/G

June 4, 1980

MEMO: ASSTY TO D
MANAGER ENVIRONMENTAL DEPARTMENT

M&E Pacific, Inc.
190 South King Street
Honolulu, Hawaii 96813

Gentlemen:

Subject: Comments on Environmental Impact Assessment for the Waiahole Valley Agriculture Park

Thank you very much for sending me copies of the Environmental Impact Assessment for the Waiahole Valley Agricultural Park. Several members of the staff of the Hawaiian Electric Company have reviewed this assessment and we foresee no impact on Hawaiian Electric Company's existing transmission and distribution facilities in the area and no special problem in providing service to the agricultural park.

Yours truly,



JCMc:cm

cc: Mr. Frank Y. K. Sunn
Director, HHA

RECEIVED JUN 8 1980

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Pacific Southwest Region
1151 Punchbowl Street, Room 323
Honolulu, Hawaii 96813

1600
(PIF)
June 5, 1980



Dr. James S. Kumagai
Vice President
M & E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

I am writing to you on behalf of Dr. Charles S. Hodges, Director
Institute of Pacific Islands Forestry.

Dr. Hodges referred an EIS notice to me for Waiahole Valley, which
was being prepared by your company. Although the Forest Service
did not have any comments to make at that time, I would appreciate
your sending future documents directly to me. I will obtain the
input from Institute personnel and for the Forest Service
Cooperative programs.

Sincerely,

Robert V. Clayton
ROBERT V. CLAYTON
Pacific Islands Forester

M & E Pacific, Inc.
Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430085

June 12, 1980

Mr. Robert V. Clayton
Pacific Islands Forester
U. S. Department of Agriculture
Forest Service
1151 Punchbowl Street, Room 323
Honolulu, Hawaii 96813

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated June 5, 1980, regarding the
proposed Waiahole Valley Agricultural Park.

A notice will be published in the Environmental Quality Commission
newsletter indicating the availability of the draft EIS for public
inspection.

James S. Kumagai
JAMES S. KUMAGAI, Ph.D.
Vice President

RS/ep

206

688-11 (7/79)

RECEIVED
JUN 17 1980
K1
CITY AND COUNTY OF HONOLULU
1455 S. BERETANIA STREET, ROOM 305
HONOLULU, HAWAII 96814
E. K. AINU
CHIEF

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 521-5051 Telex: 7430065

M&E Pacific, Inc.
Environmental Engineers



June 16, 1980

Mr. James Kumagai, Ph.D.
Vice President
M&E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

Subject: EIS for the Agricultural Park in Waiahole Valley
Fire protection service for the proposed project is available from the
Kahaluu Fire Station which is located approximately five miles away and with
a response time of approximately eight minutes.

Supportive service are available from the Kaneohe and Kaaawa Fire Stations.
Fire protection for the area is considered to be inadequate under the ISO
grading schedule since the project is more than four miles from the closest
fire station. In our Capital Improvement Program is a proposed fire
station for the Kualoa Park which is projected beyond fiscal 1986. Upon
completion, fire protection services may be deemed adequate. Strongly recom-
mend that all fire hydrants conform to standards established by the Board
of Water Supply for the proposed project.

Should you have any questions, please call Asst. Chief L. Sugamura at
955-8304.

Boniface K. Aiu
BONIFACE K. AIU
Fire Chief

BKA:LS:py

June 25, 1980

Mr. Boniface K. Aiu, Chief
Fire Department
City and County of Honolulu
1455 South Beretania Street, Room 305
Honolulu, Hawaii 96814

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated June 16, 1980, regarding the
proposed Waiahole Valley Agricultural Park.

Your comments will be included in the subject EIS.

James S. Kumagai
JAMES S. KUMAGAI, Ph.D.
Vice President
JK/ep

RECEIVED JUN 8 1980



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

DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF THE CHAIRMAN
1000 KALANOAU AVENUE
HONOLULU, HAWAII 96813
TELEPHONE: 521-2200
FACSIMILE: 521-2200
MAIL ROOM: 521-2200
RECEPTION: 521-2200
MAIL ROOM: 521-2200
MAIL ROOM: 521-2200

May 30, 1980

REF. NO.: APO-1687

Dr. James S. Kumagai
Vice President
Pac Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

We have reviewed the environmental assessment for the Waiahole Valley Agricultural Park and concur that an EIS is necessary for the following reasons:

- 1) Importance of water resources on Oahu.
- 2) Social impact of the project.
- 3) Importance of agriculture to a self-sufficient economy.

In our opinion, the EIS should include and discuss in detail the following:

Water Resources

- 1) The water resources of the valley, existing water uses, projected water uses, the source or sources of water to be developed, and the impact on other existing and potential water users including in-stream uses.
- 2) Physical descriptions of the proposed irrigation and domestic water systems; capital, operation and maintenance costs; management and operation of the system; cost of water to consumers; and the impacts of these various factors on the environment, the user and the operator of the system.
- 3) Location and design of water intakes and sources with respect to location and design of waste disposal facilities.

Dr. James S. Kumagai
Page 2
May 30, 1980

Social Impact

- 1) The 30 tenancies not covered by the 1977 survey.
- 2) The impacts of planned improvements on existing tenancies.
- 3) Households qualifying for housing assistance.
- 4) Evaluation of the delivery to tenant households of medical assistance, social security, and income maintenance services.

We also suggest that the project description should be broadened to include:

- 1) Identification of machine intensive farmland and labor intensive farmland.
- 2) Identification of areas not now in agriculture and analysis of constraints on such use.
- 3) Power and machine requirements; costs; and siting.

Very truly yours,

SUSUMU ONO, Chairman
Board of Land and Natural Resources

M&E Pacific, Inc.

Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
Phone 521-3051 Telex 7430065

M&E Pacific, Inc.

Mr. Susumu Ono
June 25, 1980
Page 2

June 25, 1980

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated May 30, 1980 (Ref. No. APO-1687),
regarding the proposed Waiahole Valley Agricultural Park.

Our replies correspond to your headings and numbered comments.

Water Resources

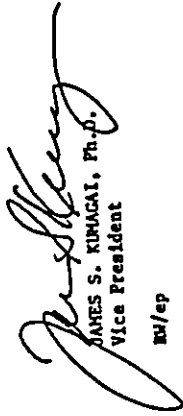
1. Your comment will be included in the subject EIS.
2. Your comment will be included in the EIS.
3. Your comment will be included in the EIS.

Social Impacts

1. The EIS will not be able to include residents who choose not to participate. However, over 75 percent of the households in Waiahole Valley will be represented and the remaining will have further opportunities to participate.
2. Your comment will be included in the EIS.
3. A list of available housing assistance programs will be included in the EIS.
4. The Department of Social Services and Housing is not aware of special programs for Waiahole residents. However, should any programs be found, they will be included in the EIS.

Additional Comments

1. We will attempt to address this topic.
2. Your comments will be included in the EIS.
3. Only generalizations on the subject topics can be made since each tenant will have the choice of crop that will be grown.


JAMES S. KIMAGAI, Ph.D.
Vice President
M/ep

KI

HISTORIC HAWAII FOUNDATION

A STATEWIDE TRUST SAFEGUARDING HAWAII'S HERITAGE

The Historic Hawaii Foundation is a nonprofit, statewide citizens' organization concerned with the preservation of the historical, architectural, social, and environmental heritage of Hawaii. Its members and its Board of Trustees represent interested and concerned persons throughout the state.

M & E Pacific, Inc.
Environmental Engineers

Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813
(808) 537-3051 Telex: 7430065

June 5, 1980

James S. Kumagai, Ph.D.
Vice President
M & E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

Thank you for the opportunity to comment on the EIS for the Agricultural Park in Waiahole Valley.

We strongly support your efforts to research any archeological sites which might be located in the area by planning and conducting an archeological survey of any new areas which will be incorporated in the proposed development.

We appreciate the fact that new facts could be uncovered in remote and little used areas which could add to our knowledge of the development of our state heritage.

Sincerely yours,

Phyllis G. Fox
Phyllis G. Fox
Executive Director

PGF:rk

cc: Edward R. Aotani, AIA

June 25, 1980

Ms. Phyllis G. Fox
Executive Director
Historic Hawaii Foundation
119 Merchant Street
Honolulu, Hawaii 96813

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your reply letter dated June 5, 1980, regarding the proposed Waiahole Valley Agricultural Park.

Your comments are appreciated and any new archaeological facts uncovered will be reported.

James S. Kumagai
JAMES S. KUMAGAI, Ph.D.
Vice President

JK/ep

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RECEIVED JUL 3 1980 JK



June 30, 1980

Hawaii Housing Authority
1002 North School Street
Honolulu, Hawaii 96817

Dear Sir or Madam:

Subject: Comments concerning Maiahole Valley Agri-cultural Park EIA

This letter is in response to your transmittal letter concern-
ing our questions on the Maiahole Agricultural Park.

Unfortunately your response to our comments about organic farm-
ing methods and agricultural pollutants was not sufficient or
was misunderstood. Nevertheless, perhaps we should further
clarify our point. As you prepare the EIS for this project,
we would like to see a study carried out that compares organic
farming methods to chemically fertilized methods. We hope such
a study would take into account the cost-benefit analysis, pol-
lution run-off, crop yields, safety to operators, resource con-
servation, and public health problems associated with each method.

Thank you for giving us this opportunity to comment on this EIA.
We look forward to reviewing the subsequent EIS concerning thi-
project.

Sincerely yours,

Jim O'Rourke
Jim O'Rourke
LOI Staff

cc: MGE Pacific, Inc.

M&E Pacific, Inc.
Environmental Engineers

August 1, 1980

Mr. Jim O'Rourke
Life of the Land
404 Piikoi Street
Honolulu, Hawaii 96814

SUBJECT: EIS for the Maiahole Valley Agricultural
Park

This correspondence is in response to your letter of June 30, 1980.

The RMA, in the development of an Agricultural Park, is not in a position
to dictate to farmers of Maiahole Valley the farming methods to be
employed. It is, however, our feeling that legal and acceptable farming
methods will be promoted through the various avenues available to farmers
(i.e., agricultural extension services and the Department of Agriculture)
throughout the State of Hawaii.

A cost-effectiveness (economic) analysis will be performed on the viability
of the project and not a comparison between organic and chemically
fertilizer farming methods.

We suggest a meeting between your organization and the farmers and other
agricultural organizations be held to discuss your concerns.

James S. Kumagai
JAMES S. KUMAGAI, Ph.D.
Vice President

MJ/ep

cc: Rex Johnson, RMA



RECEIVED JUL 31 1980

JK

United States Department of the Interior

NATIONAL PARK SERVICE
HAWAII STATE OFFICE
300 ALA MOANA BLVD., SUITE 6305
BOX 50165
HONOLULU, HAWAII 96850

July 30, 1980

IN REPLY REFER TO:
L76

Dr. James S. Kumagai
M&E Pacific, Inc.
170 S. King St., Suite 600
Honolulu, Hawaii 96813

Dear Dr. Kumagai:

SUBJECT: EIS for the Agricultural Park in Waiahole Valley

Sorry for the late reply. We are in favor of the continued agricultural use of Waiahole Valley and have no comments on the subject EIS.

Sincerely yours,

R.L. Barrel

Robert L. Barrel
Director, Pacific Area

M&E Pacific, Inc.

Environmental Engineers

Pacific Trade Center, Suite 601
190 South King Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

August 7, 1980

Mr. Robert L. Barrel
Director, Pacific Area
United States Department of the Interior
National Park Service
300 Ala Moana Blvd., Suite 6305
Box 50165
Honolulu, Hawaii 96850

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your letter dated July 30, 1980 (reference: L76), regarding the proposed Waiahole Valley Agricultural Park.

This correspondence is to confirm your response indicating that your agency has no comment on the subject EIS.

James S. Kumagai
JAMES S. KUMAGAI, P.E.
Vice President
RM/ep

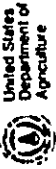
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

ENVIRONMENTAL IMPACT STATEMENT REVIEW PERIOD

The following organizations were consulted during the EIS review period. Those marked with an asterisk (*) sent written comments. The letters and responses are reproduced on the following pages.

1. Federal
 - a. Department of the Air Force
 - b. * Department of Agriculture, Soil Conservation Service
 - c. Department of Agriculture, Forest Service
 - d. * Department of the Army, Corps of Engineers
 - e. Department of the Army, Directorate of Facilities Engineering
 - f. * Department of the Navy, Civil Engineering Corps
 - g. U.S. Coast Guard
2. State
 - a. * Department of Agriculture
 - b. Department of Accounting and General Services
 - c. Department of Defense
 - d. * Department of Health
 - e. * Department of Land and Natural Resources
 - f. * Department of Planning and Economic Development
 - g. Department of Social Services and Housing
 - h. * Department of Transportation
 - i. State Energy Office
3. County
 - a. * Board of Water Supply
 - b. Building Department
 - c. Department of Housing and Community Development
 - d. * Department of General Planning

- e. Department of Land Utilization
 - f. Department of Parks and Recreation
 - g. *Department of Public Works
 - h. *Department of Transportation Services
 - i. *Honolulu Fire Department
 - j. Honolulu Police Department
4. Non-governmental Agencies
- a. American Lung Association
 - b. Hawaiian Electric Company
 - c. Hawaiian Telephone Company
 - d. *Kahaluu Neighborhood Board (Waiahole Valley Residents)
 - e. *Life of the Land
 - f. Office of Hawaiian Affairs
5. University of Hawaii
- a. *Environmental Center
 - b. Water Resources Research Center



RECEIVED JUL 1 1983

Soil Conservation Service

P.O. Box 50004
Honolulu, Hawaii
96850

June 28, 1983

Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Parnell:

Subject: Draft EIS for the Waiahole Valley Agricultural Park and Residential Lots Subdivision, Koolauapoko District, Oahu

We reviewed the subject draft environmental impact statement and offer the following comments for your consideration:

The next to last paragraph on page I-7 states that the intent of the proposed agricultural park is to locate residential lots on marginal agricultural land. Item 1 on page IV-10 states that new residential lots are restricted to marginal lands as much as possible, thus protecting prime agricultural land for agriculture. A comparison of figures I-4 and III-15 indicates the majority of the proposed residential lots will be on prime and unique agricultural lands.

We would also suggest rewording item 3 on page IV-10 to read:

"Technical assistance for the control of soil erosion is available to farmers needing it through the Windward Oahu Soil and Water Conservation District and the USDA Soil Conservation Service."

Thank you for the opportunity to review this document.

Sincerely,

Francis C.H. Lem
FRANCIS C.H. LEM
State Conservationist

cc: Hawaii Housing Authority
M&E Pacific, Inc.

The Soil Conservation Service
is a part of the
Department of Agriculture

C-45

M&E Pacific, Inc.
Engineers & Architects

Suite 500, Pauley Tower
1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430085

April 24, 1984

Mr. Francis C.H. Lem
State Conservationist
Soil Conservation Service
U.S. Department of Agriculture
P. O. Box 50004
Honolulu, Hawaii 96850

SUBJECT: Response to Comments on Draft EIS for the Waiahole Valley Agricultural Park and Residential Lots Subdivision

Thank you for your comments of June 28, 1983.

The EIS will be revised to incorporate your comments that a cluster of new residential lots will be located on prime agricultural lands. This unavoidable impact is a result of a tradeoff of utilizing a relatively small portion of prime agricultural land to concentrate housing while opening larger tracts of presently uncultivated agricultural lands for agricultural use.

Item 3 on page IV-10 will be revised per your suggestion. Thank you for the clarification.

Please call Ken Ishizaki at 521-3051 if you have any questions.

James S. Kuragai
JAMES S. KURAGAI, Ph.D.
Vice President

cc: Carleton Ching, RHA



DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT. SHAFTER, HAWAII 96835

July 6, 1983


Mr. Melvin Koizumi, Acting Director
Office of Environmental Quality Control
550 Halekauwila St., Room 301
Honolulu, Hawaii 96813

Dear Mr. Koizumi:

Thank you for the opportunity to review the EIS for Waiahole Valley Agricultural Park and Residential Lots Subdivision. The following comments are offered for your consideration:

- a. Drainage discharge and pump station structures in the stream may require a Department of the Army (DA) permit. Stream realignment will require a DA permit.
- b. Portions of the development site are regulatory flood plain areas of Zone All designation or areas of 100-year shallow flooding, and Zones A2 and A3 designations or areas of 100-year riverine flooding from Waiahole Stream. The 100-year flood refers to an event that has a one percent chance of being equalled or exceeded in any given year. Under the National Flood Insurance Program requirements, proposed structures in flood-prone areas should be flood proofed, if there is no other practicable plans and activities should be coordinated with the City and County of Honolulu, the administrator of the flood insurance program on Oahu. The County adopted its flood hazard ordinances in September 1980, placing certain restrictions on flood plain development.

Sincerely,


Kisuik Cheung
Chief, Engineering Division

M&E Pacific, Inc.
Engineers & Architects

May 10, 1984

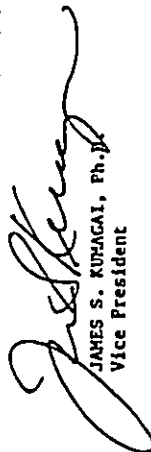
Mr. Kisuik Cheung, Chief
Department of the Army
Pacific Ocean Division
Corps of Engineers
Building 230, Fort Shafter
Honolulu, Hawaii 96858

SUBJECT: Response to Comments on the Draft EIS for the
Waiahole Valley Agricultural Park and
Residential Lots Subdivision

Thank you for your comments of July 6, 1983. Responses are provided below.

1. Comment: "Drainage discharge and pump station structures in the stream may require a Department of the Army (DA) permit. Stream realignment will require a DA permit."
Response: A pump station is not included in the preferred alternative. The Draft EIS has already acknowledged the need for Corps of Engineers' permits for drainage discharge, stream realignment, and stream withdrawal intake structures.
2. Comment: "Portions of the development site are regulatory flood plain areas of Zone All designation or areas of 100-year shallow flooding, and Zones A2 and A3 designations or areas of 100-year riverine flooding from Waiahole Stream... Under the National Flood Insurance Program requirements, proposed structures in flood-prone areas should be flood proofed, if there is no other practicable plans and activities should be coordinated with the City and County of Honolulu, the administrator of the flood insurance program on Oahu. The County adopted its flood hazard ordinances in September 1980, placing certain restrictions on flood plain development."
Response: No new residential lots have been created in designated flood-prone areas.

Please call Ken Ishizaki at 521-3051 if you have any questions.


JAMES S. KUMAGAI, Ph.D.
Vice President

RH/bs

cc: Mr. Carleton Ching, IMA

M&E Pacific, Inc.
Engineers & Architects

Suite 500, Peahi Tower
1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

October 31, 1984

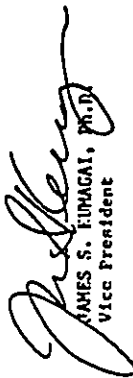
Mr. Kisuk Cheung, Chief
Department of the Army
Pacific Ocean Division
Corps of Engineers
Building 230, Fort Shafter
Honolulu, Hawaii 96858

SUBJECT: Amended Response to Comments on the Draft EIS for the
Waiahole Valley Agricultural Park and
Residential Lots Subdivision

Thank you for your comments of July 6, 1983.

The tentative water system design proposed for the subject project has been revised due to cost constraints, requiring an amendment of our initial response of May 10, 1984. The present water system design proposal will utilize groundwater as the primary supply source for both domestic and irrigation water. Tenants whose lots adjoin Waiahole Stream that opt to construct a stream intake for a private irrigation system will be responsible for compliance with all regulatory requirements, including the acquisition of a Corps of Engineers permit and compliance with the DNR's Minimum Instream Use Requirements.

Please call Ken Ishizaki at 521-3051 if you have any questions.


JAMES S. KUMATANI, Ph.D.
Vice President

dm

cc: Mr. Carleton Ching, NHA



RECEIVED JUL 8 1983

United States Department of the Interior

FISH AND WILDLIFE SERVICE
100 ALA MOANA BOULEVARD
P. O. BOX 50187
HONOLULU, HAWAII 96830

IN STATE OFFICE USE

ES
Room 6307
JUL 7 1983

Mr. Melvin K. Koizumi
Acting Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Mr. Koizumi:

The Service has reviewed the Environmental Impact Statement (EIS) which was forwarded to us with your letter of July 7, 1983 concerning the Waiahole Valley Agricultural Park and Residential Lots Subdivision. The EIS needs to clarify discrepancies in streamflow data and minimum streamflow standards. The EIS is incomplete in analyzing impacts on biological resources due to reduced flows in Waiahole Stream, potential cesspool failures and possible pesticide contamination. The effects of these impacts should be thoroughly discussed in the final EIS.

The EIS uses streamflow data from a report prepared by the Russ Smith Corp. (1980) entitled, Preliminary Engineering Report Covering Water Resources in Waiahole Valley. The report refers to site 177 (USGS station 162910) located at the 250-foot elevation level on Waiahole Stream. The reported average streamflow for the period of 1955-1966 at this site is 3.25 MGD. However, USGS Water-Supply Paper 2137 (1977) reports that the average streamflow obtained for years 1955-1968 at this station was 9.5 MGD.

USGS Water-Supply Paper 1894 (1969) notes that streamflow data obtained for this station must be corrected for occasional pumping of water from Waiahole Stream to Waiahole Ditch Tunnel and for wastage of tunnel water to the stream. Adjusted flow records from 1955 to 1960 for station 177 gave an average flow of 4.75 MGD and observed Q90 of 3.4 MGD.

The 1977 USGS streamflow calculations are more than three times greater than that reported by the Russ Smith report for three times for almost the same period of time. The 1977 USGS paper covers a longer period of record than either the Russ Smith or 1969 USGS reports. The Russ Smith report is based on data provided by the USGS. Thus, the 1977 USGS calculations may be a better indication of the long-term average streamflow for Waiahole Stream. It is unclear whether the data in the 1977 report has been adjusted to incorporate water pumping and wastage. The final EIS should clarify discrepancies on flow values.

With the development of the upper Waiahole Valley alternative for water resources (page V-5), the statement (page IV-8), "At worst, existing flow conditions will be maintained," is inaccurate. According to the EIS, if Amfac's agreement is terminated an additional 1.1 MGD will flow into Waiahole Stream. However, 2.2 MGD will be withdrawn from the stream for irrigation (and later released into Waianu Stream).

Although this theoretically keeps streamflow the same below the confluence of Waiahole and Waianu Streams, an approximate 2-mile reach of Waiahole Stream between the intake and confluence will lose 1.1 MGD. A decrease in waterflow will reduce the amount of habitat available for native stream fauna. The significance of impact is dependent on the streamflow at that time. The loss of habitat is not directly proportional to flow (i.e. a small loss of flow sometimes results in a large loss of habitat). According to the Russ Smith report (page 25), development of this alternative will remove all low flows from Waiahole and Waianu Streams so that the stream discharge of the future would be zero.

We believe that zero streamflow is a small probability; however, it may be very low (less than .5 MGD). Low flows will have a negative impact on habitat for native stream fauna. Loss of streamflow may also reduce the stream's capacity to dilute accidental pesticide contamination. Impacts to native stream fauna due to reduction in streamflow within this reach should be analyzed and discussed in the final EIS. The advantages and disadvantages of the three water resource development alternatives which were discussed in the Russ Smith report should be included in the final EIS.

The development of the upper Waiahole Valley alternative will include tunneling and construction of a dam, reservoir and pipeline in the State forest reserve (page IV-11 & V-10). Their location and design should be included in the final EIS along with an expanded discussion of potential impacts to fish, plant and wildlife resources.

The development of a minimum streamflow standard will differ based upon which average streamflow value is used in Tennant's (1976) (page IV-9) equation. His analysis of minimal flow is based on "undepleted" USGS hydrology data for streams in their pristine condition. Waiahole Stream is already impacted by the Waiahole Dike System. If the final EIS is to use Tennant's model, streamflow values prior to dike diversion should be used. According to Tennant, 60-100% of the average streamflow is the optimum range for instream flow for fish, wildlife, recreation and related environmental resources. Table IV-1 should be



C-48

Save Energy and You Save America!

100 ALA MOANA BOULEVARD
P. O. BOX 50187
HONOLULU, HAWAII 96830

corrected to reflect this criteria. Tennant's model is based on Montana river systems which have a pronounced seasonality, whereas Hawaii does not. These differences should be addressed and analyzed accordingly for impacts on native stream resources in the final EIS.

The Army Corps of Engineers does not have jurisdiction over Waiahole and Waiānu Streams because they are not considered navigable waters (Russ Smith report, page 31). Therefore, they may be unable to stipulate minimum streamflow conditions in their COE permit (EIS page IV-52).

The Waiahole Valley Agricultural Park will result in the construction of 20 new agricultural plots above the "no pass" line which was developed by the Board of Water Supply to protect potential groundwater supplies. The possibility of cesspool (dual black water-grey system) failure and long-term pesticide leaching exists, which may contaminate future water supplies. Impacts to surface and potential groundwater supplies as well as biological resources should be assessed in the final EIS.

Table IV-8 should include toxicity levels for aquatic resources, since runoff and irrigation overflow may transfer pesticides and or residues into the stream system. A single episode of pesticide contamination may not have a significant impact on stream fauna; however, cumulative activities will have an adverse effect. The presence of different pesticides can have a synergistic negative impact on stream organisms. Impacts of pesticide contamination and cesspool pollution on native stream fauna could be more thoroughly discussed in the final EIS (page IV-3). Information taken from the USFWS Resource Publication 137 entitled, Handbook of Acute Toxicity of Chemicals to Fish and Aquatic Invertebrates, is enclosed. We appreciate this opportunity to comment.

Sincerely yours,



William R. Kramer
Acting Project Leader
Office of Environmental Services

Enclosure

cc: NMFS - WPO
HDAR
HDF&M
EPA, San Francisco
HHA
H & E Pacific, Inc.

M&E Pacific, Inc.
Engineers & Architects

April 24, 1984

Mr. William R. Kramer
Acting Project Leader
U.S. Fish and Wildlife Service
300 Ala Moana Boulevard
P.O. Box 51067
Honolulu, Hawaii 96850

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your comments of July 7, 1983. Responses are provided below.

1. Comments: Apparent discrepancies between various USGS publications of stream flow data for station 16-2910.

Response: The average stream flow for years 1955-1968 as reported in U.S.G.S. Water Supply Paper 2137 is 9.5 cfs, which is equivalent to 6.14 MGD. The Preliminary Engineering Report Covering Water Resources in Waiahole Valley (PER), 1980, by the Russ Smith Corp. was based on the period of 1955-1966 as reported in Water Supply 1996, which listed the average flow of 8.32 cfs, or 5.78 MGD. As indicated in the PER, the aforementioned flows are gage measurements at the 250 ft. level and pumped water is diverted at the 450 ft. level, thus these measures and the discharge duration curve derived from these measures would account for pumpage. The PER also indicates that 3.25 MGD or more flowed 50% of the time, which defines the median value. Perhaps confusion might have resulted from the data in Table III-2 of the Draft EIS, which inadvertently mislabeled the 3.25 MGD figure as "average," rather than median.

The PER also included the same excerpt from Water Supply Paper 1894 regarding adjusted flows, which are approximations of what stream flow would be during 1955-1960 if no pumping occurred. Because the different periods of record would reflect different periods of precipitation, it would be unrealistic to attempt correlation of flow averages, but a comparison of flows at specified frequencies should correlate as long as extreme values are not utilized. After the 90 value of 2.1 MGD as reported in the EIS and PER is corrected for the typical 1.1 MGD pumpage, the "adjusted" 90 for 1955-1967 is approximately 3.2 MGD, which is similar to the "adjusted" 90 of 3.4 MGD approximated for 1955-1960 in Water Supply Paper 1894.

2. Comment: The statement, "At worse, existing flow conditions will be maintained," is inaccurate.

M&E Pacific, Inc.

Mr. William R. Kramer
April 24, 1984
Page 2

Response: The statement was intended to read, "At worse, existing flow conditions in Waianu Stream will be maintained." The revised preferred alternative will leave the Waianu stream system untouched. The Revised EIS will be revised accordingly.

3. Comment: Low flow stream discharge of the future will be zero.

Response: The report intended to indicate that immediately downstream of the diversion point, the flow would be zero. However, the irrigation diversion system has since been modified to permit continuous low flows to pass through in the interest of maintaining an adequate instream flow. The design flow quantities will be reported in the Revised EIS.

4. Comment: The location and design of the dam, reservoir and pipeline should be included in the final EIS.

Response: When the water system design is finalized a description of the system and its impacts will be covered in the Revised EIS.

5. Comment: "Undepleted" stream flow measurements taken prior to the construction of the Waiahole Ditch Tunnel should be utilized for the Tennant method.

Response: The Waiahole Ditch Tunnel has been in existence for nearly three quarters of a century. During this span, the ecosystem has been permanently altered and replaced by another balanced, "indigenous", well-established population pertaining to post-tunnel construction flows. To gauge the biological impact through comparison with an ecosystem that no longer and probably never will again exist is unjustifiable. The impact of the proposed modification should be based on the existing permanent conditions. Furthermore, only 3-1/2 months of pre-ditch tunnel stream flow records exist, insufficient to establish a reliable flow distribution record.

6. Comment: Table IV-1 should be corrected so 60%-100% of the average stream flow indicated the optimum range for instream flow.

Response: The table will be duly corrected in the Revised EIS.

7. Comment: "Tennant's model is based on Montana river systems which have a pronounced seasonality, whereas Hawaii does not."

Response: As indicated in Figure III-10 of the Draft EIS, the average monthly stream flow does have a distinct seasonality. If November-April and May-October are used to define the wet and dry weather seasons respectively, the wet weather season average is triple that of the dry weather season average.

M&E Pacific, Inc.

Mr. William R. Kramer
April 24, 1984
Page 3

8. Comment: "The Army Corps of Engineers do not have jurisdiction over Waiahole and Waianu Streams because the(y) [sic] are not considered navigable waters."
- Response: In addition to Section 10 of the Rivers and Harbors Act (1899), Section 103 of the Marine Protection, Research & Sanctuaries Act (1972) and Section 404 of the Federal Water Pollution Control Act Amendments (1972) have empowered the Corps of Engineers to protect the quality of our water resources and valuable wetlands. This jurisdiction would also encompass the revetments and riprap planned for short segments of Waiahole Stream.

9. Comment: Cesspool failure and pesticide leaching could contaminate ground water supplies.
- Response: The dual wastewater system proposed in the Draft EIS required the cessation of cesspools use for lots above the "no pass" line and proposed the use of closed vaults for black water and leaching fields for gray water. In accordance with comments made by the Department of Health (DOH) and the Board of Water Supply (BWS), the leaching field will be withdrawn as a recommendation and only closed vaults or other approved systems will be used above the no pass line. Likewise, tenants below the no pass line can only install approved systems. The selection of approved systems to prevent wastewater contamination is governed by Chapter 57 of Title 11, Administrative Rules. The prevention of the misapplication and misuse of pesticides are enforced by the Department of Agriculture under Chapter 149A, HRS, and the DOR through the BWS under Chapter 20 of Title 11, Section 3, Administrative Rules.

10. Comment: Table IV-8 of the Draft EIS should include toxicity levels for aquatic resources. U.S. Fish and Wildlife Service Resource Publication 137 is enclosed.
- Response: As indicated in the Federal Register, Vol. 45, No. 231, Friday, November 28, 1980, as amended by Vol. 49, No. 26, Tuesday, February 7, 1984, the EPA has not established chronic toxicity levels, safe limits or guidelines for the pesticides listed in the Table IV-8 of the Draft EIS, in regards to affects on fresh water or salt water aquatic life. Report Publication 137 has tested 5 of the 6 pesticides listed on Table IV-8 on exotic species that are non-native to Hawaii. Because of the high variability of acute toxicity limits between the various indicator organisms, the extrapolation of the noted effects on the exotic species to native species would be highly misleading and inappropriate. At the present, there is insufficient data to establish reasonable threshold limits for the specific aquatic species that may be potentially affected.

M&E Pacific, Inc.

Mr. William R. Kramer
April 24, 1984
Page 4

Please call Ken Ishizaki at 521-3051 if you have any questions.



JAMES S. KURAGAI, P.E.
Vice President

dm
cc: Carleton Ching, HHA

M&E Pacific, Inc.
Engineers & Architects

Suite 500, Punalu'u Tower
1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

October 31, 1984

Mr. William R. Krawser
Acting Project Leader
U.S. Fish and Wildlife Service
300 Ala Moana Boulevard
P.O. Box 51067
Honolulu, Hawaii 96850

SUBJECT: Amended Response to Comments on the
Draft EIS for the Waiahole Valley Agricultural Park

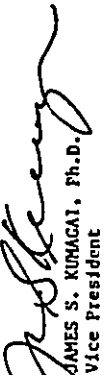
Thank you for your comments of July 7, 1984.

The tentative water system design proposed for the subject project has been revised due to cost constraints, requiring an amendment to our initial response of April 24, 1984. The present water system design proposal will utilize groundwater as the primary supply source for both domestic and irrigation water. Furthermore, consumption design quantities have been scaled down.

These design changes will affect the concerns raised by your comments in the following manner:

1. Tenants whose lots adjoin Waiahole Stream that opt to construct a stream intake and a private irrigation system will be responsible for compliance with all regulatory requirements, including the DLNR's Chapter 167 of Title 13 and Corps of Engineers permit requirements.
2. The proposed quantities of water to be utilized for domestic and irrigation water have markedly decreased. The actual net impact may result in an increase of available water for stream fauna. This proposed preferred water system alternative will be delineated further in the Revised EIS.

Please call Ken Iehizaki at 521-3051 if you have any questions.


JAMES S. KUNAGAI, Ph.D.
Vice President

G-52

dm

cc: Mr. Carleton Ching, PHA

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RECEIVED JUL 8 1983



GEORGE B. ARIYOSHI
GOVERNOR

JACK K. SUWA
CHAIRMAN, BOARD OF AGRICULTURE

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
P. O. Box 22159
Honolulu, Hawaii 96822
July 6, 1983

MEMORANDUM

To: Office of Environmental Quality Control
Subject: Environmental Impact Statement
Maialole Valley Agricultural Park and Residential
Lots Subdivision
Maialole Valley, Oahu

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

We continue to be concerned about the proposal to request an exemption to allow one-acre minimum agricultural lots. These non-conforming agricultural lots would be less than the 5 acre minimum required for a viable operation for a farm family for most crops on the 3 acres with multicropping, as stated on page IV-27 of the EIS. While we understand that disruption of existing tenancies would be minimized, substandard agricultural lots may be inconsistent with the objectives of the agricultural park program. Such lots should not be included in the area for which agricultural park funds are to be used for CIP expenditure.

Regarding sources of financing (pages 121-22), it is our understanding that funds from the Federal Farmer's Home Administration are not available for the subject project; that the project will be substantially redesigned to reduce the balance of construction funds required; and that a supplemental EIS will be issued to reflect these changes. As one of the funding agencies for this project, we expect the Hawaii Housing Authority to keep us timely informed of the progress of the revisions.

We believe that the EIS should more thoroughly discuss the impacts of the possible termination of the lease between Arfac and the State for the 1.1 mgd of water which is currently being pumped from Maialole Stream by the Maialole Water Company. We suggest that this discussion include possible alternative uses of the 1.1 mgd as well as any impacts to sugarcane irrigation and demand for groundwater in Central Oahu.

"Support Hawaiian Agricultural Products"

Office of Environmental Quality Control
Page -2-
July 6, 1983

While we note that some maps do contain numbered lots, some of the numbers are not readable and other maps were not numbered. We therefore suggest that the lots be numbered, the acreage given, and encumbered lots identified on the maps.

Thank you for the opportunity to comment.

JACK K. SUWA
Chairman, Board of Agriculture

cc: Hawaii Housing Authority
H & P Pacific, Inc.
DLIR

M&E Pacific, Inc.
Engineers & Architects

Suite 500, Pukaui Tower
1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

M&E Pacific, Inc.

Mr. Jack K. Suwa
April 24, 1984
Page 2

April 24, 1984

Mr. Jack K. Suwa
Chairman, Board of Agriculture
Department of Agriculture
1428 South King Street
P.O. Box 22159
Honolulu, Hawaii 96822

SUBJECT: EIS for the Waiahole Valley Agricultural Park

Thank you for your comments of July 6, 1983. Responses are provided below:

1. Comments: Use of agricultural park funds for substandard agricultural lots.

Response: The 1 acre size agricultural lots created to minimize the disruption of existing tenancies will be funded through the Hawaii Housing Authority's Dwelling Unit Revolving Fund (DURF).

2. Comments: Federal Farmer's Home Administration (FHA) funds.

Response: The FHA funds have been eliminated from consideration as a source of funding. Costs and sources of financing will be updated in the Revised EIS.

3. Comment: The project will be substantially redesigned to reduce construction costs, and a supplemental EIS will be issued to reflect these changes.

Response: The roadway was redesigned to below City standards to reduce capital costs, thus the state will be responsible for maintenance of the roads. These considerations will be addressed in the Revised EIS.

4. Comment: Impacts of the Amfac lease termination including alternative uses of the 1.1 MGD of water.

Response: Rising energy costs have reduced the cost-effectiveness of pumping irrigation water from Waiahole, thus in recent years Amfac has declined to utilize this source of irrigation in central Oahu. Alternative uses are not planned for the immediate future. The cessation of pumpage will not result in negative impacts to central Oahu water supplies since irrigation water uses by Amfac is expected to change much more significantly through the reduction of cultivated sugar cane acreage and the increased use of drip irrigation.

5. Comment: Illegible lot numbers on maps and no indications of acreage or encumbered lots.

Response: The maps in the Draft EIS were not intended for the purpose of indicating subdivision plans. The existing parcels can be determined from tax map atlases. The Revised EIS will contain a map of the proposed subdivision with an indication of the number and the total acreage of encumbered and non-encumbered lots. An updated list of existing tenancies will be presented in Appendix A. A preliminary copy of the proposed general plan with legible lot numbers, acreages and encumbrances will be sent to you under separate cover if you so desire.

Please call Ken Ishizaki at 521-3051 if you have any questions.


JAMES S. KAGAI, Ph.D.
Vice President

dm

cc: Carleton Ching, HMA

GEORGE S. ABRONIA
DIRECTOR OF HEALTH



STATE OF HAWAII
DEPARTMENT OF HEALTH

P. O. BOX 3219
HONOLULU, HAWAII 96811

July 25, 1983

CHARLES S. CLARK
DIRECTOR OF EPCPC

IN REPLY, PLEASE REFER TO:
FILE: EPHS-SS

MEMORANDUM

To: Acting Director
Office of Environmental Quality Control

From: Chief, Environmental Protection & Health Services Division

Subject: Environmental Impact Statement (EIS) for Proposed Wainhole Agricultural Subdivision, Wainhole Valley, Koolinupoko, Hawaii

Thank you for allowing us to review and comment on the subject EIS.

We submit the following comments for your information and consideration:

Drinking Water

The proposed EIS should address the possibility of the proposed individual wastewater systems adversely affecting potential groundwater resources. This statement was made previously and is still in effect.

Sewage Disposal

The development plan proposes the subdivision of land into agricultural (47 lots), residential (83 lots), and conservation (5 lots) designations. Since no public sewerage system is available, the use of onsite individual wastewater system, primarily closed vault and cesspool is suggested by the applicant's consulting engineers.

From our cursory observation, the topography of the land varies drastically from swamp lands to steep hillsides. Under these conditions, the functional capabilities of the subsoil strata to satisfactorily percolate sewage into the ground remain questionable, especially if cesspools are utilized.

Another factor to contend with is the problem of surface drainage. As you are aware, individual wastewater systems are closely dependent on good surface drainage for satisfactory performance. The proposal to re-align and shore-up the banks of the Wainhole Stream above Kamehameha Highway will not sufficiently improve the drainage problem and will invariably adversely affect cesspool performance.

The plan also supports the segregation of sewage into black and grey wastewaterers in the "No Pass" zoned area; the black waters to be retained in closed vault with a pumping frequency of once a month based on a 2,000 gallon capacity and the grey waters to be disposed of into the field as irrigation. The Department of Health does not approve this concept based on the fact that grey waters which are destined for fruit irrigation is not free of pathogenic bacteria.

C-155

Acting Director, OEQC

-2-

July 25, 1983

In view of the vast difference in cesspool performances and subsoil formation throughout the subdivision, the granting of a blanket approval for the use of cesspools or individual wastewater systems is not possible. Other improved methods of approved disallowance of the segregated system, the design capacity for the vault will have to be revised.

We recommend that the applicant's consulting engineers meet with Mr. Tsutomu Kubota of our Sanitation Branch to further clarify what could be acceptable individual wastewater systems for the subject project.

Noise

1. We have reservations in the subject project due to the proposed non-compatible use of land. Noise associated with agricultural activities can have an adverse effect on residential areas. Although both residential and agricultural land uses presently exist, the proposed development include additional agricultural lots which may increase noise impacts. In addition, the proposed additional residential lots would result in more people being impacted.

2. The average sound levels cited for quiet talking as 59-66 dBA (Table IV-2, Page IV-17) are levels for normal conversational speech, as indicated in various references. These levels were used in comparing calculated tractor noise level of 55 dBA. However, intrusive noise should be based on background noise levels, a calculated level of 55 dBA would be intrusive based on the 45.5-50 dBA background noise levels referenced on Page III-39.

3. As addressed on Page IV-18, residents who have chosen to live in a rural setting should expect noise from roosters, but due to the early morning occurrence, it can develop into a serious problem. Therefore, mitigative measures must be required to prevent such nuisance.

4. Based on the above comments and supplement to that addressed in Chapter IV, Pages IV-15 through IV-18, various mitigative measures as barriers, berms and other means of land use separation, should be implemented in order to minimize noise disturbances.

5. Activities associated with construction phase must comply with the provisions of Title II, Administrative Rules Chapter 43, Community Noise Control for Oahu.

a. A noise permit must be obtained if the noise levels from the construction activities are expected to exceed the allowable noise levels of the regulations.

b. Construction equipment and on-site vehicles or devices requiring an exhaust of gas or air must have a muffler.

c. The conditional use of the permit must be complied with as specified in the regulations and the conditions issued with the permit.

6. Traffic noise from heavy vehicles traveling to and from the construction site must be minimized in residential areas and must comply with the provisions of Title II, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.

Acting Director, OEQC

-3-

July 25, 1983

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.



SHINJI SONEDA

M&E Pacific, Inc.
Engineers & Architects

Suite 500, Puuhale Tower
1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

July 31, 1984

Mr. Shinji Soneda
Chief, Environmental Protection & Health Services Division
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

SUBJECT: EIS for Waiahole Valley, Agricultural Park (File EPRS-SS)

Thank you for your comments of July 25, 1983. Our previous response dated April 24, 1984 contained an error regarding the proposed project, thus is amended herein. Additional project plan changes made in the interim have also been incorporated in this reply. The revised responses are as follows:

1. Comment: Blanket approval for use of cesspools or cesspools with modifications is not possible.
Response: No blanket approval for cesspool use has been requested. Each tenant will be mandated by the lease agreement to comply with all municipal, state, and federal rules, ordinances and laws, including Chapter 57 of Title 11, "Private Wastewater Treatment Works and Individual Wastewater Systems." As indicated in Section 8, the intended user shall individually file for the approval of an adequately designed (and located) sewage disposal system.
2. Comment: The Department of Health (DOR) does not approve of the concept of dual black water-gray water sewage disposal systems.
Response: In accordance with the comments made by the DOH and the Board of Water Supply, the proposed recommendation for a dual black water vault/gray water leaching field system for new tenancies above the no pass line will be withdrawn; instead, new tenants will be advised to install closed vaults or some other approved wastewater system. Mr. Tsutomu Kubota of your office has advised us that your department has reached an understanding with the Board of Water Supply to "grandfather" existing cesspools in place above the no-pass line prior to the designation of the latter.
3. Comment: "The proposal to realign and shore-up the banks of the Waiahole Stream above Kaeleahaha Highway will not sufficiently improve the drainage problem and will invariably adversely affect cesspool performance."

M&E Pacific, Inc.

Mr. Shinji Sameda
July 31, 1984
Page 2

Response: Present plans will not require the realignment of Waiahole Stream; only the placement of boulder riprap for bank stabilization is planned. These modifications have nothing to do with surface drainage. If the stream was left to continue its natural meandering, it would have undercut and eventually destroyed a segment of Waiahole Valley Road, blocking vehicular access to the bulk of the valley. The boulder riprap lining the banks for erosion prevention will not impede the overland sheet flow that presently drains into the stream, thus will have no adverse effects on surface drainage or cesspool performance.

4. Comment: Noise associated with agricultural areas can have an adverse effect on residential areas.

Response: The bulk of the additional lots will be made available on a priority basis to existing Waiahole and Waikane residents, who should already be aware of the noise levels associated with agricultural areas, if not accustomed to them. Furthermore, the noise will be mitigated by the natural buffers provided by the rolling terrain and mature trees, in addition to the low mechanization requirements of crops such as bananas and papayas. As a precautionary measure, prospective tenants will be made aware of the potential noise levels of this agricultural area prior to the signing of leases. Those wishing to take additional sound attenuative measures that do not violate City grading ordinances may do so at their own option.

5. Comment: The "... calculated tractor noise ... level of 55 dBA would be intrusive based on the 45-50 dBA background noise levels referenced on Page III-39."

Response: The projected background noise levels of 50 and 46.5 dBA noted on page III-39 of the Draft EIS were exceeded 50 percent and 90 percent of the time. Background noise levels are statistical distributions that can be expected to exceed even the 55 dBA level a certain percentage of the time. The comparison of tractor noise at the residential boundary with quiet talking demonstrated the relatively low degree of noise levels and compliance with residential noise limits (Chapter 43 of Title 11, Administrative Rules). As noted in the previous response, low mechanization requirements should limit the duration of "intrusive" agricultural noise levels.

6. Comment: Activities stemming from construction noise must comply with Chapters 42 and 43 of Title 11, Administrative Rules.

Response: All construction activities will comply with the applicable provisions of Chapters 42 and 43, which will include securing the necessary permits.

M&E Pacific, Inc.

Mr. Shinji Sameda
July 31, 1984
Page 3

Please call Ken Ishizaki at 521-3051 if you have any questions.



JAMES S. KIKAGAKI, Ph.D.
Vice President

dm

cc: Carleton Ching, RHA

M&E Pacific, Inc.
Engineers & Architects

Suite 500, Peahi Tower
1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

April 24, 1984

Mr. Shinji Soneda
Chief, Environmental Protection & Health Services Division
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

SUBJECT: EIS for Waiahole Valley, Agricultural Park (File EPHS-SS)
Thank you for your comments of July 25, 1983. Responses are as follows:

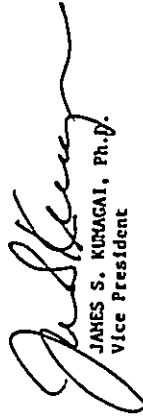
1. Comment: Blanket approval for use of cesspools or cesspools with modifications is not possible.
Response: No blanket approval for cesspool use has been requested. Each tenant will be mandated by the lease agreement to comply with all municipal, state, and federal rules, ordinances and laws, including Chapter 57 of Title 11, "Private Wastewater Treatment Works and Individual Wastewater Systems." As indicated in Section 8, the intended user shall individually file for the approval of an adequately designed (and located) sewage disposal system.
2. Comment: The Department of Health (DOH) does not approve of the concept of dual black water-gray water sewage disposal systems.
Response: In accordance with the comments made by the DOH and the Board of Water Supply, the proposed recommendation for a dual black water vault - gray water leaching field system will be withdrawn. The tenants above the "no pass" line will be required to close all existing cesspools and install vaults or some other approved wastewater system.
3. Comment: "The proposal to realign and shore-up the banks of the Waiahole Stream above Kamehameha Highway will not sufficiently improve the drainage problem and will invariably adversely affect cesspool performance."
Response: The realignment of the stream has nothing to do with surface drainage. Straightening of the sharp bend in the stream was intended to increase hydraulic capacity and prevent overflowing of the stream at this segment. Furthermore, if the stream was left to continue its natural meandering, it would have undercut and eventually destroyed a segment of Waiahole Valley Road, blocking vehicular access to the bulk of the valley. The boulder riprap lining the banks for erosion prevention will not impede the overland sheet flow that presently drains into the stream, thus will have no adverse effects on surface drainage or cesspool performance.

M&E Pacific, Inc.

Mr. Shinji Soneda
April 24, 1984
Page 2

4. Comment: Noise associated with agricultural areas can have an adverse effect on residential areas.
Response: The bulk of the additional lots will be made available to existing Waiahole and Waikane residents, who should already be aware of the noise levels associated with agricultural areas, if not accustomed to them. Furthermore, the noise will be mitigated by the natural buffers provided by the rolling terrain and mature trees. In addition to the low mechanization requirements of crops such as bananas and papayas. As a precautionary measure, prospective tenants will be made aware of the potential noise levels of this agricultural area prior to the signing of leases. Those wishing to take additional sound attenuative measures that do not violate City Grading ordinances may do so at their own option.
5. Comment: The "... calculated tractor noise ... level of 55 dBA would be intrusive based on the 45.5-50 dBA background noise levels referenced on Page III-39."
Response: The projected background noise levels of 50 and 44.5 dBA noted on page III-39 of the Draft EIS were exceeded 50 percent and 90 percent of the time. Background noise levels do not have an absolute limit, but are statistical distributions. Background noise levels can be expected to exceed even the 55 dBA level a certain percentage of the time. As noted in the previous response, low mechanization requirements should limit the duration of "intrusive" agricultural noise levels.
6. Comment: Activities stemming from construction noise must comply with Chapters 42 and 43 of Title 11, Administrative Rules.
Response: All construction activities will comply with the applicable provisions of Chapters 42 and 43, which will include securing the necessary permits.

Please call Ken Ishizaki at 521-3051 if you have any questions.


JAMES S. KUNAGAI, Ph.D.
Vice President

dm

cc: Carleton Ching, IHA

George R. Atkinson
Governor of Hawaii



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

BYRONARD ONO, CHAIRMAN
Board of Land & Natural Resources
EUGENE A. HILLIS
Secretary of the Commission
DIVISIONS:
AGRICULTURAL DEVELOPMENT
FOREST RESOURCES
ADULT EDUCATION
CONSERVATION AND
RECREATION
HAWAIIAN CULTURE
CONSERVATION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 14, 1983

Mr. Melvin K. Koizumi
Acting Director
Office of Environmental Quality Control
550 Halekuanila Street, Room 301
Honolulu, Hawaii 96813

Dear Mr. Koizumi:

We appreciate the opportunity to review the draft of an environmental impact statement (EIS) for the Maialoha Valley agricultural park and residential subdivision. We have a number of concerns regarding this project:

HISTORIC SITES

Our historic sites office has not received a copy of the archaeological reconnaissance report on the project area. We recommend that two copies of this report be submitted for review and evaluation. Based on the findings in the reconnaissance report, we should be able to comment on the draft EIS.

RECREATION

- 1) Scenic Resources. The Koolau Pali scenic area should be addressed in the EIS. The project boundaries include a small portion of the Koolau Pali scenic area - the lower section of the ridge situated between Maiano and Maialoha Streams. Although this area will be retained as natural open space, we recommend that additional protection be given to this scenic resource by having its State land use classification reclassified from agriculture to conservation.
- 2) Open Space. The retention of a large portion of the project area as natural open space is commendable. However, there are certain critical areas that should remain as natural open space rather than be subdivided as agricultural lots (proposed Subdivision Plan). These areas are: a) THK 4-8-01:3; b) the portion of THK 4-8-07:1 that is situated within the Conservation District; and c) the portion of THK 4-8-01:1 with slopes of 30% or greater.
- 3) Public Access. Public vehicular access to Maialoha Forest Reserve should be provided. Is the south branch of the Maialoha Valley Road to become a public road, thereby assuring public vehicular access to the forest reserve, or are there some other provisions for public access? This concern should be closely coordinated with the Division of Forestry and Wildlife.

C-59

OEQC
RE: DEIS for Maialoha Valley Ag Park
July 14, 1983
Page Two

- 4) Park Dedication. How will the provisions of the Park Dedication Ordinance be met? If land is to be set aside for a park, then what will be the size of the lot, and where will it be located? This concern should be closely coordinated with the Honolulu Department of Parks and Recreation.

WATER RESOURCES

Table I-3, Sources of Financing (page I-21), item 2, covering appropriations for water development indicates that no interest or repayment is required. Under Section 174-21, Hawaii Revised Statutes, this department is obligated to repay bonds issued for irrigation projects. Table I-3 should be amended to reflect this requirement.

In reviewing Figure IV-5, Direct Cost-Benefit Analysis Discount Present Value of Cash Flow (page IV-25), we find that a benefit-cost ratio of 2.42:1 is given. The Upper Valley water benefit is shown as \$3,593,000. An explanation should be provided indicating how this figure was derived.

Table II-1, List of Necessary Approvals (page II-8), indicates that a Corps of Engineers permit/approval is required for stream realignments. This department is presently developing departmental administrative rules to implement the new Instream Use Program authorized by Act 185, the Hawaii Instream Use Protection Act of 1982. A discussion of Act 185 should be included in the EIS text under Chapter II.

SOILS

An item needing correction is Item 3, Agricultural Lands, page IV-10. The statement, "Erosion control programs will be carried out by the U. S. Soil Conservation Service (SCS) with farmers on a voluntary basis . . ." should be re-worded. The fact is, SCS does not carry out the erosion control work. The farmer does. SCS provides technical assistance to the farmers through State administered soil and water conservation districts. Conservation program should be required of each lessee, not voluntary.

AQUATIC RESOURCES

From the standpoint of potential effects on marine organisms, the draft EIS correctly notes possible adverse effects from wastewater leachate, fertilizers, pesticides, drainage discharges, and eroded soils (p. 6). The likelihood would increase as the number of holdings ("tenancies") would increase from the present 82 to 130, as proposed (i.e. by 59%). While we agree with the applicant that the adjacent shoreline contains no coastal resources which are unique (p. 11-4), such resources are not thereby without value.

OEQC
re: DEIS for Waiahole Valley Ag Park
July 14, 1983
Page Three

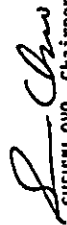
We concur as to the value of wetland "filters" in protecting coastal resources (p. III-32). We note that construction would increase the total volume of sediments discharged by Waiahole Stream into Kaneohe Bay by approximately 10%, and therefore we concur that grading-permit controls should be carefully selected and observed (pp. IV-36 to -38). It is also suggested that construction be scheduled as much as possible for seasons of minimal rainfall.

We note that the proposed expansion of agricultural use would increase the discharge nitrogen nutrient-load by about 50% and that changes in the existing discharge rates for pesticides are not estimated since they would be affected most by application practices on the new and expanded agricultural operations (p. IV-48).

In mitigating the risks of sedimentation, pesticides, and contamination of streamwater discharges, the proposing authority offers advisory efforts by other agencies (e.g. USDA Soil Conservation Service - p. IV-10; State Department of Agriculture - p. IV-48; State Department of Health - p. IV-5), and essentially voluntary compliance by the proposed users. Inasmuch as the proposed mitigation is beyond control of the proposing authority, it seems there should be some indication from these agencies of acceptance regarding their proposed services, and a means provided whereby prospective tenants would agree and be required to comply with the agencies' recommendations.

The report states that the Waiahole Stream flow will be reduced immediately below the proposed irrigation system intake (p. IV-8). There is a further possibility, however, that this stream reach may also run dry during periods of minimum flows, resulting not only in habitat loss, but a passage barrier as well for the stream inhabitants. These impacts may be mitigated through design modification of the proposed intake system to provide for the continuous passage of low stream flows. We urge that this matter be considered in the design and construction of the irrigation system intake.

Sincerely,



SUSUMU ONO, Chairperson
Board of Land and Natural Resources
and
State Historic Preservation Officer

cc: Hawaii Housing Authority
M&E Pacific, Inc.

M&E Pacific, Inc.

Engineers & Architects

Suite 500, Puuhali Tower
1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430085

April 24, 1984

Mr. Susumu Ono, Chairperson
Board of Land and Natural Resources
State of Hawaii
1151 Punchbowl Street
Honolulu, Hawaii 96813

SUBJECT: Response to Comments on Draft EIS for the
Waiahole Valley Agricultural Park and
Residential Lots Subdivision

Thank you for your comments of July 14, 1983. Responses are provided below.

Historic Sites

Comment: Review of reconnaissance report

Response: A copy of the report has been transmitted for your review.

Recreation

1. Comment: Protection of scenic resources

Response: The unused land areas will be turned over to DLNR, who can then reclassify the land if necessary.

2. Comment: Critical areas that should be left in open space

Response: The areas that you listed will be left in conservation and not be subdivided into agricultural lots.

3. Comment: Provision of public access to forest reserve

Response: The south branch of the Waiahole Valley Road will continue to be a public road that will allow public access to the forest reserve.

4. Comment: Park dedication requirements

M&E Pacific, Inc.

Mr. Susumu Ono, Chairperson
April 24, 1984
Page 2

Response: An exemption from various City requirements, including park dedication, will be sought under authority of Chapters 359C and 171, HRS. The City Council will review the total plan to evaluate the appropriateness of these exemptions (see p. 11-7 and 11-8 of the DEIS).

Water Resources

1. Comment: CIP appropriation for water development
Response: The project has been funded by a combination of bonds and appropriations. Additional appropriations are presently being sought; thus, the table will be updated and corrected.
2. Comment: Explanation of water benefit of \$3,593,000
Response: This figure was originally included to reflect about 3.4 mgd of potable water that could be developed in the upper Waiahole Valley for use by the BWS. Since there are no definite agreements with the BWS, this figure has been downscaled and will be completely eliminated as a potential source of "revenue" in the Revised EIS.
3. Comment: Instream Use Regulations and its relation to proposed stream improvements
Response: A copy of the proposed Instream Use Regulations has been obtained from your Department. The applicability of any requirements stipulated in the regulations will be addressed in the Revised EIS.

Soils

Comment: Clarification of the role of the U.S. Soil Conservation Service (SCS) in erosion control

Response: In its comments to the Draft EIS, the SCS provided specific language to correct what was stated in the DEIS. A conservation program will be required by the lessee through the lease agreement. The SCS will provide technical assistance to develop this program.

Aquatic Resources

1. Comment: Significance of impacts to aquatic resources
Response: The impacts to marine organisms from nutrients, sediments, and pesticides were discussed in Chapter IV. Within the SMA, which is landward from the shoreline, there are no resources that require special protection (p. 11-4).

M&E Pacific, Inc.

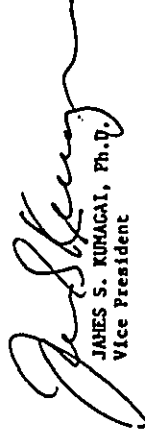
Mr. Susumu Ono, Chairperson
April 24, 1984
Page 3

2. Comment: Mitigation of risks from sedimentation, pesticides, nutrients
Response: Prospective tenants will be mandated through the lease agreements to comply with all city, state, and federal laws, rules, and ordinances. The control of wastewater contamination will be enforced by the Department of Health through the Board of Water Supply as required by Chapter 20 of Title 11, Section 3, Administrative Rules, and by the Department of Health through the Underground Injection Control (UIC) program. The control of pesticide contamination is under the jurisdiction of the State Department of Agriculture under Chapter 149A, Hawaii Revised Statutes, "Hawaii Pesticides Law," and Section 24(C), "Federal Insecticide, Fungicide, and Rodenticide Act." Erosion control has been addressed in the previous section under "Soils."

3. Comment: Minimum streamflow in Waiahole Stream

Response: The proposed irrigation intake has been redesigned to allow continuous passage of low stream flows. The proposed intake will not impede the passage of stream inhabitants.

Please call Ken Ishizaki at 521-3051 if you have any questions.



JAMES S. KURIHARA, Ph.D.
Vice President

dm

cc: Carleton Ching, HHA

M&E Pacific, Inc.

Engineers & Architects

Suite 500, Paiahi Tower
1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-5051 Telex 740065

October 31, 1984

Mr. Susumu Ono, Chairperson
Board of Land and Natural Resources
State of Hawaii
1151 Punchbowl Street
Honolulu, Hawaii 96813

SUBJECT: Amended Response to Comments on the
Draft FIS for the Waiahole Valley Agricultural Park

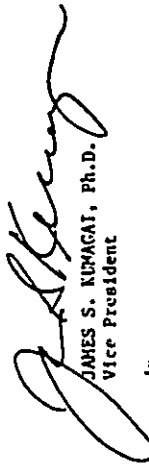
Thank you for your comments of July 14, 1984.

The tentative water system design proposed for the subject project has been revised due to cost constraints, requiring an amendment to our initial response of April 24, 1984. The present water system design proposal will utilize groundwater as the primary supply source for both domestic and irrigation water. Furthermore, consumption design quantities have been scaled down.

These design changes will affect the concerns raised by your comments in the following manner:

1. Tenants whose lots adjoin Waiahole Stream that opt to construct a stream intake and a private irrigation system will be responsible for compliance with all regulatory requirements, including the DLNR's Chapter 167 of Title 13 and Corps of Engineers permit requirements.
2. The proposed quantities of water to be utilized for domestic and irrigation water have markedly decreased. The actual net impact may result in an increase of available water for stream fauna. This proposed preferred water system alternative will be delineated further in the Revised EIS.

Please call Ken Ishizaki at 521-3051 if you have any questions.


JAMES S. KUMAGAI, Ph.D.
Vice President

dm

cc: Mr. Carleton Ching, IHMA

C-62

RECEIVED JUL 12 1983



DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

GEORGE R. ARNONE
Kent M. Keith
PLANNING AND ECONOMIC DEVELOPMENT

STATE OF HAWAII, DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT, 100 SOUTH KING STREET, HONOLULU, HAWAII 96813

July 6, 1983

COPY

Ref. No. 7670

MEMORANDUM

TO: Mr. Melvin Koizumi, Acting Director
Office of Environmental Quality Control

FROM: Kent M. Keith, Director

SUBJECT: Draft EIS for the Maialole Valley Agricultural Park
and Residential Lots Subdivision

We have reviewed the subject environmental impact statement (EIS) and have the following comments.

The interrelationship between the Maialole Valley Agricultural Park and the proposed residential subdivision should be more specifically discussed in the EIS. This discussion should examine the compatibility between the agricultural and residential uses which are proposed in close proximity to each other. Past experience has shown that concerns may arise between certain farming operations and nearby residential uses.

According to the EIS, the proposed residential subdivision will entail the reclassification of approximately 18.63 acres of land from Agricultural to Rural classification. Inasmuch as there are no current Rural classified lands on Oahu and the City and County of Honolulu has no comparable zoning category for Rural classified lands, the EIS should discuss the overall impact of such a precedent for Oahu. The specific impact of the proposed Rural reclassification upon other surrounding Agricultural and Conservation lands along the Maialole Coast should also be examined. The residential nature of the State Rural District as well as the one-half acre minimum lot size permissible, should be examined in the discussion of potential impacts to surrounding land uses. The alternative of retaining this area in the Agricultural District or reclassifying to an Urban District should be discussed and/or pursued.

We also recommend that the following paragraph be substituted for present paragraph on State Functional Plans (page II-3).

State Plan. The proposed development plan for Maialole Valley involves three broad categories of State programs: agriculture, water and housing. A plan has been prepared for each category in order to provide inter-agency guidelines to State agencies in the execution of their responsibilities. These plans constitute interim guidelines until the Legislature adopts State functional plans pursuant to Chapter 26, Hawaii Revised Statutes.

Mr. Melvin Koizumi
Page 2
July 6, 1983

The citation in the last paragraph on page II-3 should be corrected to read Section 226-19(2)(b)(7).

Thank you for the opportunity to comment on this document.

cc: Hawaii Housing Authority
✓ HAE Pacific, Inc.

C-63

M&E Pacific, Inc.

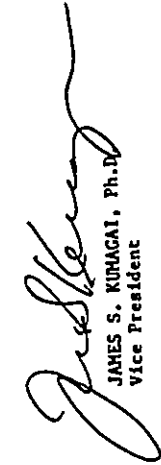
Engineers & Architects

Suite 500, Puuahi Tower
1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

M&E Pacific, Inc.

Mr. Kent M. Keith, Director
April 24, 1984
Page 2

Please call Ken Ishizaki at 521-3051 if you have any questions.



JAMES S. KUMAGAI, Ph.D.
Vice President

dm

cc: Carleton Ching, RHA

April 24, 1984

Mr. Kent M. Keith, Director
Department of Planning and
Economic Development
State of Hawaii
250 South King Street
Honolulu, Hawaii 96813

SUBJECT: Response to Comments on Draft EIS for the
Waiahole Valley Agricultural Park and
Residential Lots Subdivision

Thank you for your comments of July 6, 1983. Responses are provided below.

1. Comment: Compatibility between farming operations and residential uses

Response: The Draft EIS did specifically address three potential concerns: (1) air quality in terms of pesticide drift (p. IV-12), (2) air quality in terms of odor (e.g., from manure fertilizer) (p. IV-13), and (3) noise from farm machinery and animals (p. IV-18). The findings indicated that pesticide drift will not pose significant public health concerns because the predominant wind conditions are upvalley (away from the residential lots); odor problems are infrequent and can be mitigated by proper storage techniques; and noise will be mitigated by the natural buffers provided by the rolling terrain and mature trees and the relatively low mechanization requirements of such crops as bananas and papayas.

2. Comment: Rural land use classification

Response: The Rural classification will not be pursued. Instead, the lots in question will be readjusted to a minimum size of one acre and be retained in the Agricultural classification.

3. Comment: Interim status of State functional plans

Response: Your suggested language will be used in substitution of the present paragraph on page II-3. Thank you for the clarification. Incidentally, the citation on p. II-2 will be corrected to read Sec. 226-19(2)(b)(7).

GEORGE R. ARTDORF
DIRECTOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
808 PUNCHBOWL STREET
HONOLULU HAWAII 96813

July 20, 1983

Mr. Melvin Koizumi
Acting Director
Office of Environmental
Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Mr. Koizumi:

Environmental Impact Statement
Waiahole Valley Agricultural
Park and Residential Lots
Subdivision; Waiahole Valley,
Koolaupoko, Oahu

Thank you for the opportunity to review the referenced document. Our comments are:

1. A hydraulic study at the Waiahole Stream Bridge (Kamehameha Highway) should be made during the design phase, taking into account the additional discharge into Waiahole Stream.
2. An assessment of the traffic impact upon Kamehameha Highway should be conducted and presented.

Very truly yours,

Ryokichi Higashionna
Ryokichi Higashionna
Director of Transportation

RYOKICHI HIGASHIONNA, Ph.D.
DIRECTOR

DEPUTY DIRECTORS
WAYNE J. YAMASAKI
JAMES B. ACCORBUCCI
JOHN THOMAS SIBBOLD, Ph.D.
CENTRAL OFFICE

IN REPLY REFER TO
STP 8.9222

M&E Pacific, Inc.
Engineers & Architects

May 10, 1984

Mr. Wayne Yamasaki, Director
Department of Transportation
State of Hawaii
809 Punchbowl Street
Honolulu, Hawaii 96813

SUBJECT: Response to Comments on Draft EIS for the
Waiahole Valley Agricultural Park and
Residential Lots Subdivision

Thank you for your comments of July 14, 1983. Responses are provided below.

1. Comment: "A hydraulic study at the Waiahole Stream Bridge (Kamehameha Highway) should be made during the design phase, taking into account the additional discharge into Waiahole Stream."
Response: The Waiahole Stream Bridge at Kamehameha Highway is presently subject to flooding and overtopping. Additional stream discharge generated by the infrastructural improvements is relatively insignificant; the tributary area of the drainage system is very small in comparison with the entire Waiahole Valley drainage basin.
2. Comment: "An assessment of the traffic impact upon Kamehameha Highway should be conducted and presented."
Response: Presently there is virtually no traffic congestion at the Waiahole Valley Road-Kamehameha Highway intersection, the primary access point for the valley. Occasional queuing has been noted on weekends due to cars making left turns at this intersection. The proposed additional 33 residential lots may increase the frequency of occurrence and duration of queuing on weekends slightly; the overall potential traffic impact of the proposed project has been estimated to be minor.

Please call Ken Ishizaki at 521-3051 if you have any questions.

James S. Kumagai
JAMES S. KUMAGAI, Ph.D.
Vice President

RH/bs

cc: Mr. Carleton Ching, HRA

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERTANIA
HONOLULU, HAWAII 96813

EILEEN R. ANDERSON, Mayor
YOSHIE H. FUJIMAKI, Chairman
JOYNA H. HOWARD, V-Chair
MILTON J. AGNER
MICHAEL J. CHUN
WALTER A. DOOS, JR.
RYOICHI HIGASHIHANA
ROBERT A. SOUZA
KAZU HAYASHIDA
Manager and Chief Engineer



July 7, 1983

Mr. Melvin Koizumi, Acting Director
Office of Environmental
Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Mr. Koizumi:

Subject: Draft Environmental Impact
Statement for Waiahole Valley
Agricultural Park and
Residential Lots Subdivision

We reviewed the environmental document and have the following comments to add to those appended on page C-16:

1. We have no objections to the proposal to install two separate water systems. The Board will take over the proposed domestic water system, provided the system is constructed in accordance with our Water System Standards and is compatible with our existing water system (Page I-12). The irrigation system should be retained by the State.
2. The use of black and gray water systems have not been approved by us in the "No-Pass" zone. All waste waters in the "No-Pass" zone should be piped and discharged in the "Pass" zone or collected in a water-tight vault and pumped to an acceptable area.

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

Very truly yours,

Kazu Hayashida
KAZU HAYASHIDA
Manager and Chief Engineer

cc: Hawaii Housing Authority
M & E Pacific

C-66

M & E Pacific, Inc.
Engineers & Architects

April 24, 1984

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

SUBJECT: Response to Comments on Draft EIS for the
Waiahole Valley Agricultural Park and
Residential Lots Subdivision

Thank you for your comments of July 7, 1983. Responses are provided below.

1. Comment: Design standards and ownership of the water systems
Response: The domestic water system will be designed and constructed in accordance with BWS standards and be compatible with the existing BWS system. The Russ Smith Corporation, the consultants for the proposed water system, are working with your staff to ensure that the Board is satisfied and willing to take over the domestic system. The irrigation system, however, will be retained by the State.
2. Comment: Onsite wastewater disposal above the "no-pass" line
Response: All new residential lots above the BWS "no-pass" line will be required to install closed vaults to receive both black and gray wastewater. To minimize the frequency of vault pumping, composting toilets will be suggested as a supplement to the vault system at the option of the tenants. Vaults will be pumped by private pumping companies.

Please contact Ken Ishizaki at 521-3051 if you have any questions.

James S. Kumagai
JAMES S. KUMAGAI, P.E.
Vice President

dm

cc: Carleton Ching, IHHA

Enclosure

M&E Pacific, Inc.
Engineers & Architects

Suite 500, Puuh Tower
1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

October 31, 1984

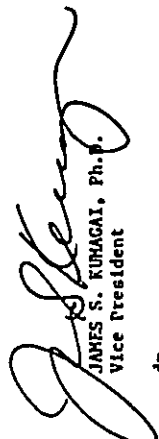
Mr. Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96813

SUBJECT: Amended Response to Comments on Draft EIS for the
Waiahole Valley Agricultural Park and
Residential Lots Subdivision

Thank you for your comments of July 7, 1983.

The tentative water system design proposed for the subject project has been revised due to cost constraints, requiring an amendment of our initial response of April 24, 1984. A domestic water system designed and constructed in accordance with Board of Water Supply standards would exceed budget limitations. Presently, a new water system alternative is being developed and will be delineated further in the Revised EIS.

Please call Ken Iehizaki at 521-5031 if you have any questions.



JAMES S. KURAGAI, Ph.D.
Vice President

dn

cc: Mr. Carleton Ching, RHA

RECEIVED JUN 29 1983

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU

550 SOUTH KING STREET
HONOLULU, HAWAII 96813



KILEEN M. ANDERSON
MAYOR

WILLARD T. CHOW
CHIEF PLANNING OFFICER

RALPH PORTWORE
SENIOR CHIEF PLANNING OFFICER

DGP6/83-6954

June 28, 1983

Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekaunila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Parnell:

Waiahole Valley Agricultural Park and
Residential Lots Subdivision
Draft Environmental Impact Statement

Our comments are as follows:

1. There are presently eight residences with cesspools above the Board of Water Supply's "no pass" line where cesspool use is not normally permitted. Development of the agricultural park will further result in about 20 additional plots above the "no pass" line with individual on-site cesspools also the method for wastewater disposal.

In order to protect drinking water sources and the area's stream ecosystem from (1) wastewater seepage from cesspools, and (2) agricultural runoff and seepage from fertilization and pesticide application, it is important that monitoring of underground water sources and stream flows be conducted by the Department of Health at regular intervals, at low and high stream flow periods. In the event of evidence of stream contamination, mitigation steps should be proposed.

Ms. Jacqueline Parnell
Page 2

2. Prospective tenants above the "no pass" line should also be made aware of the frequency of cesspool pumping requirements (estimated at about once a month) to prevent overflows and potential health problems before leases are entered into.

Sincerely,

Ralph Kawahoko

RALPH KAWAHOKO
Planner

APPROVED:

Willard T. Chow

WILLARD T. CHOW

cc: Hawaii Housing Authority
, M & E Pacific, Inc.

M&E Pacific, Inc.
Engineers & Architects

April 24, 1984

Mr. Willard T. Chow
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

SUBJECT: Response to Comments on Draft EIS for the
Waiahole Valley Agricultural Park and
Residential Lots Subdivision

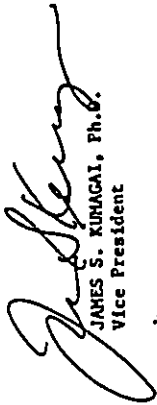
Thank you for your comments of June 28, 1983. Responses are provided below.

1. Comment: a. Residences with cesspools above the "no-pass" line would necessitate groundwater monitoring
Response: No new cesspools or leaching fields are proposed above the "no-pass" line in the Revised EIS. The mandatory use of closed vaults to be supplemented by composting toilets at the tenant's option would preclude the necessity of groundwater monitoring for wastewater contamination.
Comment: b. Groundwater monitoring for pesticide and fertilizer contamination.
Response: The technical advisory services of the U.S. Soil Conservation Service and the State Department of Agriculture will be provided to help mitigate adverse effects. In addition, the Department of Health and the State Department of Agriculture are empowered under Chapter 20 of Title 11, Administrative Rules and Chapter 149A, Hawaii Revised Statutes, to prevent the misuse of pesticides that could result in groundwater contamination.
2. Comment: Frequency of vault pumping
Response: Prospective tenants will be informed of the required frequency of vault pumping and the necessity of hiring private services, since the City and County of Honolulu does not pump wastewater disposal systems such as the closed vault.

M&E Pacific, Inc.

Mr. Willard T. Chow
April 24, 1984
Page 2

Please call Ken Iohizaki at 521-3051 if you have any questions.



JAMES S. KUMAGAI, Ph.D.
Vice President

dm

cc: Carleton Ching, HRA

RECEIVED JUN 3 1983

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

830 SOUTH KING STREET
HONOLULU, HAWAII 96813



EILEEN ANDERSON
MAIL ROOM

MICHAEL J. CHUNG, Ph.D.
DIRECTOR AND CHIEF ENGINEER

Maurice H. Kaya
Deputy Director
ENV 83-156

June 27, 1983

Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Parnell:

Re: EIS for Waiahole Valley Agriculture Park and Residential
Lots Subdivision, Waiahole, Koolau-poko, Oahu

Our comments on the subject EIS are as follows:

1. Roads and streams under private ownership will not be maintained by the City and County. However, roads that are built according to City standards will be accepted for maintenance. Will the roads be paved with asphaltic concrete?
2. Construction of sidewalks or footpaths if desired will be the responsibility of the abutting property owners. Abutting property owners will also be responsible for the maintenance of the sidewalk area (area from property line to curb or edge of pavement including gutters or swales).
3. The City will provide pumping and treating services for individual household cesspools. However, the City will not pump wastes from closed vaults proposed for homes. The Board of Water Supply's "no pass" line. Residents with closed vaults will have to rely on private pumping companies for service.

Me ke aloha pumehana,
Michael J. Chung
MICHAEL J. CHUNG
Director and Chief Engineer

cc: Hawaii Housing Authority
M & E Pacific, Inc.
Engineering Division
Wastewater Management Division

C-70

M & E Pacific, Inc.
Engineers & Architects

April 26, 1984

Dr. Michael J. Chun
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

SUBJECT: Response to Comments on Draft EIS for the
Waiahole Valley Agricultural Park and
Residential Lots Subdivision

Thank you for your comments of June 27, 1983. Responses are provided below.

1. Comment: Design standards and ownership of roads
Response: Roads will not be constructed to City standards due to rural conditions and budget constraints. The State plans to own and maintain these roads, which will be paved with asphaltic concrete.
2. Comment: Provision of sidewalks
Response: No sidewalks will be provided.
3. Comment: Responsibility for pumping closed vaults
Response: Residents above the BMS "no-pass" line will be informed through the lease agreements that black and grey water must be directed to closed vaults. In addition, the residents with closed vault sewage systems will be informed that they must rely on private pumping companies for service.

Please call Ken Ishizaki at 521-3051 if you have any questions.

James S. Kumagai
JAMES S. KUMAGAI, Ph.D.
Vice President

dm

cc: Carleton Ching, IHA

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
550 SOUTH KING STREET
HONOLULU, HAWAII 96813



EILEEN R. ANDERSON
DIRECTOR

ANDREW T. CHANG
DEPUTY DIRECTOR

WILLIAM A. BONNETT
DIRECTOR

DALE RWEZ
DEPUTY DIRECTOR

July 13, 1983

TE 6/83-2357

Mr. Melvin Kolzumi, Acting Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Mr. Kolzumi:

Subject: Review of Draft EIS for the Waiahole Valley
Agricultural Park and Residential Lots Subdivision

We have reviewed the Draft Environmental Impact Statement for the subject development and notice that there is no data on future bus patron use for this proposed project. We feel that the impact from this project on the City's bus service, no matter how minimal, should be addressed in the EIS.

Thank you for giving us the opportunity to review this Draft EIS.

If you have any questions, please contact Kenneth Hirata at 527-5031.

Sincerely,

WILLIAM A. BONNETT
Director

cc: Hawaii Housing Authority
M & E Pacific, Inc.

M & E Pacific, Inc.
Engineers & Architects

April 24, 1984

Mr. William A. Bonnet, Director
Department of Transportation Services
650 South King Street
Honolulu, Hawaii 96813

SUBJECT: EIS for Waiahole Valley Agricultural Park

Thank you for your comments of July 13, 1983. Responses are as follows:

Comment: The draft EIS has no data on future bus patron use. The impact of this project on the City's bus service should be addressed in the EIS.

Response: As noted in the discussion of traffic on page IV-30, only limited growth is planned for Waiahole Valley. The limited number of additional residences will first go to existing Waiahole tenants who wish to relocate, then Waikane residents who wish to be relocated because they want longer term lease commitments, then remaining lots will be made available to outsiders. Impacts on bus ridership is expected to be minimal, and this will be noted as such in the Revised EIS.

Please call Ken Ishizaki at 521-3051 if you have any questions.

JAMES S. KURAGAI, Ph.D.
Vice President

dm

cc: Carleton Ching, IHA

Suite 500, Puuhii Tower
1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

RECEIVED JUN 24 1983

FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

1455 S. BERZANIA STREET, ROOM 303
HONOLULU, HAWAII 96814



GILKEM R. ANDERSON
MAYOR

MELVIN M. NONAKA
FIRE CHIEF

THOMAS C. BLONDM
FIRE WRENCH CHIEF

Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
Page Two; June 22, 1983

Should you have any questions, please call Battalion Chief
Norman Wilson at 943-3838.

MELVIN M. NONAKA,
Fire Chief

June 22, 1983

Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

RE: Waiahole Valley Agricultural Park and Residential Lots
Subdivision; Environmental Impact Statement (EIS)

Dear Ms. Parnell:

Thank you for the opportunity to review and comment on the
EIS for the Waiahole Valley Agricultural Park and Residential
Lot Subdivision.

We note that in your report, fire protection services from the
Kahaluu Fire Station has a response time of approximately 4 to
5 minutes and is within the state standard of 5 minutes or less
to reach the scene of an emergency.

You have also mentioned that no additional fire stations or
additional firemen are needed based on the state standards.

This report needs to be clarified.

The approximate time for the Kahaluu Fire Station to the
subject project is approximately 8 minutes. Although sup-
portive services are available from the Kaneohe and Kaawaa
Fire Stations, fire protection for the area is considered
to be inadequate. Until the proposed Kualoa Fire Station
is completed which is projected beyond the year 1986, fire
protection for the subject project will continue to be in-
adequate. These standards for the location of fire protec-
tion facilities are based on the Insurance Services Office
grading schedule.

MMN:ct/NSKW

cc: Hawaii Housing Authority
Attn.: Carleton Ching

and

M & E Pacific, Inc.

M&E Pacific, Inc.
Engineers & Architects

Suite 500, Puuhiki Tower
1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430063

April 24, 1984

Mr. Melvin M. Nonaka, Fire Chief
Honolulu Fire Department
1435 S. Beretania Street, Room 305
Honolulu, Hawaii 96814

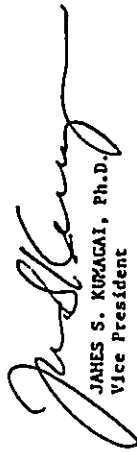
SUBJECT: EIS for Waiahole Valley Agricultural Park

Thank you for your comments of June 22, 1983. Responses are provided as follows:

Comment: Fire protection services from the Kahaluu Fire Station have a response time of 8 minutes rather than 5 minutes, which is in excess of State standards. Until the Kualoa Fire Station is completed, which is projected beyond 1986, fire protection will continue to be inadequate.

Response: Your corrections are duly noted and will be incorporated in the Revised EIS.

Please call Ken Ishizaki at 521-3051 if you have any questions.


JAMES S. KURAGAI, Ph.D.
Vice President

dm

cc: Carleton Ching

RECEIVED JUL 11 1983

KAHALU'U NEIGHBORHOOD BOARD NO. 29
777 KAHALU'U NEIGHBORHOOD COMMUNITY CENTER
41-223 WAIAHOE
KAHOOLAWE, HAWAII 96741

MEMBER RES. KAHALU'U, WAINANE, WAIKANE, MAHIPOO AND KULUOHI



"Let us not ever have
an unhappy minority"

July 8, 1983

Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekawa'ila Street, Room 301
Honolulu, Hawaii 96813

Comments on Draft Environmental Impact Statement
Waiahole Valley Agricultural Park
and
Residential Lots Subdivision
Waiahole, Ko'olaupoko, O'ahu, Hawaii

Dear Ms. Parnell:

Our comments on this Waiahole Valley Draft Environmental Impact Statement must necessarily be brief for, while the document was over three years in the making, we have had less than one month to review it.

We note that the land use plan is inconsistent with the recently adopted Ko'olaupoko Development Plan. It is our understanding, however, that the justification for the 18.63 acres proposed for the new State Rural District designation is for the express purpose of accommodating existing long term Waiahole residents and, further, that the justification for 36 additional lots proposed for the reduced State Urban District designation are for the express purpose of relocating existing long term Waikane and Waiahole residents.

We realize that almost six years of efforts by the Hawaii Housing Authority, the Waiahole-Waikane Community Association and others have gone into reaching the present level of agreement on a plan for Waiahole. The deviations from the Development Plan may, therefore, be acceptable if they specifically address the concerns and needs of the long term Waiahole & Waikane residents.

Very truly yours,
Kaha'ulu Neighborhood Board No. 29
Edwin H. Stevens
Edwin H. Stevens, Secretary

Response authorized at N.B.#29 Regular Meeting 6-22-83
(Materials prepared by Members Stevens & Nakamoto)

KAHALU'U NEIGHBORHOOD BOARD NO. 29
Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
Page 2

Copies: Hawaii Housing Authority, Attn: Carleton Ching
H & E Pacific, Inc.
Department of General Planning, Willard T. Chow, CFO
Waiahole-Waikane Community Association, Attn: David Chinen
Kaha'ulu N.B.#29 - Chair
- Land Use Standing Committee
- Development Plan Sub Committee
Kaha'ulu Community Resource Center
Neighborhood Commission

Suite 500, Paauhā Tower
1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

M&E Pacific, Inc.
Engineers & Architects

May 24, 1984

Mr. Edwin B. Stevens
Secretary
Kahala Neighborhood
c/o Kahala Community Center
47-232 Waihee Road
Kaneohe, Hawaii 96744

SUBJECT: EIS for the Waialeale Valley Agricultural Park

Thank you for your comments of July 8, 1983. Responses are as follows:

Comment: Proposed rural district designation is inconsistent with the recently adopted Ko'olaupoko Development Plan.

Response: The rural classification will not be pursued. Instead, the existing residential lots that fall within the existing State Land Use Agricultural District will remain agricultural. Although the county's Comprehensive Zoning Code requires a minimum lot size of 2 acres for lots classified as "AG-1," an exemption will be requested to reduce the minimum lot size to 1 acre (Section 4 of Chapter 359C, HRS). Enlarging the existing residential lots within the Agricultural district to only 1 acre would preclude the possible need for relocating any existing tenants.

Please call Ken Ishizaki at 521-3051 if you have any questions.


JAMES S. KURACAL, Ph.D.
Vice President

dm

cc: Carleton Ching, NRA



LIFE OF THE LAND

RECEIVED JUL 6 1983

H & E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

July 5, 1983

Subject: Draft EIS for Waialahole Valley Agricultural Park and Subdivision

Gentlemen:

We had great difficulty reviewing the subject EIS because most of its footnoted "sources" are not included in the bibliography. Consequently, we limited our efforts to our major areas of concern: stream fauna and Kaneohe Bay water quality.

The following comments on the Draft EIS should not be construed as either support for or opposition to the proposed project. Life of the Land's Board of Directors has not taken a position concerning State plans for Waialahole Valley.

Attached to this letter you will find: (1) USGS discharge data for Waialahole Stream at an elevation of 250 feet, (2) excerpts from a USFWS publication titled "The Water-Dependent Fish and Wildlife Resources of the Kaneohe Bay Area," and (3) Donald Tennant's article on instream flow regimens in the Bulletin of the American Fisheries Society. These attachments contain data necessary to correct several factual errors in the Draft Waialahole Valley Agricultural Park EIS. In particular:

- at an elevation of 250 feet, the measured average discharge of Waialahole Stream is 6.14 mgd and the measured minimum discharge is 1.49 mgd.
- at its mouth, the estimated average discharge of Waialahole Stream is 8.1 mgd, i.e., 18% of the estimated average perennial stream flow into Kaneohe Bay.
- 90% of the stream fauna near Waialahole Stream's mouth and 97% of the stream fauna near Waialahole Stream's headwaters are endemic diadromous species - an amazing high proportion compared to other Kaneohe streams.
- Tennant recommends maintaining at least 30% of the average flow as the minimum instantaneous flow in a stream.

To put it bluntly, pages 111-16, 1V-7, 1V-8, and 1V-9 of the Draft EIS contain factual errors and mislead the reader into thinking that stream flow and fauna will not be adversely affected by the proposed project. Unless the Revised EIS addresses these issues better and incorporates appropriate impact mitigation measures, we will insist that the Corps of Engineers drafts a NEPA EIS prior to issuing permits for any stream diversion.

H & E Pacific, Inc.
July 5, 1983
page 2

Assuming that Tennant's mainland research is applicable to Hawaiian stream fauna, which may not be the case, then it would be desirable to maintain a minimum instantaneous flow of 1.8 mgd in Waialahole Stream at an elevation of 250 feet. However, if the proposed new Waialahole Irrigation system diverts a "net" 1 mgd at 340 feet of elevation, then Waialahole Stream would run dry in sections and could have an instantaneous flow as small as 0.49 mgd at an elevation of 250 feet. In Water Year 1966, which was a "wet" year, USGS data attached to this letter shows that removal of 1 mgd would have resulted in extended periods where stream discharge at 250 feet of elevation would only be 11% of average flow.

Table IV-7 on nitrogen loading of Kaneohe Bay compares the mean discharge and average nitrogen concentration of all Kaneohe Streams combined with the Q50 discharge (at 250 feet of elevation) and the average nitrogen concentration of Waialahole Stream. On the surface, this would appear to be statistical B.S. because the Q50 discharge is substantially smaller than mean discharge. Incidentally, why is the Corps estimate of average stream discharge so greatly different from that of the USFWS? Also, how were nitrogen concentrations estimated for all Kaneohe streams combined and for Waialahole Stream by itself? Were estimates of average nitrogen concentration based on average stream flow using USFWS estimates or Corps estimates? Lastly, the average 8.5 mg/l nitrogen concentration for Waialahole Stream (with the agricultural park) appears to be a typographical error. (If not, then estimated mass emission and annual loading are in error.)

When you have addressed these points, we would appreciate being provided with a copy of your Revised EIS.

Sincerely,

D.T.T. for

Arthur Mori
President

250 S. Hotel St. Rm. 211, Honolulu, Hawaii 96813 Tel 521-1300

M&E Pacific, Inc.
Engineers & Architects

Suite 500, Puuhahi Tower
1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

M&E Pacific, Inc.

Mr. Arthur Mori, President
April 24, 1984
Page 2

April 24, 1984

Mr. Arthur Mori, President
Life of the Land
250 South Hotel Street, Room 211
Honolulu, Hawaii 96813

SUBJECT: EIS for the Waialeale Valley Agricultural Park

Thank you for your comments of July 5, 1983. Responses are provided below:

1. Comment: The flow quantities for station 177 on page III-16 of the Draft EIS should be corrected to read an average flow of 6.14 MGD and a minimum flow of 1.49 MGD.

Response: The median flow of 3.25 MGD was inadvertently listed as the average flow. The minimum flow of 1.5 MGD was derived from the 2.3 cfs as reported in USGS Water Supply Paper 1937 and is correctly listed. The average flow figure will be corrected in the Revised EIS.

2. Comment: The estimated average discharge at the Waialeale Stream mouth is 8.1 MGD.

Response: The Draft EIS has not stated anything to the contrary. We would welcome further clarification of your comment.

3. Comment: An extremely high proportion of the stream fauna are endemic.

Response: The Draft EIS has not stated anything to the contrary. U.S. Fish and Wildlife Service Publication FWS/OBS-78/17 has noted that only one of the species reported in Table 2 of your FWS Kaneohe Bay Study Attachment is endemic and diadromous (opae kalaiole) and one other is indigenous and diadromous (opae nakea). These species and their propensities were stated on page III-22 of the DEIS. The proposed revetments to prevent further erosion under the Waialeale Valley Road bridge and in the realigned stream channel segment near Kamehameha Highway will not alter the nature of the stream bottom. The irrigation intake will use the existing USGS weir, thus no new structures will be placed in the stream that will impede the migration of diadromous or catadromous species.

4. Comment: Tennant recommends maintaining at least 30% of the average flow as the minimum instantaneous flow in a stream...it would be desirable to maintain a minimum instantaneous flow of 1.8 MGD in Waialeale Stream at an elevation of 250 ft...this would be only 11% of average flow.

Response: Referring to Table 1 of the Tennant article in Fisheries, Vol. 1, No. 4:

The term "minimum" is applied to the 10% of dry season average flows and 10% of wet season average flows.

Utilizing the "fair" category for the base flow would require 10% of wet season average flows and 30% of dry season average flows. As shown in Figure III-10 of page III-18 of the Draft EIS, the wet season average during 1961-1968 (which is wetter on the average than 1955-1969) is 12.4 MGD and the dry season average is 4.1 MGD. Applying the aforementioned criteria to these flow rates would require the maintenance of a "design low flow" of 1.25 MGD and 1.24 MGD during the wet and dry seasons, respectively, between the gaging station and the confluence in Waialeale Stream.

Your 11% estimate was based on diverting a net of 1 MGD from the 100 of 1.5 MGD and you compared the balance against the annual average. The use of 100 is unrealistic, since extreme variables are a function of the length of record. If this length of record was extended to infinity, 100 would approach zero. 90 is typically used as a minimum flow design parameter. However, Tennant did not use minimum 100 values. Tennant established separate minimum flow criteria for wet and dry weather seasons based on annual average flow records.

As an additional protective margin, 770,000 gpd that was intended for taro flow-through irrigation will now remain in Waialeale Stream in the revised design. The existing Waialeale Stream-aval taro irrigation system will be left untouched and the revised average irrigation draft from Waialeale Stream will be 1.5 MGD. With the cessation of Amfac's pumping, the net draft will be 0.6 MGD. As estimated in the Revised EIS, 85% and 95% of existing flow will be maintained in the dry and wet weather seasons, respectively. According to the Tennant criteria, 60-100% is considered the "optimum range" for recommended base flows.

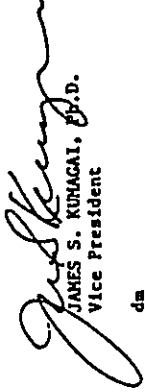
M&E Pacific, Inc.

Mr. Arthur Mori, President
April 24, 1984
Page 3

M&E Pacific, Inc.

Mr. Arthur Mori, President
April 24, 1984
Page 4

Please call Ken Ishizaki at 521-3051 if you have any questions.


JAMES S. KUMAGAI, Ph.D.
Vice President

dm

cc: Carleton Ching, HRA

Although Q_{90} and Q_{100} minimum flows are not utilized to project a minimum baseline flow in the Tennant method, the application of the revised net draft to the Q_{90} and Q_{100} flows would now also fall in the same "optimum" category, as delineated in the Revised EIS. Finally, a draft of a given quantity from the stream will not result in a reduction stream flow of the same amount, since the lowered hydraulic grade line will induce a higher rate of influent groundwater gain. This gain is significant, and has been measured to increase stream flow another 25% between the gaging station and the Waiannu-Waihole Stream confluence and another 25% between the confluence and the stream mouth (USGS Water Supply paper 1894).

5. Comment: Why is the (U.S. Army) Corp (of Engineers) [sic] estimate of average stream discharge so greatly different from that of the USFWS?

Response: The ultimate source of official stream flow records is the U.S. Geological Survey, Water Resources Division. As outlined in response 2, different values are obtained if different sites and different periods of record are utilized or if various compensations or adjustments are accounted for. The numbers are consistent.

6. Comment: Why is median discharge multiplied by average nutrient concentration to obtain the mass emission rate?

Response: The median was inadvertently mislabeled as the mean flow on Table 111-2 and this error was carried through on the nutrient calculations. These corrections will be made on the Revised EIS.

7. Comment: How were nitrogen concentrations estimated for all of Kaneohe streams combined and Waihole Stream only?

Response: Both were obtained from the source footnoted on Table VI-7.

8. Comment: The projected average total nitrogen concentration on mass emission rate is in error.

Response: Data from the aforementioned footnoted source were inadvertently transcribed in error. The revisions and corrections will be made in the Revised EIS.

M&E Pacific, Inc.
Engineers & Architects

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1001 Bishop Street
Honolulu, Hawaii 96813
(808) 521-3051 Telex 7430065

September 26, 1984

Mr. Arthur Mori, President
Life of the Land
250 South Hotel Street, Room 211
Honolulu, Hawaii 96813

SUBJECT: Amended Response to Comments on the
Draft EIS for the Maialoha Valley Agricultural Park

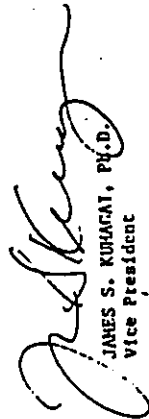
Thank you for your comments of July 5, 1984.

The tentative water system design proposed for the subject project has been revised due to cost constraints, requiring an amendment of our initial response of April 24, 1984. The present water system design proposal will utilize groundwater as the sole supply source for both domestic and irrigation water. Furthermore, consumption design quantities have been scaled down.

These design changes will affect the concerns raised by your comments in the following manner:

1. No stream intake structure will be constructed.
2. The proposed quantities of water to be utilized for domestic and irrigation water have been markedly decreased. The actual net impact may result in an increase of available water for stream fauna as well as taro farmers who are dependent on stream flow-through auwai systems. This proposed preferred water system alternative will be delineated further in the Revised EIS.

Please call Ken Ishizaki at 521-3051 if you have any questions.


JAMES S. KURIHARA, P.E.
Vice President

RM/bs

cc: Mr. Carleton Ching, RHA

C-79

RECEIVED JUL 12 1983



University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (Hon) 946-7581

Director
Office of Environmental Quality Control
550 Halekaunāhā Street, Room 301
Honolulu, Hawaii 96813

Dear Sir/Madam:

Draft Environmental Impact Statement
Waiahole Valley Agricultural Park and Residential Lots Subdivision
Waiahole Valley, Koolau, Oahu

Thank you for the opportunity to review the above cited DEIS. Our Environmental Center review has been prepared with the assistance of James Parrish, Hawaii Cooperative Fishery Research Unit; Harold Baker, Agricultural Economics; Charles Lamoureux, Botany; Bertell Davis, Anthropology; Pamela Hahnen and Mark Ingolla, Environmental Center. The following comments are offered for your consideration.

Stream flow and fauna

The impacts of the proposed Waiahole Valley Agricultural Park and Residential Lots Subdivision on Waiahole and Waianu streams have been thoroughly documented. Yet, this carefully investigated stream and water management plan has been developed on the assumption that Amfac will agree to terminate its lease with the state and allow the 1.1 mgd currently being pumped into Waiahole ditch to flow down Waiahole stream. Amfac's very important 1.1 mgd is the major water source which is the basis for stating the proposed project will enhance stream habitat (page IV-6). Since Amfac's lease is still pending, it should be noted in Chapter VI, Unresolved Issues, that the availability of this 1.1 mgd is as yet not assured. In conversations with staff of the Hawaiian Housing Authority we have been informed that a supplemental EIS will be submitted after the water source issue is clarified. The revised EIS should acknowledge this unresolved issue and the intent to prepare a supplemental EIS after water sources are finalized.

The studies of Norton, 1977 and Tennant, 1976 discussed on pages III-22 and IV-8 were not cited in the list of references. This is especially important in the case of Tennant, 1976. It is assumed that the Tennant article is in reference to the following: Tennant, D.L. "Instream Flow Regimens for Fish, Wildlife, Recreation and Related Environmental Resources" Fisheries Vol. 1, No. 4 pp. 6-10, 1976. It is important to note in this article (1) its relatively old date considering minimum stream flow research and literature (2) the Montana Method has been developed from mainland stream and river flow data (3) the method is based on data from streams with natural flows.

AN EQUAL OPPORTUNITY EMPLOYER

Director, OEQC

- 2 -

July 8, 1983

There is a need to have minimum stream flow standards established. In contacting the Department of Land and Natural Resources we have been informed that minimum stream flow determinations will be covered in the Instream Use Program (IUP). Currently the IUP is still in the development stages with public hearings and the Governor's approval yet to be completed before final adoption of the presently drafted rules. Having the IUP rules finalized may change the stream management strategy presented in the DEIS. It would be helpful if the IUP Program and its relation to the proposed project were discussed in the revised draft. John Ford from the U.S. Department of Fish and Wildlife is an expert in minimum stream flow determination with respect to biological implications and may be of value as a resource person in this matter. Clearly, a more site specific instream flow determination is needed to protect the native fauna of Waiahole and Waianu streams. Hawaii's hot, dry summer season and the need to irrigate taro to reduce water temperatures for disease prevention is just one site specific reason why more work is needed on stream flow management.

In reviewing the "Preliminary Engineering Report Covering Water Resources in Waiahole Valley" prepared by the Russ Smith Corporation, the lower Waiahole Valley Development--Alternative III recommended by the preparers was not adopted. Alternative III appears to be the least detrimental to the stream ecosystem while also being the least capital intensive (by \$763,000 as compared to Alternative I) yet this alternative has not been chosen. Is the basis of the decision to select Alternative I based solely on the 2.1c/1,000 gallon savings achieved by not utilizing Alternative III? If so, the mitigative measure suggested by the Russ Smith Corporation to sell groundwater for domestic use outside of Waiahole Valley to offset the additional costs of pumping should be discussed. A more thorough examination of the Alternative I decision and the rationale upon which it is based should be presented to clarify why the less environmentally acceptable and more capital intensive alternative was selected.

Although Stream Channel Modification in Hawaii, Part C: Tolerance of Native Stream Species to Observed Levels of Environmental Variability by Charles Hatthaway was included in the reference list, the site specific data for Waiahole stream was not included in Table III-3. We suggest that this information be incorporated into the revised EIS.

In the discussion of instream values (page III-22) it is stated "of the 3 native fishes only the oopu nakea requires a fresh water habitat during post larval stages, hence, its distribution in the upper reaches." The differences between oopu nakea, oopu naniha and oopu okuhe has been over emphasized, since all three oopu require fresh water during their life cycles.

The realignment of 20 feet of Waiahole stream should be discussed in greater detail. Will this realignment effect stream fauna? Will concrete culverts be used and if so, will appropriate shading of the stream be incorporated? Short term erosion and sedimentation impacts should also be discussed.

Figure IV-3 is mentioned on page IV-10 to help illustrate present impacts on stream water quality by diagramming sampling points. Instead, a graph of the influence of spray droplet size on drift is shown. The location of sampling sites is needed to compliment Table III-3. A correction of Figure IV-3 is needed.

Sediment-Soil Erosion

The destructive effects of sediment on corals discussed on page IV-11 should include the reduction of hard bottom or substrate surfaces suitable for coral settlement.

Director, OEQC

- 3 -

July 8, 1983

Actual figures for sediment losses are confusing. The figure of 4,900 T/yr. is cited (paragraph 1, page II-36) as the estimated sediment yield from Waiahole. If the 4,900 T/yr. figure is correct, the 475 T/yr. increase in sediment during construction (cited on page IV-36) represents a 9.6% increase not 1 percent as shown in the DEIS. It is also stated "Agricultural activity, which presently accounts for about 321 T/yr., will increase to 444 T/yr. as a result of turning the idle lands into cultivation." Assuming that this "Agricultural Activity" will be a long term sediment source, 123 T/yr. would be the additional sediment that would be generated by this project in contrast to the 14 T/yr. long run projection stated on the bottom of page IV-36. The various estimates of sediment loss should be re-examined and checked for consistency.

Archaeology

In the Summary page 3, it would be helpful to specifically include which 2 archaeological sites may need to be salvaged prior to road construction. With 28 sites reported, including 8 significant enough to be described, the more specific number of sites should be given rather than the term "several" to emphasize the significance of the archaeological resources in Waiahole Valley.

In Appendix B there is no specific statement as to whether the 2 sites mentioned will be salvaged. What are the plans for these 2 sites? It appears few of the recommendations (2 general, 5 specific) by Tomonari-Tuggle have been directly incorporated into the outline for the Cultural Resource Management/Data Recovery Plan for Waiahole Valley Agricultural Park. More specific acknowledgment in the REIS should clarify how the archaeological resources will be preserved. An outline of "necessary requirements" (page IV-11) of construction activities to mitigate potential impacts to the archaeological resources could relieve concerns that may arise over possible damage to the 28 surveyed sites. There is a need for specific mitigative measures. The present Management/Data Recovery Plan is only an organizational frame and lacks specific implementation procedures.

Finally, the proposed new water project extends beyond the limits of the agricultural park. Will archaeological impacts be addressed for the areas of water line development?

Water and Waste Water Management

The termination of Amfac's lease of 1.1 mgd from the state is an important issue. The loss of water from the leeward side of Oahu should be stated as an impact of this development. The 1 mgd reservoir (page I-16) is not clearly defined as to what effects it will impose on soil erosion and sedimentation.

Above the "no pass" line, 28 residences need individual, on site, waste management facilities. The use of grey water systems is an excellent alternative often overlooked, and may be appropriate for the situation if soil characteristics are adequate. The use of "dry" or composting toilets along with the grey water systems may be a potentially less polluting alternative to the closed vault and cesspool systems. The agriculturally oriented future residents may be more aware of the advantages of composting methods as an acceptable solution to their waste management problems. The following references may be of help in examining Dry Toilet technology:

Adams, R.A., Jon Averill, John Daniels, Compost Toilets: A Guide for Home Builders, National Center for Appropriate Technology, July, 1979.

Stoner, Carol Huppung, Goodbye to the Flush Toilet, Rodale Press, 1977.

Director, OEQC

- 4 -

July 8, 1983

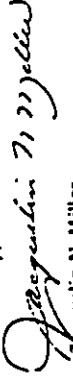
California State, Water Resources Control Board, Rural Wastewater Disposal Alternative Final Report Phase I, March 1980.

Economics

While benefit-cost analysis is a useful tool, as used in the DEIS its value is questionable (aside from the assumptions made as developed). The decision has already been made that maintenance of the rural life style is the goal. The benefit-cost analysis confirmed this decision. Benefit-cost analysis could be used to determine which of the alternative ways to retain this rural life style is most cost effective.

A minor note, on page I-5 the income requirement is defined as a "major portion" while on page I-9 it is "50 percent." Since this is essentially an agricultural park the major source of income from agricultural activity requirement would promote the efficient use of the park for agricultural production.

Yours truly,


Jacquelin N. Miller
Acting Director

cc: James Parrish
Bert Davis
Charles Lamoureux
Hal Baker
Jacquelin Miller
Pamda Bahnen
Mark Ingolia
Hawaii Housing Authority
M & E Pacific, Inc. ✓

M&E Pacific, Inc.

Dr. Doak Cox, Ph.D.
April 24, 1984
Page 2

M&E Pacific, Inc. Engineers & Architects

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1001 Bishop Street
Honolulu, Hawaii 96813
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April 24, 1984

Dr. Doak Cox, Ph.D.
Director, Environmental Center
University of Hawaii
Crawford 317
2550 Campus Road
Honolulu, Hawaii 96822

SUBJECT: Response to Comments on Draft EIS for the
Waiahole Valley Agricultural Park and
Residential Lots Subdivision

Thank you for your comments of July 8, 1983. Responses are provided below.

Stream Flow and Fauna

1. Comment: Unresolved issues with the water system design

Response: The proposed design is predicated on the acquisition of Asfac's 1.1 HGD, and if this water cannot be acquired, a supplemental source should be required. Since no legal documents have been signed, this source should be considered an unresolved issue and will be addressed as such in the Revised EIS. The failure to acquire Asfac's water is unlikely, however, since the state has the right to unilaterally revoke leased water rights for "higher use."

2. Comment: Validity of the Tennant (Montana) Method to assess the impact on instream uses and relationship of the Instream Use Program to the proposed project.

Response: The appropriateness of the Tennant Method, in addition to any other minimum stream flow estimation method, still needs to be validated for the assessment of instream use impacts in Hawaiian streams. Any permanent instream use program (IUP) standards are intended to be site specific, and various minimum stream flow standards may be adopted simultaneously for different streams or different stream segments. The lack of detailed transect data and time constraints have made the Tennant method an appropriate planning guideline for preliminary design. Based on the conservatively high minimum stream flow allowed for in the preliminary design, this stream flow quantity should be sufficient to meet the criteria of any IUP standard that is

selected as appropriate for the stream segment of concern. DMR's Instream Use Study was made publicly available at the time the Draft EIS was filed; consequently, the program could not be fully addressed in the Draft EIS. The Revised EIS will describe the implications of the program for the proposed project.

3. Comment: Alternative irrigation system designs and selection rationale

Response: An assessment of the alternative irrigation systems was included in Chapter V of the Draft EIS. Briefly, the rationale for the selected alternative was as follows: (1) a gravity system is more cost effective and energy conservative than a pumped system; (2) alternative III reduces streamflow at the stream mouth, which has a more drastic impact on the migration of diadromous species than the higher elevation diversion of alternative I; and (3) more water would need to be diverted from the McCandless system/Waiamu Stream source to service the higher level agricultural lots, thus reducing the Waiamu streamflow. The Board of Water Supply has indicated that it is not interested in the purchase of water from other suppliers, thus this source of income has been deleted. Additional constraints have severely limited the scope of water system alternatives, which will be discussed in the Revised EIS.

4. Comment: Incorporation of Hathaway's water quality data for Waiahole Stream

Response: Hathaway's data were incorporated in Table III-3 but were incorrectly referenced as Timbol and Maciolek, 1978. The corrected reference to Hathaway's report will be included in the Revised EIS.

5. Comment: Distribution pattern of native stream fauna

Response: Data from Norton's report showed a distinct difference in distribution among the three o'opu species. The paraphrasing of excerpts from the Norton report may have been inappropriately stated in the EIS and the language will be revised. If you have found information to the contrary, we would appreciate a citation of the reference.

6. Comment: Impact of stream realignment

Response: There will be no concrete culverts--only a rock lining along the bank adjacent to Waiahole Valley Road and and revetments at the Waiahole Valley Road Bridge to mitigate the present undermining. In addition, the stream will be rechannelized at the former site to remove a constriction that is causing the undermining. The Revised EIS will discuss the impacts in greater detail, including the short-term erosion and the effects on the stream fauna.

M&E Pacific, Inc.

Dr. Doak Cox, Ph.D.
April 24, 1984
Page 3

7. **Comment:** Correction on page IV-10
Response: The correct figure number should be III-12, which shows the sampling locations.

Sediment and Erosion

1. **Comment:** Impact of sedimentation on coral recolonization
Response: The Revised EIS will include the reduction of hard substrata for coral settlement as another effect of sedimentation.
2. **Comment:** Clarification of sediment loss estimates
Response: The Revised EIS will be revised to clarify the sediment loss estimates. The estimates are summarized in the attached table. The increased yield from agriculture (+123 T/yr) is offset by the reduction in yield from wildlands (-109 T/yr), resulting in a net increase of 14 T/yr in the long term. This is based on the assumption that the conversion of arable wildlands to agriculture will reduce the erosion rate of those presently unmanaged lands. The percent increase of sediment yield from the existing rate was incorrectly stated in the DEIS. The corrected figure should be less than a 1 percent increase in the long term and 10 percent in the short term.

Archaeology

1. **Comment:** Identification of significant archaeological sites impacted by construction and mitigation measures
Response: Sites that may be impacted by road construction are 3510 and 3512. Archaeological studies (Tomonari-Tuggle, 1983) have found the latter site to have significant research value. Arrangements are presently being made for an archaeologist to survey and document both sites prior to construction.
2. **Comment:** Adequacy of Cultural Resource Management/Data Recovery Plan
Response: Appendix B was originally intended to be a framework for the long-term management of archaeological resources. It will be revised in the Revised EIS to more specifically address the necessary mitigation measures during construction.
3. **Comment:** Survey of archaeological resources along the water line beyond the project boundaries

M&E Pacific, Inc.

Dr. Doak Cox, Ph.D.
April 24, 1984
Page 4

- Response:** The proposed water line will be laid within the existing road; thus, surface archaeological resources are not a concern. Subsurface remains, if encountered, will be brought to the attention of the State Historic Sites Office.

Water and Wastewater Management

1. **Comment:** Impact of reducing the Waiahole Ditch flow by 1.1 mgd on leeward Oahu
Response: Rising energy costs has reduced the cost-effectiveness of pumping water from Waiahole, thus Amfac has declined to utilize this source of irrigation in leeward Oahu for the past several years. Alternative uses for Waiahole Valley water in leeward Oahu are not now planned. The cessation of pumpage will not negatively impact leeward Oahu water supplies since irrigation water use by Amfac is expected to be more significantly affected through the reduction of cultivated sugar cane acreage and the increased use of drip irrigation.
2. **Comment:** Soil erosion effects from the 1 MG reservoir
Response: The reservoir is a tank that is not subject to erosion. Standard erosion control measures will be included in the grading plan to mitigate erosion during construction.
3. **Comment:** Alternative onsite disposal methods above the "no-pass" line.
Response: No gray water leaching field systems are permitted by the Board of Water Supply above the "no-pass" line. The compost toilet will be mentioned as a potential supplement to lessen the pumping frequency of closed vaults. The choice will be left to the prospective lessee who will be informed through the lease agreement that cesspools are not permitted and that the closed vault or closed vault with compost toilet are some of the alternatives which might be appropriate, subject to control by regulatory agencies.

Economics

1. **Comment:** Appropriateness of benefit-cost analysis
Response: The intent of that section, as the title indicates, was to undertake a fiscal impact analysis and not a benefit-cost analysis. The purpose of the fiscal impact analysis was to assess the direct and indirect monetary impacts to government funds. Although the term "benefit-cost ratio" was used, it should not be confused with the benefit-cost analysis tool to which you refer. The benefit-cost analysis tool differs from fiscal impact analysis in that nonmonetary

RECEIVED JUL 11 1983

July 7, 1983

Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekauiila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Parnell,

RE: Maiahole Valley Aq. Park EIS

In regards to getting responses from valley residents on this EIS draft, I feel residents were not given enough time to study all of the documentation. Copies were not available to us until June 23, 1983, and then only 5 copies of the draft and 1 copy of the technical data for 35 families. This only gave us 2 weeks in which to study this report.

I myself was only able to skim through it as other families wished to see it and in that time I found some minor errors in some of the tables and figures. Also some of the information was very unclear to me as to what had been done or what was going to be done.

I wish an extension could be allowed to give everyone more time to study the documentation.

Sincerely,

Gloria Fraiolo, Maiahole Valley Resident
47-328 Waihee Road
Kaneohe, Hawaii 96744

CC: Hawaii Housing Authority
M & E Pacific, Inc.

M & E Pacific, Inc.
Engineers & Architects

April 24, 1984

Ms. Gloria Fraiolo
47-328 Waihee Road
Kaneohe, Hawaii 96744

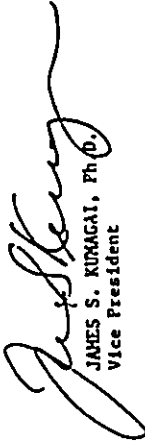
SUBJECT: EIS for Maiahole Valley Agricultural Park

Thank you for your comments of July 7, 1983. Responses are provided as follows:

Comment: There was an insufficient number of copies of the EIS and support documents for the given number of families and the given period of review.

Response: The provision of the additional copies at the Maiahole Valley Elementary School was voluntary on our part and beyond the legal specified requirements. We do understand that the review period is very limited and do sympathize with you regarding this concern. We hope that in the additional period that you have had because of the delayed project implementation has given the residents additional time to review the document. Any additional comments that you may have are welcomed.

Please call Ken Ishizaki at 521-3051 if you have any questions.


JAMES S. KUMAGAI, Ph.D.
Vice President

dm

cc: Carleton Ching

Suite 500, Paahoi Tower
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Honolulu, Hawaii 96813
Phone 521-3051 Telex 7430065

RECEIVED JUN 17 1983

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 15TH AIR BASE WING (PACAF)
HICKAM AIR FORCE BASE, HAWAII 96813



REPLY TO
ATTENTION DFE
DEEV (Mr Yamada, 449-1831)

16 JUN 1983

SUBJECT: Draft Environmental Impact Statement for the Waiahole Valley Agricultural Park and Residential Lots Subdivision

TO: Ms Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, HI 96813

1. This office has reviewed the subject EIS and has no comment relative to the proposed project.
2. We greatly appreciate your cooperative efforts in keeping the Air Force apprised of your project and thank you for the opportunity to review the document. The draft EIS is returned for your file.

Robert H. Okuyuki
ROBERT H. OKUYUKI
Chief, Engrg & Envtl Plng Div
Directorate of Civil Engineering

1 Atch
Draft EIS

Cy to: Hawaii Housing Authority
ATTN: Mr Carleton Ching
P. O. Box 17907
Honolulu, HI 96817

RBE Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, HI 96813



DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
FORTY-THIRD AVENUE, HAWAII 96813

July 5, 1983

REPLY TO
ATTENTION DFE

Directorate of Facilities Engineering

Mr. Melvin Koizumi, Acting Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Mr. Koizumi:

The Draft Environmental Impact Statement (DEIS) for the Waiahole Valley Agricultural Park and Residential Lots Subdivision, Koolau-poko District, Oahu has been reviewed and we have no comments to offer. There are no Army installations or activities in the vicinity of the proposed project.

Thank you for the opportunity to comment on the DEIS.

Sincerely,

Ronald A. Borrello
for

Ronald A. Borrello
Colonel, Corps of Engineers
Director of Facilities Engineering

Copies Furnished:

Hawaii Housing Authority
ATTN: Mr. Carleton Ching
P. O. Box 17907
Honolulu, Hawaii 96817

M & E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

2/1/12

ALVIN T. LAW
HONOLULU, HAWAII
REPRESENTATIVE



STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
349 SHILOH FIELD ROAD, HONOLULU, HAWAII 96819

JUN 6 1983

GEORGE R. ARROYO
SECRETARY

NEED INFORMATION
CONTACT
SHELE M. TORRES
SECRETARY

LETTER NO. (P) 1557.3



STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P. O. BOX 114, HONOLULU, HAWAII 96819

JUN 22 1983

GEORGE R. ARROYO
SECRETARY

Ms. Jacqueline Parnell, Director
Office of Environmental Quality
Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Parnell:

Subject: Waiahole Valley Agricultural Park
and Residential Lots Subdivision
Environmental Impact Statement

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

Very truly yours,

HIDEO MURAKAMI
State Comptroller

HIENG

Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Parnell:

Waiahole Valley Agricultural Park and
Residential Lots Subdivision

Thank you for providing us the opportunity to review the proposed project,
"Waiahole Valley Agricultural Park and Residential Lots Subdivision"
Environmental Impact Statement Draft.

We have completed our review and have no comments to offer at this time.

Yours truly,

JERRY M. MATSUDA
Contractor, HANG
Cont' & Engr Officer

cc: Hawaii Housing Authority
M & E Pacific, Inc.
Env. Quality Comm w/EIS



HEADQUARTERS
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860

RECEIVED JUL 11 1983

IN REPLY REFER TO:
WDA:QLB:jss
Ser 1540
7 JUL 1983

Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Parnell:

Environmental Impact Statement
Maialole Valley Agricultural Park and
Residential Lots Subdivision

The EIS for the Maialole Valley Agricultural Park and Residential Lots Subdivision has been reviewed and the Navy has no comments to offer. As this command has no further use for the EIS, the EIS is being returned to the Environmental Quality Commission, by copy of this letter.

Thank you for the opportunity to review the EIS.

Sincerely,

A. M. DALLAM
CAPTAIN, CEC, U. S. NAVY
BY DELEGATION OF THE COMMANDER

Enclosure

Copy to:
Environmental Quality Commission
Hawaii Housing Authority
M & E Pacific, Inc.

C-88

US Department
of Transportation
United States
Coast Guard



RECEIVED JUN 16 1983

Commander (dpl)
Fourteenth Coast Guard District

Prince Kahanui
Federal Building
300 Ala Moana Blvd.
Honolulu, Hawaii 96860
Phone: 546-2861

11000
Serial 555
15 June 1983

Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Parnell:

The Fourteenth Coast Guard District has reviewed the Environmental Impact Statement for the Maialole Valley Agricultural Park and Residential Lots Subdivision and has no objection or constructive comments to offer at the present time.

Sincerely,

J. E. SCHWARTZ
Commander, U. S. Coast Guard
District Planning Officer
By direction of

Commander, Fourteenth Coast Guard District

Copy: Hawaii Housing Authority
M & E Pacific, Inc.

RECEIVED JUL 15 1983



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
150 MALEKAUWILA STREET
ROOM 301
HONOLULU, HAWAII 96813

Melvin K. Koizumi
Acting Director
TELEPHONE NO.
548-9115

WILEEN R. ANDERSON
MAILER

BUILDING DEPARTMENT
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
150 SOUTH KING STREET
HONOLULU, HAWAII 96813



ROY H. TANJI
DIRECTOR AND BUILDING INSPECTOR
WILLIAM F. REGULAR
SENIOR INSPECTOR

PB 83-465

June 20, 1983

Mr. Carleton Ching
Hawaii Housing Authority
P.O. Box 17907
Honolulu, Hawaii 96817

Dear Mr. Ching:

Subject: Environmental Impact Statement for the Waiahole
Valley Agricultural Park and Residential Lots
Subdivision, Koolaupoko, Oahu

We have reviewed your draft EIS and have no substantive
comments. Thank you for providing us the opportunity to
review your EIS.

Sincerely,

Melvin Koizumi
Acting Director

cc: M & E Pacific, Inc.

C 89

Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Parnell:

Subject: Draft EIS for the Waiahole Valley Agricultural
Park and Residential Lot Subdivisions
Koolaupoko District, Oahu, Hawaii

We have reviewed the subject draft EIS and have no comments.
Thank you for the opportunity to review it.

Very truly yours,

ROY H. TANJI
Director and Building Superintendent

cc: J. Harada
Hawaii Housing Authority
M & E Pacific, Inc.

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1499 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96814 - AREA CODE (808) 935-4111



EILEEN R. ANDERSON
MAYOR

OUR REFERENCE CS-ES

June 17, 1983

CHIEF

WALDO FALK
DEPUTY CHIEF

EILEEN R. ANDERSON
MAYOR

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

550 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 935-1061



JOSEPH K. CONANT
DIRECTOR
CHARLES M. TORIBIO
DEPUTY DIRECTOR

June 30, 1983

Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Parnell:

Subject: Maialole Valley Agricultural Park
and Residential Lots Subdivision

We have reviewed the draft of the Environmental Impact Statement for the Maialole Valley Agricultural Park and Residential Lots Subdivision. As stated on page IV-22, the proposed development should have little effect on police operations as demand for police services should be minimal. We have no further comment at this time.

Sincerely,

Waldo Falk
WALDO FALK
Acting Chief of Police

cc: Hawaii Housing Authority
P. O. Box 17907
Honolulu, Hawaii 96817
Attention: Carleton Ching
H & E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813

Q-90

Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Parnell:

Subject: Draft Environmental Impact Statement (DEIS)
Maialole Valley Agricultural Park and
Residential Lots Subdivision

Thank you for the opportunity to review the subject document.

We are pleased to note that the residential lots will be made available to low- and moderate-income households. We have no further comments to offer at this time.

We will be retaining the DEIS for our files.

Sincerely,

JOSEPH K. CONANT
Original Signed
JOSEPH K. CONANT

cc: Hawaii Housing Authority
P. O. Box 17907
Honolulu, Hawaii 96817
Attention: Carleton Ching
H & E Pacific, Inc.
Pacific Trade Center, Suite 600
190 South King Street
Honolulu, Hawaii 96813



University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 253 - 2540 Dole Street
Honolulu, Hawaii 96822

7 July 1983

RECEIVED JUL 6 1983

HAWAIIAN ELECTRIC COMPANY, INC.

Box 2750 / Honolulu, Hawaii / 96840

ENV 2-1
NY/G

July 1, 1983

RICHARD L. O'CONNELL, P.E.
MUNICIPAL ENVIRONMENTAL DEPARTMENT
1983 148 4486

Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Parnell:

Subject: Draft Environmental Impact Statement for the
Maiahole Valley Agricultural Park and Residential
Lots Subdivision, Koolauapoko District, Oahu, Hawaii

We have reviewed the above Draft Environmental Impact Statement
and foresee no adverse effects on Hawaiian Electric Company's
transmission lines or our ability to provide required service
to the proposed subdivision.

Thank you for the opportunity to comment on this Draft Environ-
mental Impact Statement.

Sincerely,

Richard L. O'Connell
Manager, Environmental Department

JMP,Jr.:cal

cc: Hawaii Housing Authority
Attn: Carleton Ching

M&E Pacific, Inc. v

Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Parnell:

SUBJECT: Draft EIS for the Maiahole Valley Agricultural Park and
Residential Lots Subdivision, Koolauapoko District,
Oahu, Hawaii, June 1983

We have reviewed the subject DEIS and have no comment to offer. Thank
you for the opportunity to comment.

This material was reviewed by WRRRC personnel.

Sincerely,

Edwin T. Murabaynashi
EIS Coordinator

ETH:jm