FINAL

Supplemental Environmental Impact Statement

JULY 1988

FOR

WAIMANALO AGRICULTURAL PARK

PHASE II

FARM LOT SUBDIVISION

PREPARED FOR:

DIVISION OF WATER AND LAND DEVELOPMENT
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE OF HAWAII

DIVISION OF WATER AND LAND DEVELOPMENT

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE OF HAWAII

This Environmental Document is Submitted
Pursuant to Chapter 343, HRS

SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

WAIMANALO AGRICULTURAL PARK
PHASE II

FARM LOT SUBDIVISION

Waimanalo, Oahu, Hawaii

TMK: 4-1-10:66,79,80,82,85,86,87,88 & 91

PROPOSING AGENCY:

Division of Water and Land Development
Department of Land and Natural Resources
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ACCEPTING AGENCY:

Governor, State of Hawaii

William W. Paty Date
Chairperson
Board of Land & Natural Resources

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SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

February 1988

PROJECT: AGRICULTURAL SUBDIVISION, PHASE II
WAIMANALO AGRICULTURAL PARK

PRIOR DOCUMENTS:

1. ENVIRONMENTAL IMPACT STATEMENT
   WAIMANALO AGRICULTURAL PARK
   PHASE 1 INCREMENT
   PROPOSED BY DEPT. OF LAND & NATURAL RESOURCES
   ACCEPTED BY THE GOVERNOR, STATE OF HAWAII,
   MAY 27, 1982

2. WATERSHED PLAN AND ENVIRONMENTAL IMPACT
   STATEMENT
   WAIMANALO WATERSHED
   PROPOSED BY: U.S. SOIL CONSERVATION SERVICE
   AND DEPT. OF LAND & NATURAL RESOURCES
   ACCEPTED BY THE GOVERNOR, STATE OF HAWAII,
   APRIL 23, 1982

LOCATION: WAIMANALO, KOOLAUPOKO DISTRICT
ISLAND OF OAHU, STATE OF HAWAII

PROPOSING AGENCY: DIVISION OF WATER AND LAND DEVELOPMENT
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE OF HAWAII

ACCEPTING AUTHORITY: GOVERNOR, STATE OF HAWAII

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II. LOCATION MAP
III. SITE PLAN
IV. SLOPE MAP
V. FLOOD HAZARD MAP

LIST OF REFERENCES

1. "Waimanalo Agricultural Park, Phase 1 Increment" - Environmental Impact Statement, Department of Land & Natural Resources, State of Hawaii, December 1981.

2. "Watershed Plan and Environmental Impact Statement - Waimanalo Watershed", Department of Land & Natural Resources, State of Hawaii and U.S. Soil Conservation Service, Department of Agriculture, December 1981.

3. "Waimanalo Agricultural Park - Report R61", Department of Land & Natural Resources, State of Hawaii, April 1980.

4. "Flood Management Plans & Preliminary Engineering Studies - Waimanalo Flood Control Project", Department of Land & Natural Resources, State of Hawaii, October 1976.

5. "Waimanalo Wastewater Facilities - Environmental Impact Statement", Department of Public Works, City and County of Honolulu, June 1983.

6. "Development Plan & Land Use Map - Koolaupoko", Department of General Planning, City and County of Honolulu, May 1983.

SECTION 1: SUMMARY

PROPOSED PROJECT: Waimanalo Agricultural Park, Phase II

PROPOSING AGENCY: Department of Land and Natural Resources
Division of Water and Land Development
State of Hawaii

PROJECT LOCATION: TMK: 4-1-10: 66, 79, 80, 82, 85, 86, 87, 88 & 91
Waimanalo, Oahu, Hawaii

PROJECT DESCRIPTIONS

The State Department of Land and Natural Resources and Department of Agriculture propose to subdivide 70 acres of State Land into 6 leasehold farm lots varying in size from 6 acres to 12 acres. The smaller lots (2) are recommended for nursery use and the larger lots (4) are recommended for orchards crops - specifically, banana farming.

The Department of Agriculture is the administering agency for the Agricultural Park program. The administration of the Waimanalo Irrigation System will be transferred from the Department of Land and Natural Resources to the Department of Agriculture, effective July 1, 1989.

Access to the agricultural subdivision will be provided from Waikupanaha Street at Mahiku Place (Waimanalo Agricultural Park, Phase I) via a 24-foot wide asphalt concrete road built to City standards.

Irrigation water will be provided by the Waimanalo Irrigation System (WIS). It is estimated that a peak demand of 200,000 gallons per day (gpd) will be required for banana production. Initial water demands for nursery production is expected to be provided by BWS municipal water from a 180,000 gpd commitment. Peak demand for the nursery lots is estimated at 59,000 gpd. Upon completion of the associated 60 million gallon reservoir by the U.S. Soil Conservation Service, the subscribers should have sufficient year-round supply of irrigation water.

Present drainage patterns will be maintained. Drainage facilities meeting County standards will be installed to allow the runoff to pass under the roadway structure. Construction, land acquisition, administration, and engineering costs are estimated to total $1.13 million.

DESCRIPTION OF EXISTING ENVIRONMENT

The proposed Waimanalo Agricultural Park is located in the Waimanalo Area of the Koolaupoko District of the Island of Oahu, Hawaii. Part of the area proposed for subdivision was, at one time, used for sugar cane cultivation. Waimanalo contains many farms supporting the diversified agricultural industry.

The mean annual rainfall is approximately 44 inches a year. The prevalent wind direction is from the northeast, 80 percent of the time. Average annual temperature is 74°F (70°F in January and 78°F in August).

The Kailua Reservoir and the Waimanalo Stream are the receiving bodies for storm drainage from the project. Kailua Reservoir is part of the WIS and has a controlled outlet to the Waimanalo Stream. The project area has not been surveyed by the Flood Insurance Agency.

Domestic water, electric and telephone services are available at the fringe of the project. The State has a 180,000 gpd commitment from the BWS for domestic water supply. Irrigation water is available from the Waimanalo Irrigation System. Sewage disposal will be by individual cesspools.

SECTION 2: INTRODUCTION

2.1 General

The planned development of the Waimanalo Agricultural Park in its entirety is described in Waimanalo Agricultural Park, prepared by Park Engineering. This development plan provided for improvement of existing infrastructure and new infrastructure in support of an overall park consisting of about 1,900 acres, much of which was already being farmed at the time the plan was developed. Additional increments of new agricultural subdivision lands (encompassing approximately 560 acres) were planned for future development. Phase I, which provided 14 new lots was completed in 1986, and Phase II (described as part of Phase V in the Park Engineering plan), which is the subject of this Supplemental EIS, is now proposed to further implement the overall planned development of the Waimanalo Agricultural Park.

An EIS for Waimanalo Agricultural Park, Phase I was prepared by the State Department of Land and Natural Resources, Division of Water and Land Development in March 1982. The EIS was accepted by the Governor, State of Hawaii on May 27, 1982. This document is a supplement to this previously accepted EIS as the action under consideration is within the Waimanalo Agricultural Park and an expansion of the initial project (Phase I).

A supplemental statement is warranted as the scope of the action has been substantially increased. Unchanged material is incorporated by reference to the original EIS (hereinafter called "accepted EIS"). This intent has been announced in the August 8 1987 and August 23, 1987 issues of the OEQC Bulletin published by the Office of Environmental Quality Control.

2.2 Definition

"Agricultural parks" are defined as any agricultural complex which combines and concentrates in a common location agricultural activities for the purpose of production and distribution economics. Agricultural structures (farmer and employee dwellings) necessary to the production and distribution of agricultural commodities are considered part of the agricultural park.

Chapter 171, of the Hawaii Revised Statutes, enables the creation of agricultural parks. The Department of Agriculture is the administering agency for the Agricultural Park program pursuant to Act 222, Session Laws of Hawaii (1986). Act 306 (SLH 1987) transfers the authority of administration of the Waimanalo Irrigation System from the Department of Land and Natural Resources to the Department of Agriculture, effective July 1, 1989.

2.3 Historic Overview

The history of the project area and enabling legislation is unchanged from the accepted EIS.

2.4 Planning Overview

The Waimanalo Agricultural Park (EXHIBIT I: VICINITY MAP) consists of approximately 1,900 acres of State land. The development will be accomplished in five (5) phases. Phase I included the subdivision of 475 acres into 17 lots. These lots are served by an improved roadway, domestic and irrigation water systems, drainage system, and electrical and telephone distribution systems.

Phase II (EXHIBIT II: LOCATION MAP) will subdivide 70+ acres into 6 lots varying in size from 6 acres to 12 acres. Extending from Waikapunaha Street, access roadways and utility improvements to the 6 lots are included in this project. Also, new irrigation and domestic water distribution systems to the proposed agricultural lots are part of the project, (EXHIBIT III: SITE PLAN). Irrigation system and a 60-million gallon reservoir serving the existing farm lots are also part of Phase II, and their environmental impacts were disclosed in the "Watershed Plan and Environmental Impact Statement - Waimanalo Watershed." Phases II and IV include further replacement of ditches. Development of the remaining agricultural lands shall be included in Phase V.

SECTION 3: DESCRIPTION OF PROPOSED PROJECT

3.1 Project Location

The project site is in the Waimanalo area (EXHIBIT I: VICINITY MAP) which is at the southeast end of Windward Oahu approximately 14 miles from central Honolulu via the Pali Highway and Kalanaianaole Highway. The agricultural subdivision will be on State-owned land within TMK 4-1-10: 66, 79, 80, 82, 85, 86, 87, 88 & 91.

EXHIBIT II: LOCATION MAP indicates the project's situation within Waimanalo Valley. Phase II is in the south-eastern corner of the valley at the foot of the southerly valley walls.

3.2 Description of Proposed Action

A. General:

The land subdivision to accomplish the project is shown on EXHIBIT III: SITE PLAN. The six lots will be encumbered by flowage easements for drainage and cesspool location restrictions for water supply protection. Recommended uses of the six lots are based on the agricultural feasibility analysis which has been prepared as one component of the overall planning and engineering study. Lots 1 & 2 are recommended for nursery use -- the production of potted foliage plants. Lots 3, 4, 5 & 6 are larger lots which encompass the more sloping portions of the overall park area. These lots are recommended for orchard crops -- specifically, banana farming.

B. Subdivision: Gross and net acreages of the seven proposed lots are tabulated as follows:

LOT NO.	GROSS AREA	NET ARE[1]	NET USEABLE ARE[2]
1	6.4 acres	6.3 acres	5.3 acres
2	5.3	5.1	4.1
3	12.0	10.3	9.3
4	12.2	10.6	9.6
5	11.0	10.4	9.4
6	11.5	9.4	8.4
	58.4	52.1	46.1

1. Net of slopes greater than 25%, easements, and flowage channels.
2. For lots of 5 acres or more, 1 acre was allocated to dwelling unit and other non-agricultural uses.

Lot sizes were determined by taking into account topography as well as minimum lot size required to produce a reasonable rate of return to the farmer, given capital and operating costs in relation to projected commodity sales. Lots with larger areas consisting of steep slope conditions (greater than 25% slope), necessarily had to be larger, to provide the minimum useable area for crop production.

Construction of one single-family detached dwelling, in conformance with current zoning, will be allowed per lot. Cesspools will service domestic sewage wastes and will be located makai of the water conservation line within the "Pass Zone" area. The lots will be leased for an extended period. The State also proposes to set leasing conditions which will assist in retaining the agricultural nature of the Waimanalo area. These conditions will include the proliferation of diversified agricultural use upon the leased lots and the encouragement of crop production which will be economically viable and will not adversely impact the market prices of other Hawaiian agricultural goods.

The 6-lot agricultural subdivision will include the construction of a 24-foot wide asphalt concrete pavement within a 44-foot wide right-of-way. This road will begin at the western end of Waikupanaha Street as shown in EXHIBIT III. The road will conform to the City and County of Honolulu's Typical Agricultural Road section and will be dedicated to the City for maintenance.

C. Water Supply: Two distinct water systems would support agricultural uses in the proposed park. For lots 1 and 2, which are designated for nursery use, BWS municipal water would be used. For the remaining lots, lots 3, 4, 5 & 6, Waimanalo Irrigation System (WIS) water would be used to meet the requirements for the recommended banana cropping. Potable water will be provided to Lots 3, 4, 5, and 6 by connection to the BWS system. The WIS serves the Phase I and existing farm areas.

Recommended nursery uses, the production of potted foliage plants, would require the higher quality municipal water to meet certification requirements with respect to those nurseries producing plants for sale in the Mainland U.S. Plants imported from Hawaii by California and many other states must meet quarantine requirements intended to prevent plant insects and diseases from entering these states. In particular, the nematode parasite which is present in Oahu soils is the pest of principal concern. Since the nematode is frequently present in surface irrigation water, and has been identified in WIS water, to meet certification requirements, nurseries must use BWS water which is free of nematodes. A large proportion of Hawaii's

nursery production (about 80% of potted foliage) is exported to the Mainland, therefore most nurseries are expected to become certified.

In an agreement between the State DLNR and the BWS, the latter agency has committed to provide up to 180,000 gallons per day (GPD) to Phase II and other future agricultural subdivisions developed by the State in the Waimanalo Agricultural Park. An 8-inch municipal water line would serve the Phase II lots and connect to the BWS's Waimanalo Well II. In consideration of the State's contributing development funds to the BWS, as part of the water agreement, Phase II nursery users would not be required to pay Water System Facilities charges to the BWS. Municipal water service to the nursery lots will be provided though 1.5-inch meters.

With respect to lots 3,4,5 & 6 recommended for orchard use, irrigation quality water would be provided by a 12-inch pipeline connecting the subdivision to the WIS system from the intersection of Waikupanaha Street and Kumuhau Street (Phase I).

On-going improvements to the Maunawili source will increase the total irrigation flow available to Waimanalo. Other improvements to the irrigation system (reservoirs, transmission mains, etc.) include provisions for this subdivision. Hydrants connected to the irrigation pipelines will provide for fire protection for the area.

3.3 Goals and Objectives

Development of Phase II of the Waimanalo Agricultural Park implements one component of the planned development of State owned Agriculture District lands in Waimanalo, and thereby contributes to overall State goals and objectives in regard to diversified agriculture. The Hawaii State Plan (Section 226-7(a)(2)) explicitly notes that one of the state's two basic economic objectives for agriculture is:

> "Continued growth and development of diversified agriculture throughout the State."

Among the policies listed in the State Plan for implementing this objective is:

> "Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs."

Chapter 166 of the Hawaii Revised Statutes provides the enabling legislation and intent for the State's Agricultural Parks Program. This chapter specifically notes that:

> ".... important agricultural lands should be preserved for productive purposes; the contribution of diversified agriculture and aquaculture to export and local markets should be expanded, thereby increasing its importance in the State's economy; and continued use of the State's agricultural land resources should be ensured by providing lands to new farmers, displaced farmers, and other qualified farmers." (Section 166-1)

To carry out the intent and purposes of Chapter 166, the State Department of Agriculture has been authorized to plan, develop and manage agricultural parks. (Before June 30, 1986, the State Department of Land and Natural Resources was the agency with primary responsibility for development of State agricultural parks.)

3.4 Phasing and Funding

Development time for the proposed Agricultural Subdivision is estimated at 12 months after all approvals have been given.

The State will finance all off-site capital improvement costs, utilizing funds for construction from Act 214 SLH 1979, Item IV-A-14, Agricultural Park Subdivision, Statewide. Each tenant will be responsible for funding his own respective on-site improvements.

Total Estimated Cost for the Phase II development of the Waimanalo Agricultural Park is $1,130,000. The specific costs are as follows:

o	Land Acquistion	$ 20,000
o	Roadway	607,000
o	Drainage System	372,000
o	Irrigation System With Fire Hydrants	252,000
o	Domestic Water System	106,000
o	Street Lighting System	8,000
	SUBTOTAL	$1,365,000
	Administration/Inspection	84,000
	Engineering/Surveying	189,000
	TOTAL	$1,638,000

SECTION 4: EXISTING ENVIRONMENT

4.1 Geology

The geology of the area is described in the accepted EIS. The steep mountain slopes are formed of thin bedded lava flows of the Koolau Volcanic Series. Alluvium overlies eroded basalt at the foot of the slopes and over much of the lowland.

4.2 Topography

In Exhibit IV, lands of the proposed agricultural park have been mapped according to slope conditions. Prevailing degree of slope is categorized into lands with slopes ranging from 0 to 12 percent, by slopes ranging 13 to 25 percent, and lands with slopes greater than 25 percent. Exhibit III indicates the lot boundaries within the proposed park. Referring to both Exhibits III and IV, one can obtain a sense of the slope conditions within each of the six proposed lots.

Overall, about 89 percent (52.1 acres) of the gross area encompassing the six lots is considered agriculturally useable in slopes of 25 percent or less. Lots 1 & 2, which are recommended for nursery use, encompass the less sloping part of the subdivision. Some grading will be required to provide maximum slope of five percent for the locations within each lot where shadehouses would be constructed. Lots 3,4,5 & 6 occupy the steeper part of the subdivision lands. These lots have been recommended for orchard use -- specifically banana farming.

4.3 Climate

The climate of the area is described in the accepted EIS. The mean annual rainfall is approximately 44 inches a year with the wetter period between November through April. Prevalent winds are from the northeast, 80% of the time. The average annual temperature is $74^{o}F$.

4.4 Hydrology

The surface water and groundwater in the project area were described in the accepted EIS. The project area is within the Waimanalo Stream basin which has a total drainage area of 5 square miles. Waimanalo Stream is perennial with an average annual discharge of 1017 billion gallons.

Groundwater occurs as dike-impounded water, perched water, and brackish basal water. Dike-impounded water in lava flows in the Koolau Mountains, is high quality water suitable for domestic use.

Perched water is of lower quality but important for future resource. Brackish basal water is unsuitable for domestic use without treatment.

4.5 Biology

The nature of flora and fauna in the project area are described in the accepted EIS. Most of the site was once cultivated for sugar cane by the Waimanalo Sugar Company. The relatively lush growth of vegetation appears to be introduced flora species such as Guava, Christmas Berry, California Grass, Hilo Grass, and Rice Grass, which have replaced former native flora in the area.

No threatened or endangered birds are known to inhabit the area. Common urban birds, such as mynahs, doves, cardinals, and sparrows were observed at the project site. Wildlife inhabiting the area include stray cats, mongoose, and rats which are common in open areas next to farmland.

4.6 Archaeology

An archaeological survey was performed by Cultural Surveys of Hawaii and is included herein as APPENDIX "A". No prehistoric or historic period archaeological sites were located in the survey area. It is suspected that wetland taro cultivation occurred in this area but all physical remains were destroyed first by cattle grazing and then by commercial sugar planting.

Two prehistoric taro complexes lie immediately mauka of the project area. These two complexes are significant archaeological resources as they represent the only surviving remnants of one of Windward Oahu's smallest taro growing areas.

4.7 Flood Hazard

EXHIBIT V: FLOOD HAZARD MAP was developed from the Flood Insurance Rate Maps (Rev Sept 4, 1987) of the Federal Emergency Management Agency's National Flood Insurance Program. The project is in an area in which flood hazards are undetermined.

The storms of Dec. 11, 1987 and Dec. 31, 1987 did not damage the project area. Field observations indicated that the natural slopes and ground cover prevented inundation and serious erosion. Flood heights at the major drainage gullys were assessed to aid in the design of culvert crossings.

Observations of the completed Phase I Agricultural Park showed minor erosion problems. Serious erosion was prevented by compliance with soil conservation methods. Roadway conditions were satisfactory - mud was generated from an off project embankment.

The project site is not located within the tsunami inundation zone.

4.8 Infrastructure

The existing domestic water system, irrigation system, electrical service, gas service, wastewater system, and solid waste disposal system are discussed in the accepted EIS. Adequate domestic water is available at the entrance to the Phase 1 Increment. A Water Service Agreement betweem DLNR and BWS commits 180,000 gallons per day for the project. This amount is sufficient for domestic consumption and projected nursery use.

Irrigation water is available from the Waimanalo Irrigation System (WIS). Maunawili Valley watershed is the primary source. The supply system was originally built by the Waimanalo Sugar Company and recently improved by DLNR.

Electricity in the area is supplied by Hawaiian Electric Co. An overhead 4.16 kilo volt line extends to the intersection of Kumuhau and Waikupanaha Streets. Gas service via distribution lines is not available in the area.

The Waimanalo Sewage Treatment Plant (STP) is the municipal facility of the area. The project site is outside the STP service area as shown in the current facility plan.

Solid waste in the area is picked up by the Refuse Collection and Disposal Division of the City and County of Honolulu, and disposed at the Kapaa Sanitary Landfill. A convenience center was recently completed for collection of solid waste. The center is operated by the City's Refuse Division.

4.9 Public Services

Public services available in the vicinity of the project area are discussed in the accepted EIS. These services remain unchanged and include:

a. Police Protection: Kailua Police Substation @ 219 Kuulei Road

b. Fire Protection: Waimanalo Fire Station @ 41-1301 Kalanianaole Highway

c. Health Services: Castle Memorial Hospital @ 640 Ulukahiki Street

d. Educational Services: Waimanalo Elementary & Intermediate School @ 41-1320 Kalanianaole Highway
Kailua High School @ 451 Ulumanu Drive

4.10 Economic Characteristics

Waimanalo Valley, including the Waimanalo and Waimanalo Beach communities, is encompassed by Census Tract 113, which has a resident population of 9,132, according to the 1980 Census. Most residents comprising the area's 2,137 households who are in the labor force, work in downtown Honolulu, or in other towns on Oahu outside of the Waimanalo area. Except for agriculturally related activities, the economy of the area consists mainly of limited retail and outdoor recreational activities -- the latter including golf, stables, and rodeo events. In the Southeast portion of the area, near Makapuu Point, there also is ocean engineering, marine and aquaculture research, and the recreational complex of Sea Life Park. Of the total number employed in 1980, 3,626 persons, 337 (9.3%) were in farming and fishing occupations, primarily the former. In 1981, the SCS estimated gross income from crop production in the Waimanalo watershed area to be about $7.1 million, produced on an estimated 600 acres which were used for truck crops, banana and nursery products. Total diversified agricultural production (fruits, vegetables and melons, and nursery products) on Oahu in 1981 was estimated to be about $19.8 million. Thus the Waimanalo area accounted for approximately 35 percent of the total Oahu diversified agricultural output.

SECTION 5: RELATIONSHIP TO LAND USE

5.1 City & County of Honolulu

A. Development Plan

The project is within the Koolaupoko Development Plan (Ord. 83-8, May 10, 1983) administered by the Department of General Planning. This development plan is the City policy that will guide the future growth and development of Waimanalo. The site is designated "agriculture" and therefore the agricultural subdivision is in conformance.

B. Zoning

The project site is zoned Ag-2, General Agricultural District. The purpose of this district is to protect and preserve agricultural lands for the performance of agricultural functions and to encourage concentration of such uses in areas where potential friction with urban uses will be minimized (City and County of Honolulu, 1978).

Principal uses allowable within these districts are agricultural, apiary, and horticultural uses, including orchards, vineyards, and nurseries. Accessory structures include dwelling units for employees working on the premises, provided that only one such unit will be permitted per lot.

Ag-2 zoning requires minimum lot size of two (2) acres if land use is other than raising of livestock. The six lots proposed are therefore, in conformance.

5.2 State of Hawaii

A. State Land Use Districts

The land-use designation for the project site is "agricultural". Approximately 38% of the lands in Waimanalo are likewise designated. Land within an agricultural land use district are:

1. Lands with a high capacity for agricultural production.
2. Lands with significant potential for grazing or for other agricultural uses.
3. Lands surrounded by or continguous to agricultural lands.

B. Hawaii State Plan

This agricultural subdivision is in compliance with several policies and policy directions for growth and development of diversified agriculture as enumerated in the accepted EIS.

- Continued growth and development of diversified agriculture throughout the State.
- Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.
- Assist small independent farmers in securing land and loans.
- Encourage the use of public and private resources to develop agricultural and aquacultural activities which have economic growth potential.
- Continue the development of agricultural parks.

SECTION 6: PROBABLE ENVIRONMENTAL IMPACTS

6.1 General

The proposed project will generate primary and secondary environmental impacts. Primary impacts are those resulting directly from construction activities and from the agricultural uses on the proposed project site. Secondary impacts are those which are anticipated over the duration of the agricultural subdivision use and which may include potential use conflicts and indirect benefits arising from the proposed action.

6.2 Primary Impacts

A. Short-Term Impacts

Short-term impacts, beneficial and adverse, generally result from construction-related activities. Consequently, these impacts are of short duration and should not last longer than the duration of the construction. It should be noted that construction will be confined to roadway, drainage, and utility systems. Lot grading will be the farmers responsibility.

1. Economic Impacts: Construction of the Phase II Waimanalo Agricultural Park is expected to take about one year. Park infrastructure, including access road, potable and irrigation water lines, and related construction will cost about $1.1 million. Farm lot lessees of the six lots will be constructing dwelling units and other farm-related improvements such as nursery shadehouses and packing and storage buildings. The construction activity associated with these improvements will result in the generation of construction jobs and income during the period of construction. This construction activity, in turn, will result in increased government revenues via gross excise, income and other taxes generated by the construction spending.

2. Air Quality Impacts: During construction of the agricultural subdivision roadways and utilities, some dust may be generated. This problem, however, is not anticipated to be significant since the soil type at the site is predominantly of the Lolekaa, Hanalei, and Alaeloa series and erosive activity is slight. If dust is a significant problem, it will be mitigated in the field by the use of appropriate water sprinkling methods, limiting the area being worked at any one time, and immediate seeding of the graded area.

Exhaust emissions from construction equipment are not expected to significantly affect the air quality of the area. The prevailing winds in the area should help to quickly disperse any exhaust gas concentrations.

Burning of clearing and grubbing material will not be allowed during construction of the subdivision. These materials will be transported to and disposed at landfills.

3. Water Quality Impacts: The soil type found at the project site is characterized by slight erosive activity. During construction then, significant erosion and sedimentation problems are not expected to impact the Kailua Reservoir and Waimanalo Stream located on the project site. However construction activity can contribute to an increased sediment load into the bodies of water especially if a significant storm occurs. The impact of construction activities can be mitigated by conforming to strict erosion control measures, particularly those specified in the City and County of Honolulu's Grading, Grubbing, and Stockpiling Ordinance No. 3968, 1972; and the State Department of Health's Water Quality Standards, Chapter 37-A, Public Health Regulations, 1968. Farming activities are a short term risk but the sediments generated by opening of lands can be mitigated by conformance to the USDA Soil Conservation Service's Erosion and Sediment Control Guide for Hawaii, 1981.

4. Traffic Impacts: During construction of improvements at the agricultural subdivision site, the construction work force will add to the traffic load during the morning and afternoon peak hours. Additional traffic will be generated throughout the working day as machinery and materials are transported to the site. The impacts of increased traffic due to construction activities will be minor because of the limited adjacent development and the confinement of activities to the project site.

5. Noise Impacts: During site preparation, clearing, and construction activities, an increase of ambient noise is inevitable. Construction-related noise will be intermittent rather than continuous throughout the construction period and will cease upon completion of the project. The following are methods for minimizing noise produced during construction:

   - Placing mufflers on construction machinery, equipment, etc.

- Instruct workers to avoid unnecessary "gunning" of construction equipment and to turn off equipment when not in use.

- Conduct construction activity during daylight hours, between 7:30 a.m. and 5:00 p.m.

6. Biological Impacts: Vegetation in the project area is not considered threatened or endangered by State and Federal agencies. The majority of species are introduced and significant impacts on the existing botanical communities are not expected.

   During construction, fauna in the immediate vicinity of the project site may relocate into adjacent areas. However, upon completion of construction, the fauna may adapt to the proposed action and return to the site for food and shelter.

7. Archaeological impacts: The archaeological reconnaissance performed by Cultural Surveys of Hawaii (APPENDIX 'A') addresses this item.

B. Long-Term Impacts

Long-term impacts, beneficial and adverse, result from the implementation and operation of the agricultural subdivision. The impacts associated with these actions are identified and discussed in this section.

1. Economic Impacts: The development of the proposed agricultural park project would create six farm and nursery operations, resulting in beneficial long-term economic impacts. These impacts would include the creation of new jobs in agriculture, increased income, contribute to growth of Hawaii exports (nursery industry) and import substitution (banana industry), and increased government revenues -- including revenues which would accrue to the State Agricultural Park Program from lease rents and irrigation water use charges.

   a. Employment and Income Impacts: In terms of employment, the 4 banana and 2 nursery operations proposed for the Phase II agricultural park would result in the creation of approximately 5.5 full-time-equivalent (FTE) jobs in banana farming and 17.6 FTE jobs in nursery production, for a total of about 23.1 additional jobs. Management requirements (for both banana and nursery operations) would add about 3.2 FTE jobs, bringing the total number of new FTE jobs created by the park to 26.3.

The 26.3 new jobs in farming and nursery operations would entail estimated annual wage and salary income of $359,500. Farmer and nurseryman's return on invested capital would generate additional annual personal income (return to risk) of about $219,400.

b. Agriculture Industry Development: The proposed project would lead to banana production on an estimated 36.7 acres, and nursery production on an estimated 9.4 acres. Currently, Hawaii imports most of the bananas it consumes -- an average of 9.4 million pounds per year during the last three years, 1984-1986. With respect to nursery production of potted foliage products, about 80 percent of output goes to the U.S. Mainland market. For both agricultural industries, the additional acreage brought into production as a result of the new park, could contribute to further development of Hawaii's diversified agriculture sector, and to increased exports and import substitution -- significant long-term economic benefits. Growth of diversified agriculture provides new jobs to residents in the labor force who do not wish to work in tourism or other service industries, i.e. a wider choice of job opportunities. Increased exports of nursery products, and substitution of Hawaii grown bananas for imported bananas contributes to a more favorable Hawaii balance of trade, an important consideration given Hawaii's heavy dependence on imports of manufactured goods.

Assuming the growing of Williams variety bananas, annual production from the 36.7 acres of agricultural park banana farms would be about 1.2 million pounds of bananas. In terms of the current level of banana imports (9.4 million pounds), park production would represent a significant contribution.

With respect to nursery production, a wide variety of potted foliage species probably would be produced by the 9.4 acres of park nursery operations. It is estimated that the value of this production would be about $784,000 in terms of nursery sales. Although it is impossible to say how much of this annual production for would be exported, if the industry experience is assumed for illustrative purposes, 80 percent or about $627,000 worth of potted foliage products would be exported.

c. Government Revenues: The long-term economic impact of the proposed park on government revenues would result from excise, property, and other taxes generated by agricultural production and use of the land, including householders payment of taxes on labor income and return on farmers' investment. Irrigation water use fees and lease rents on agricultural lots would represent other government revenue which would go directly to the Agricultural Park Special Fund.

General excise taxes are levied on farm (and nurseries) gross revenues at the rate of 0.5 percent. Gross revenues for the six banana and nursery operations have been estimated at about $1.14 million per annum in 1987 dollars. Therefore, gross excess taxes would amount to about $5,700 per year. Property taxes on agricultural use is $9.00 per $1,000 of assessed valuation for both land and improvements. Excluding the value of dwelling units, property taxes for the park have been estimated at about $5,500 per annum. With respect to other taxes, Tax Foundation of Hawaii data indicate that about 12.7 percent of personal income in Hawaii is paid to state and local government for all personal taxes, including income taxes, general excise taxes on retail purchases, and other taxes. The labor income and farmers' return on investment would constitute household or personal income, which has been estimated at $578,900 per year for the agricultural park. With 12.7 percent of personal income payable to state and local government for personal taxes, government revenue from this source would amount to about $73,500 per annum as a result of the personal income generated by the proposed agricultural park.

Altogether, total government tax revenues generated as a result of the economic activity created by the agricultural park, including property taxes, would amount to an estimated $84,700 per year.

Besides tax revenues, the farmers and nursery operators would be paying annual lease rents for use of their park lots. These lease rents would be established by the State Department of Agriculture at the time the lots are leased. The lease rent terms for the Phase I Waimanalo Agricultural Park can be used to provide an estimate of lease rent revenues. For the Phase I lots, a base rent of $260 per acre per year was set, with additional rent being payable based

on a percentage of gross revenue generated by agricultural production. For general diversified agriculture, such as banana farming, the percentage would be 2.0 percent of gross sales. Additional rent is only paid to the extent the 2.0 percent of gross sales exceeds the base rent of $260 per acre. In the case of banana farming, projected gross sales per acre amount to $9,780, thus 2.0 percent of this amount would be $195.60, or less than the base rent. For nursery lots, the additional rent payable is based on 1.5 percent of gross sales, which in the case of the proposed Phase II lots would be applied to the projected gross sales of $80,000 per acre, or $1,200. Since the projected additional rent of $1,200 per acre exceeds the base rent of $260, nursery operators could be expected to pay $1,200 per acre ($260 in base rent, and $940 in additional rent). Given the respective acreages in banana (36.7 acres) and nursery (9.4 acres) production, total lease rents are estimated to amount to about $21,300 per annum. Lease rent revenues would accrue to the State Agricultural Park Special Fund, which was established to pay for future development of additional agricultural parks and for the operation and maintenance of existing parks infrastructure and irrigation water systems.

Those lots using WIS water also would pay use charges based on amount of water used. For the Phase II park lots, the four banana farms would utilize WIS water. Average annual water use per acre of banana has been estimated at 1.46 million gallons, or average daily consumption of 4,000 gallons per acre. Projected WIS water use charges are $0.16 per 1,000 gallons (the current charge is $0.10 per 1,000 gallons). Given the projected usuage per acre and rate of 16 cents per thousand gallons, total annual irrigation water use charges would amount to about $8,600. These revenues also would accrue to the Agricultural Park Special Fund. Counting both land lease rents and water use charges, total revenues going to the Special Fund would amount to about $29,900 per year.

2. Air Quality Impacts: The long-term environmental impacts on the ambient air quality are not anticipated to be significant. Odors and airborne particles from agricultural activities and chemical treatment could be generated within the proposed agricultural park. These could be from dust due to furrowing or from fallow fields and overspray of pesticides and fertilizers. The

prevailing tradewinds will carry any odor and airborne pollutant away from populated areas and Kalanianaole Highway.

Use of EPA approved herbicides and pesticides should not present a significant problem if applied according to prescribed methods. Permitted use of EPA approved herbicides and pesticides require instructions prior to granting permission. These chemicals are expensive and therefore most farmers will use them judiciously.

Certain agricultural operations may require the burning of excess vegetation for disposal. Agricultural operation means a bonafide agricultural activity with a license to engage in business. Any burning would require a permit from the State Department of Health in conformance with Administrative Rules, Title II, Chapter 60, Air Pollution Control. The permit covers open outdoor fires used in agricultural operations, growing of crops, raising of fowls or animals, forest management, or range improvements.

3. Water Quality Impacts

a. Surface Water: Development of the agricultural subdivision could affect surface water quality due to erosion (addressed in the following section) and use of chemicals. Storm waters will discharge into the Kailua Reservoir which is connected to the Waimanalo Stream and the wetlands downstream by a controlled outlet.

Soil conditioners, fertilizers, herbicides, and pesticides will change the chemical constituents of the surface runoff. The impact is dependent on the chemical amount and frequency of use, solubility, amount of rainfall and frequency, and dilution. Use of chemicals in agriculture is regulated by the State Department of Agriculture and the Hawaii Pesticides Law. Farmers must be trained and must pass a test before a pesticide applicator permit is issued.

The Kailua Reservoir will act as a filter for the Waimanalo Stream during normal conditions. Flow retention and agricultural diversion will minimize the impacts downstream. The generally infrequent flood flows will transport sediments and suspended material downstream. The wetlands will then serve to filter the flow before it reaches the ocean. Since many chemicals lose their toxicity with time and dilution, the period between application and heavy rainfall and the amount of rainfall will affect its impact.

b. Groundwater: To protect groundwater quality, the Board of Water Supply has established a Water Conservation Line (pass/no pass line) that approximately parallels the Waimanalo Forest Reserve Boundary (Figure III). No cesspools will be allowed mauka of the pass/no pass line. The subdivision lots will be configured to honor this line and yet allow cesspool construction on each lot. Cesspools will be used as it is not feasible to build a transmission main to the Waimanalo Wastewater Treatment Plant (2.5 miles away.)

Chemical use and its possibility of contaminating the groundwater is a concern. Farmers will use chemical pesticides, herbicides, and fertilizers to increase production and protect their investment. The Environmental Protection Agency (EPA) has issued a list of chemicals that are approved for use in agriculture. Use of the approved chemicals in accordance with label instructions will reduce the impact of the chemicals on groundwater.

4. Erosion Impacts: The recommended type of agricultural uses, banana cropping and potted foliage nurseries, together with appropriate conservation practices, should minimize the risk of soil erosion and runoff because of the sloping topography. The recommended agricultural uses will not require annual tillage reducing the erosion potential.

With respect to potted foliage nursery operations on Lots 1, & 2, grading will be required to prepare shadehouse pads which are to be placed on slopes not to exceed 5 percent -- the recommended practice for nurseries using bench type production systems. Grading to prepare shadehouse pads will entail the proper compaction of fill material, with side slopes not to exceed 3:1. Pad slopes will be planted with ground cover to provide soil protection. Wedelia, lippia, or bermuda grass are ground cover plantings which may be used for erosion control on pad slopes.

For land to be used in banana cropping, appropriate ground cover is important because of the prevailing slope conditions in Lots 4, 5, & 6. At the time the banana mats are established, the balance of the orchard acreage should be planted with a ground cover such as hieronymii, which was recently introduced in Hawaii by the SCS. Hieronymii is well adapted to the climate and soil conditions of the

Phase II park site. A perennial, the low-growing stoloniferous grass grows prostrate to form a dense sod before growing upright. It is a low-maintenace plant and is easily established by sprigging.

One of the lease conditions that will be applicable to all Phase II lessees will be the requirement that the farmer (nurseryman) shall carry out a program of conservation developed by the lessee in cooperation with the Windward Oahu Soil and Water Conservation District. To do this, the lessee must apply for and attain cooperative status with the Conservation District. The conservation program developed for the lessee's property would address practices such as clearing of land, cropping system, storm runoff control system, irrigation system, and noxious weed control. In regard to grading and grubbing, the lessee must comply with City and County of Honolulu (Department of Public Works) Ordinance No. 3968, by obtaining a permit. The Soil and Water Conservation District will assist lessees in preparing the application for the permit.

5. Noise Impacts: Noise originating from the proposed agricultural subdivision is expected to be generated primarily by farm equipment such as tractors, front loaders, and trucks. Noise generating activities are expected to be confined to the daylight hours. There are no schools, churches, or hospitals located directly adjacent to the agricultural subdivision. The nearest impacted area consist of similar agricultural subdivisions and residential units. All project generated noise must comply with Title II, Administrative Rules State Department of Health, Chapter 43, "Community Noise Control for Oahu". Considering the agricultural/rural character of the area and the open spaces, noise is not expected to create any adverse impacts to the Community.

6. Biological Impacts: The project area is not considered to be a sensitive wildlife habitat area, nor does the site contain any endangered species of plants or animals. Therefore, long-term adverse impacts are not anticipated from the proposed action.

The use of the project area for agricultural activities may present potential vector problems. These vectors would include mice, rats, flies and mongoose. Vector problems can usually be controlled through trapping, and more importantly, through the use of sanitary agricultural practices. It will be to the benefit of the individual farmer to practice sanitary agricultural techniques, not

only to keep down the vectors, but to increase his yields by preventing crop damage by these vectors.

7. Archaeological Impacts: In the event that archaeological remains or artifacts are uncovered during construction of the agricultural subdivision, work will be halted and the State Historic Preservation Officer will be notified.

   Two prehistoric taro complexes were identified during the project archaeological survey. These complexes lie outside the project area but there is a potential or indirect impact upon the complexes from the project. To preserve these complexes, the two terraces will be flagged to identify them in the field and the lessees of Lots 4 and 6 will be informed that disturbances of these terraces and farming outside of the lots will not be permitted. The Department of Land and Natural Resources is considering the nomination of these sites to the State and National Registers.

8. Utilities

   a. Irrigation: Estimating water demand for the Agricultural subdivision requires consideration of a complex interaction of changes in wind, rainfall, insolation, and plant growth rates, which will lead to a peak demand typically occurring in the arid months, June through September, and much lower levels of demand in the wetter months, December through February. The actual total amount of water required by the Agricultural Subdivision cannot be projected at this time, since the exact mix of crops is unknown.

      However, agricultural water demand to support recommended nursery and banana production uses have been estimated. Per acre requirements for each category of use have been computed taking into account type of on-farm irrigation system expected to be used, rainfall and seasonality factors, and crop requirements. Peak demand during the dry season, and total annual requirements have been estimated.

      During dry period conditions, typically from June through September, maximum water use for bananas has been estimated to be about 5,500 gallons per acre per day. This requirement is based on use of a sprinkler irrigation system, and corresponds to weekly water consumption of about 38,500 gallons per acre (about 1.4 acre-inches of water). Average daily per acre

water demand over the entire year is estimated at 4,000 gallons, or about 1.46 million gallons per year. Based on total banana acreage of 36.8 acres, peak demand would be 202,400 GPD, and total annual demand would amount to about 53.7 million gallons (MG).

The USDA Soil Conservation Service, in their Watershed Plan and Draft Environmental Impact Statement for the Waimanalo Watershed have proposed to provide all irrigation resources to the agricultural subdivision

by upgrading the Waimanalo Irrigation System. The Watershed Plan and Draft Environmental Impact Statement describes plan formulation, discloses the expected environmental and economic impacts and provides the basis for authorizing Federal assistance for implementation. The Watershed Plan covers the Waimanalo Watershed area and will irrigate a total of 1,252 acres. The Plan was prepared to integrate with the Waimanalo Agricultural Park Plan and will provide all the irrigation water necessary for the entire Agricultural Subdivision.

With improvements being made to the WIS, the banana farmers should have sufficient supply to meet estimated water demand. However, during extended dry periods the farmers using the WIS system will have to depend upon system storage capacity which currently is limited. Part of WIS improvements include the construction by the SCS of a new 60 MG reservoir at the end of Mahailua Street (see Exhibit II). This reservoir is expected to be constructed in Fiscal Year 1991. Upon completion of the new reservoir, WIS subscribers should have a sufficient year-round supply of irrigation water.

In regard to water demand for nursery production, BWS municipal water provided through 1.5-inch meters would be connected to nursery shadehouse sprinkler systems. With the use of sprinkler systems, peak nursery water demand during the dry season would be about 6,000 GPD per acre, or 42,000 gallons per week. Average daily water requirements on an annual basis would amount to about 4,250 gallons, or about 1.55 MG per acre per year. Based on total nursery acreage of 9.4 acres, peak demand would amount to 58,800 GPD, and total annual consumption would come to about 15.2 MG. In relation to the BWS commitment of 180,000 GPD, nursery

irrigation water demand would be well within the supply committment.

b. Potable Water: The demand for potable water will be based on both irrigation needs (58,800 GPD) and domestic consumption, (4,500 GPD) which is based on a 750 GPD per lot. The lessees of the lots will be responsible for paying the applicable water rates.

c. Liquid Waste Disposal: Municipal sewers are not available at the project site, nor are any planned for the future. However, portions of each parcel are

located outside of the BWS Water Conservation Line (pass/no pass line), thereby allowing residents to be serviced by cesspools. Allowance of cesspools, though, must be determined jointly by the Department of Land and Natural Resources (DLNR) and the Department of Health (DOH), in addition to the BWS.

Each lessee would be responsible for providing his own cesspool and conforming to the DOH's regulations on cesspools.

d. Solid Waste Disposal: The City and County Division of Refuse Collection and Disposal will collect household refuse from any lot on streets meeting City standards. In the Waimanalo area, the City operates the Waimanalo Convenience Center on Hihimanu Street for collection and transfer of household refuse. The center was constructed by the State with joint financing with the USDA Soil Conservation Service on a 50% cost sharing basis.

e. Drainage: The agricultural subdivision will include culvert crossings to convey flood waters beneath the road, drainage system as necessary to capture and convey water along the roadways, and flowage easements throughout the lots. The drainage improvements will be designed according to city standards and deed documents will be worded to prevent encroachment into these drainage ways.

To mitigate flood damages, flowage easements were developed for each natural drainage way. The flowage easements will be left in their present state such that the characteristics of the existing drainage ways will essentially remain the same.

Peak storm discharges may increase due to change in ground cover and reduced time of concentrations (increased flow velocities). Contour grading and adherence to soil conservation management will mitigate the concern. The actual increase will not be significant considering drainage basin size, maintenance of permeable conditions, and the downstream wetlands.

f. Gas, Electrical, and Telephone: Gas, electrical, and telephone demands are anticipated to be minimal, since use of the Agricultural subdivision will primarily be farm activities.

Gas, electrical, and telephone services in the area should be adequate to satisfy all demands generated by proposed project.

9. Public Facilities and Services

a. Traffic/Access: The impact of additional traffic due to the project should be very minimal and should not present any long-term traffic problems, since the proposed action will consist of subdividing 6 lots and leasing them to farmers.

Access to the project site will be provided by a 24-foot wide asphalt concrete pavement within a 44-foot wide right-of-way. This road will begin at the intersection of Kumuhau and Waikupanaha Streets, extending mauka. The road will conform to the City and County of Honolulu's Typical Agricultural Road Section and will be dedicated to the city for maintenance. Kumuhau Street is the direct access to Kalanianaole Highway and includes a 20 feet wide asphalt concrete travel way.

b. Security and Emergency: Security should not present a major problem to the project area. Each individual farmer would be responsible for providing security for his farm equipment and his parcel of land. In the event that emergency services are required, excellent facilities are located within the vicinity of the project site at the Castle Memorial Hospital, for medical services; the Kailua substation, for police protection; and the Waimanalo and Kailua fire stations for fire protection.

c. Schools: Students from the area are in the Windward District. Initial education is provided by Waimanalo

Elementary and Intermediate School (K-8) followed by Kailua High School (9-12).

The children of the agricultural subdivision are not expected to adversely impact the schools due to their limited number. Children of employees of the farms are not expected to adversely impact the schools since most of the employees are expected to be from nearby areas.

6.3 Secondary Impacts

A. Land Use

Use of this area as an agricultural park will preclude other actions for the land. Therefore, land use actions incompatible with the intent of the agricultural subdivision will not be permitted.

B. Population

The agricultural subdivision will produce an insignificant increase in the area's population. This increase will not adversely impact the infrastructure, public facilities or public services.

SECTION 7: ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

7.1 Introduction

This section briefly discusses probable adverse environmental effects which cannot be avoided, and mitigation measures that would reduce unavoidable adverse effects to insignificant levels.

7.2 Primary Short-Term Impacts

Dust problems may result from the grubbing and clearing of the existing vegetation. If dust becomes a serious problem, it can be mitigated to a large extent by water sprinkling, limiting the area being work at any one time, and immediate seeding of the graded area. However, it is anticipated that dust will not be a significant problem, due to the slight erosive characteristics of the soil types at the project site.

Exhaust emissions from construction and farming equipment will undoubtedly occur. However, prevailing winds in the area should help to quickly dilute and disperse any concentrations of exhaust emissions. The direction of the prevailing winds is away from the existing populated areas. Air quality of the area should therefore, not be significantly affected.

Increased sediment loads into Kailua Reservoir and Waimanalo Stream can be expected to result from construction activities, especially if a significant storm occurs. The impact of construction activities can be mitigated by conforming to strict erosion control measures, particularly those specified in the City and County of Honolulu's Grading, Grubbing, and Stockpiling, Ordinance No. 3968, 1972; the State Department of Health's Water Quality Standards, Chapter 37-A, Public Health Regulations, 1968; and the USDA Soil Conservation Service Erosion and Sediment Control Guide for Hawaii, 1981.

The noise level will increase during the construction period of the agricultural subdivision. This effect will be of short duration, lasting only for the construction phase. Activities associated with the construction phase of the project must comply with the provisions of Title II, Administrative Rules Chapter 43, Community Noise Control for oahu. The noise level can be reduced by the contractor by ensuring proper functioning of mufflers on all equipment, instructing workers to avoid unnecessary, "gunning" of equipment, and conducting construction activity only during daylight hours, between 7:30 a.m. to 5:00 p.m.

7.3 Primary Long-Term Impacts

Significant adverse effects to air quality is not anticipated from the use of pesticides, herbicides, and fertilizers. Farmers will use EPA approved herbicides and pesticides and will be required to take courses and receive instructions before granted a permit to use these materials.

Surface water quality may be affected by storm runoff transporting farm chemicals and erosion sediments. Chemical impacts will be mitigated by use of EPA approved materials and proper use per label instructions. Erosion effects will be lessened by a conservation program in cooperation with the Soil and Water Conservation District and compliance with the City's grading ordinance.

The farming activities within the new agricultural subdivision will impact the irrigation resources of the area. In terms of agricultural productions, the new crops will have a negative impact upon the existing farming activities in this area until the proposed water system improvements are completed. The approved Watershed Plan will mitigate the impact with on-going improvements to the Maunawili source, a proposed 60 MG reservoir and reconstruction of the transmission system. Potable water demands will be controlled by the BWS with limitations established by earlier funding agreements.

7.4 Secondary Impacts

Adverse secondary impacts are not anticipated. No significant population increase is expected from this action. The proposed action would set aside this land for the people of the State for agricultural purposes and will assist in providing for the diversified agricultural economic base on the Island of Oahu.

SECTION 8: ALTERNATIVES TO THE PROPOSED ACTION

8.1 Introduction

This section briefly explores and evaluates known alternatives to the proposed action.

8.2 No Action Alternative

The project site is presently vacant and unused. There are no existing plans for its use. Prime agricultural land is a valuable resource for which productive use should be encouraged. Productive use will also preserve the lands for agricultural purposes.

A no action alternative would not accomplish the objectives of the Department of Land and Natural Resources. These objectives are to provide land for diversified agriculture, to provide land for practical experience in the areas of agriculture, and to provide an opportunity for the small farmers.

8.3 Alternative Sites

Agricultural Park projects are joint programs cooperatively developed by the Departments of Agriculture and Land and Natural Resources. Presently, there are nine committed projects in various stages of planning, design, construction, or completion. Moving the proposed action to an alternative site is similiar to the no action alternative. Construction at an alternative site will meet different environmental impacts, some of which will be less or more severe than the proposed action.

Establishment of the site as part of the Waimanalo Agricultural Park was one of the recommendations of the Department of Agriculture Study conducted for the Ninth Legislature of the State of Hawaii. The site is included in the Department of Land and Natural Resources Report R61 - #1 Waimanalo Agricultural Park" for agricultural development.

This project conforms to the recommendations of the study and the planning considerations of the report to assure the best possible use of the land and water resources of the project area.

8.4 Alternative Land Use

Alternative uses of the land other than those compatible with the agricultural land use designations would require changes in the City's Koolaupoko Development Plan and Zoning Designation as well as the State Land Use designation. The project site is designated "agriculture" according to the State Land Use District boundary, the City and County of Honolulu Development Plan, and is zoned Ag-2.

Permitted uses in AG-2 districts (other than agriculture) include meeting facilities, public uses, schools, and utility installations. However, the project site should be utilized as an agriculture park since the land is available for immediate use, minimal land acquisition costs are involved and the parcel is located in close proximity to the Honolulu market and to shipping facilities in Honolulu Harbor.

When agricultural lands are converted to urban uses, it is unlikely that the situation would be reversed to regain agricultural production. Through the implementation of this project, the State will assist small farmers by providing infrastructure, long-term leases, and preserving productive agricultural lands.

8.5 Alternative Agricultural Use

An agricultural feasibility analysis was prepared for this project. Considerations included agricultural options, site physical characteristics, improvement requirements, and economic analysis. The analysis recommends agricultural uses for nursery and banana production which will generate export income (nursery) and substitute domestic production for imports (banana).

Recommendation for banana production includes consideration of minimizing the risk of soil erosion and runoff because of the sloping topography. The recommended agricultural uses will not require annual tillage reducing the erosion potential.

8.6 Alternative Site Improvements

The "Engineering Report for Waimanalo Agricultural Park, Phase II - Farmlot Subdivision" investigated various improvement alternates. Water system alternatives involved consideration for fire protection standards. Hydraulic calculations concluded that the most feasible alternative was to size water lines based on fire hydrants connected to the irrigation system.

Roadway alternatives were mainly investigation of possible alignments. The alignment selected had comparative construction and land costs as other alternatives but was less disruptive. Other alternatives required relocation of homes to meet City roadway standards. Pavement alternatives were not considered as improvements must adhere to City standards.

SECTION 9: IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The construction and operation of the proposed project would involve the irretrievable commitment of certain natural and fiscal resources. Major resource commitments include land, construction materials, manpower and energy. The impacts of using these resources should, however, be weighed against the economic benefits to the residents of the County and State, and the consequences resulting from taking no action.

Land commitment involves 90 acres of agricultural land for at least the term of the state lease. Since only agricultural use is proposed, the action will keep the site mainly in open space and will not represent a permanent irreversible or irretrievable commitment of land.

The commitment of construction materials, manpower, and energy are mostly unrenewable and irretrievable. Benefits will accrue to the State's agricultural industry. The operation of the project will also include the consumption of potable water and electricity which also represents the irretrievable commitment of resources.

SECTION 10: RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES AND MAINTENANCE/ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The development of the agricultural subdivision will serve the short-term uses of man's environment by providing farm lots and employment. Maintenance of long-term productivity is included in this action through its consideration of the environment, construction standards, and need for agricultural lands.

The development will also enhance the long-term productivity of the land by employment of a valuable natural resource and preservation of the area in agriculture. The economic resources of the area will be strengthened and small farmers will have the opportunity to participate in the economic growth of the State.

The proposed project will not involve trade-offs between short-term environmental gains at the expense of long-term losses, narrow the ranges of beneficial use of the environment, or propose long-term risks of health and safety.

11. LIST OF NECESSARY APPROVALS

Approval Needed	Approving Agency or Body
Subdivision Approval	Department of Land Utilization
1) Tentative Approval of Preliminary Map	
2) Approval of Final Map	
3) Approval of Stamped Map	State Surveyor, Land Court
Grading Permit	Department of Public Works Division of Engineering
Refuse Collection	Department of Public Works Division of Refuse Collection and Disposal
Street Construction, Signing and Pavement Markings	Department of Transportation Services
Electrical	Hawaiian Electric Company
Telephone	Hawaiian Telephone Company
Street Signs	Department of Transportation Services
Potable Water	Board of Water Supply, Department of Health
Building Permit	Building Department
Fire Hydrant Installation	Fire Department
Cesspools	Board of Water Supply Department of Land & Natural Resources Department of Health

12. LIST OF AGENCIES, ORGANIZATIONS, AND INDIVIDUALS FOR REVIEW

The Supplemental EIS Notice of Preparation (NOP) was officially published in the Office of Environmental Quality Control's "Bulletin" on August 8, 1987 and August 23, 1987. As of January 20, 1988, no written comments were received. The following agencies, organizations and individuals will be sent copies of this draft EIS.

Since this document supplements an environmental impact statement which was reviewed by essentially the same organizations and individuals on the consultation list, the draft SEIS was developed and forwarded in lieu of the NOP. It is expected that the concerns will be similar to that addressed by the EIS and any additional consideration will be disclosed in the final SEIS.

FEDERAL

U.S. Army Corps Engineer District

U.S. Environmental Protection Agency

U.S. Fish & Wildlife Service

U.S. Geological Survey

U.S. Soil Conservation Service

Headquarters 15th Air Base Wing (PACAF)

STATE

Governor, State of Hawaii

Department of Accounting & General Services

Department of Agriculture

Department of Transportation

Department of Education

Department of Hawaiian Home Lands

Department of Health

Department of Land & Natural Resources

Department of Business & Economic Development

Office of Environmental Quality Control

University of Hawaii, Environmental Center

University of Hawaii, Water Resources Center

CITY & COUNTY OF HONOLULU

Mayor, City & County of Honolulu

Honolulu Police Department

Honolulu Fire Department

Board of Water Supply

Department of Transportation Services

Department of Public Works

Department of Parks & Recreation

Department of General Planning

Department of Housing & Community Development

Department of Land Utilization

ORGANIZATIONS & INDIVIDUALS

Honorable Mary George, Senator, State of Hawaii

Honorable Cam Cavasso, Representative, State of Hawaii

Honorable Dennis O'Connor, Councilman, City & County of Honolulu

American Lung Association of Hawaii

Hawaii Farm Bureau Federation

East Oahu Farm Bureau

Waimanalo Council of Community Organizations

Waimanalo Neighborhood Board No. 32

Hawaii Association of Nurserymen

Hawaii Audubon Society

Hawaii Banana Industry Association

Hawaiian Historical Society

Hawaiian Electric Co.

Hawaiian Telephone Co.

Life of the Land

Oahu Banana Growers Cooperation

The Outdoor Circle

Pacific Banana Growers Cooperation

Sierra Club, Hawaii Chapter

Waimanalo Farmer's Association

SECTION 13: SEIS CONSULTATION, PHASE, COMMENTS AND RESPONSES

The following agencies, organizations, and individuals provided comments in reviewing the Draft SEIS. A total of 27 comments letters were received.

A single asterisk (*) indicates those letters not requiring substantive responses. The comment letters are reproduced in this section.

A double asterisk (**) indicates those which submitted written comments requiring substantive responses. The comment letters are reproduced in this section.

A. Federal Agencies

* 1. Department of the Army, U. S. Army Engineer District, Honolulu
* 2. U.S. Department of Agriculture, Soil Conservation Service
* 3. U.S. Department of Interior, Fish and Wildlife Service
* 4. Department of the Air Force, Headquarters 15th Air Base Wing (PACAF)
* 5. Department of the Navy, Naval Base Pearl Harbor

B. State Agencies

* 1. Department of Accounting and General Services
* 2. Department of Agriculture
* 3. Department of Transportation
* 4. Department of Hawaiian Home Lands
* 5. Department of Health
** 6. Department of Business and Economic Development
* 7. Department of Business and Economic Development (HFDC)
* 8. Department of Business and Economic Development (LUC)
* 9. Department of Defense
** 10. University of Hawaii at Manoa, Environmental Center

C. County Agencies

* 1. Honolulu Fire Department
* 2. Board of Water Supply
* 3. Honolulu Building Department
** 4. Department of Transportation Services
* 5. Department of Public Works
* 6. Department of Parks & Recreation
* 7. Department of General Planning

* 8. Department of Housing and Community Development
* 9. Department of Land Utilization
** 10. Neighborhood Board #32 (Waimanalo, Hawaii)

D. Utilities

* 1. Hawaiian Electric Company
* 2. Hawaiian Telephone Company

SECTION 14: SEIS DOCUMENT LIST OF PREPARERS

14.1 Akinaka & Associates, Ltd.

Henry S. Morita, Vice-President

Education: B.S. Civil Engineering, M.S. Civil Engineering

Area of Expertise for Project: Project Management, Civil Engineering

14.2 Lucas Associates

Robert L. Lucas, President

Education: B.A. Finance, M.A. Economics

Area of Expertise for Project: Marketing Research, Economic Feasibility, Financial Analysis and Planning, Development Planning

14.3 Cultural Surveys Hawaii

Hallett H. Hammatt, Proprietor

Education: Ph.D. Archaeology

Area of Expertise for Project: Archaeology Reconnaissance, Site and Area Management and Assessment

Douglas Borthwick, Associate

Education: B.A. Archaeology

Area of Expertise for Project: Hawaiian Archaeology, Site Survey, and Historical Research

David Shidelar, Associate

Education: B.S. Zoology, B.A. Anthropology, M.A. Environmental Health Management

Area of Expertise for Project: Hawaiian Archaeology, Floral and Faunal Identification, and Ecology

REFERENCES

1. Department of Planning and Economic Development, State of Hawaii, The Hawaii State Plan Revised, 1986.

2. Park Engineering, Inc., Waimanalo Agricultural Park, Report R61, April 1980.

3. Lucas Associates, Agricultural Feasibility Analysis, Waimanalo Agricultural Park, Phase II, August 1987.

4. Soil Conservation Service, USDA, and Department of Land and Natural Resources, State of Hawaii, Waimanalo Watershed, City and County of Honolulu, Hawaii, Final Watershed Plan and Environmental Impact Statement, December 1981.

5. Akinaka & Associates, Ltd., Preliminary Engineering Report for Waimanalo Agricultural Park, Phase II - Waimanalo Irrigation System, July 1987.

6. Bureau of the Census, U.S. Department of Commerce, 1980 Census of Population and Housing, Census Tracts, PHC80-2-183, June 1983.

7. Soil Conservation Service, USDA, unpublished economic analysis prepared for Watershed Plan (reference 4 above), 1981.

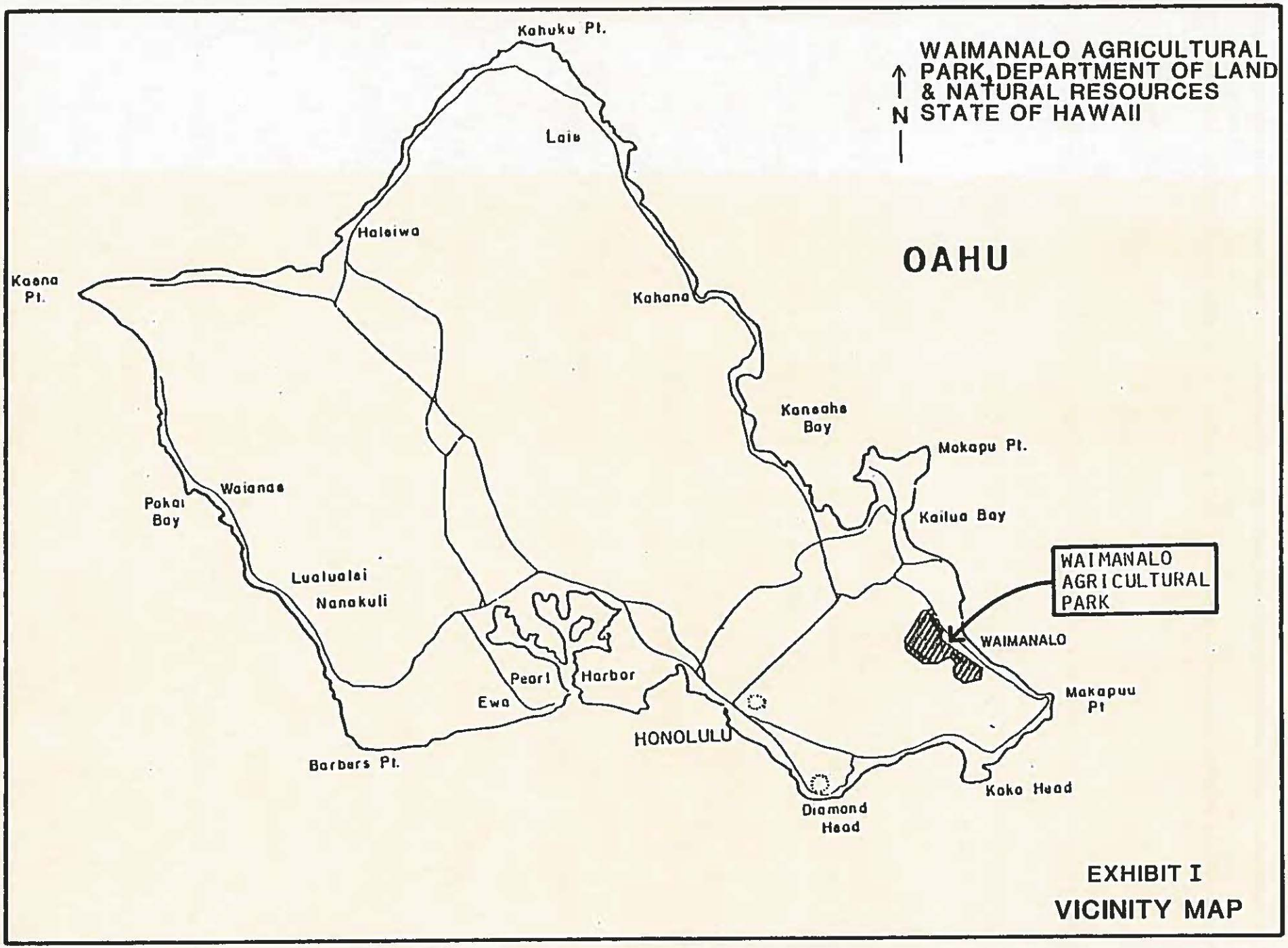
8. Hawaii Agricultural Reporting Service, Statistics of Hawaiian Agriculture 1983, July 1984.

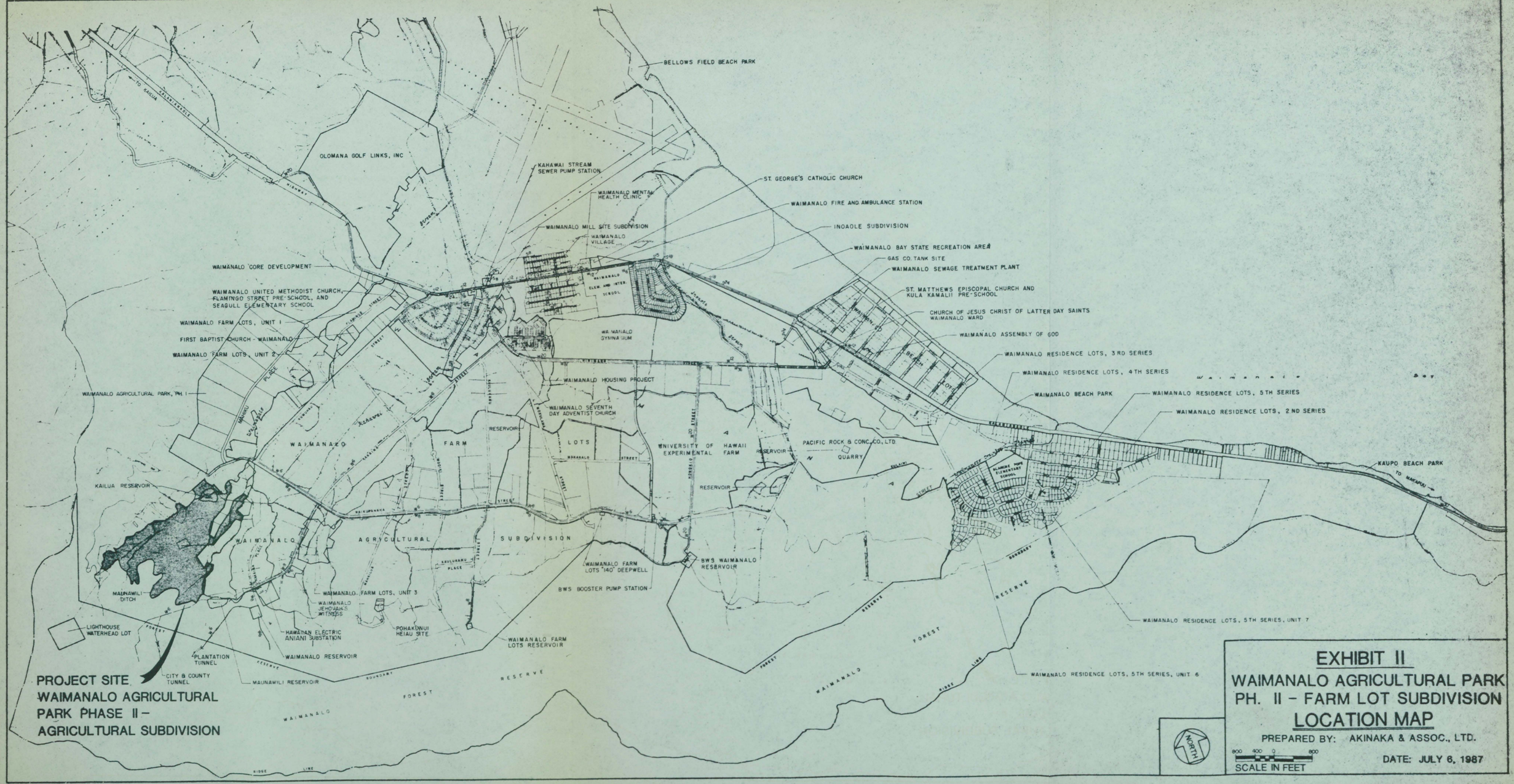
9. Tax Foundation of Hawaii, Government in Hawaii 1986, nd.

10. Soil Conservation Service, USDA, in cooperation with The University of Hawaii Agricultural Experiment Station, Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii, August 1972.

11. Soil Conservation Service, USDA, in cooperation with the Hawaii Association of Soil and Water conservation Society of America, Hawaii Chapter, Erosion and Sediment Control, March 1981.

12. Soil Conservation Service, USDA, Management and Uses of Hieronymii, information sheet, February 1981.


WAIMANALO AGRICULTURAL PARK, DEPARTMENT OF LAND & NATURAL RESOURCES STATE OF HAWAII
N
OAHU
Kahuku Pt.
Laie
Haleiwa
Kaena Pt.
Kahana
Kaneohe Bay
Mokapu Pt.
Waianae
Pokai Bay
Kailua Bay
Lualualei
Nanakuli
WAIMANALO AGRICULTURAL PARK
WAIMANALO
Pearl Harbor
Ewa
Makapuu Pt
HONOLULU
Barbers Pt.
Koko Head
Diamond Head
EXHIBIT I
VICINITY MAP



PROJECT SITE
WAIMANALO AGRICULTURAL PARK PHASE II – AGRICULTURAL SUBDIVISION

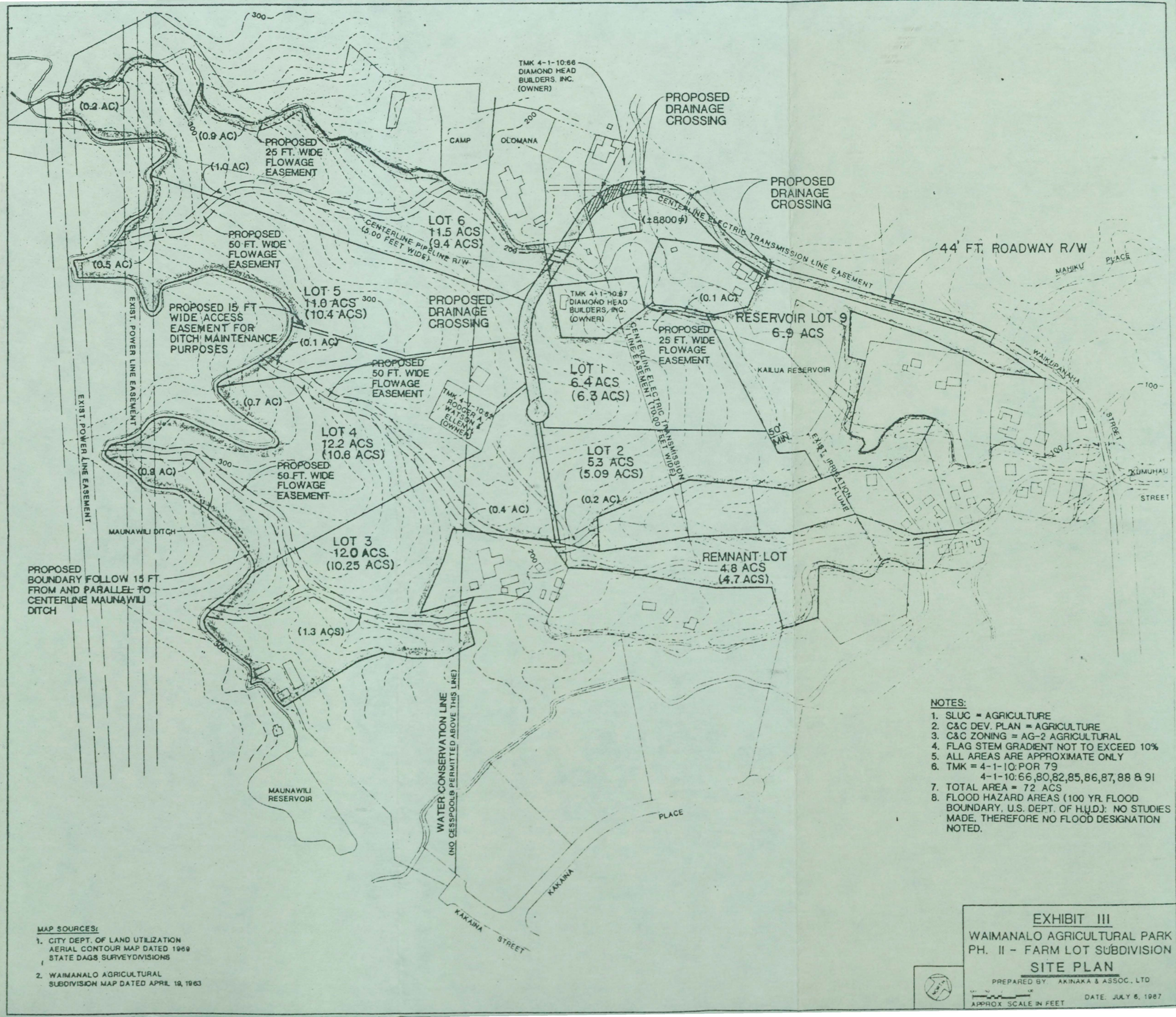
EXHIBIT II

WAIMANALO AGRICULTURAL PARK PH. II – FARM LOT SUBDIVISION

LOCATION MAP

PREPARED BY: AKINAKA & ASSOC., LTD.

DATE: JULY 6, 1987



NOTES:

1. SLUC = AGRICULTURE
2. C&C DEV. PLAN = AGRICULTURE
3. C&C ZONING = AG-2 AGRICULTURAL
4. FLAG STEM GRADIENT NOT TO EXCEED 10%
5. ALL AREAS ARE APPROXIMATE ONLY
6. TMK = 4-1-10: POR 79
   4-1-10: 66, 80, 82, 85, 86, 87, 88 & 91
7. TOTAL AREA = 72 ACS
8. FLOOD HAZARD AREAS (100 YR. FLOOD BOUNDARY, U.S. DEPT. OF H.U.D.): NO STUDIES MADE. THEREFORE NO FLOOD DESIGNATION NOTED.

MAP SOURCES:

1. CITY DEPT. OF LAND UTILIZATION AERIAL CONTOUR MAP DATED 1969 STATE DAGS SURVEYDIVISIONS
2. WAIMANALO AGRICULTURAL SUBDIVISION MAP DATED APRIL 19, 1963

EXHIBIT III

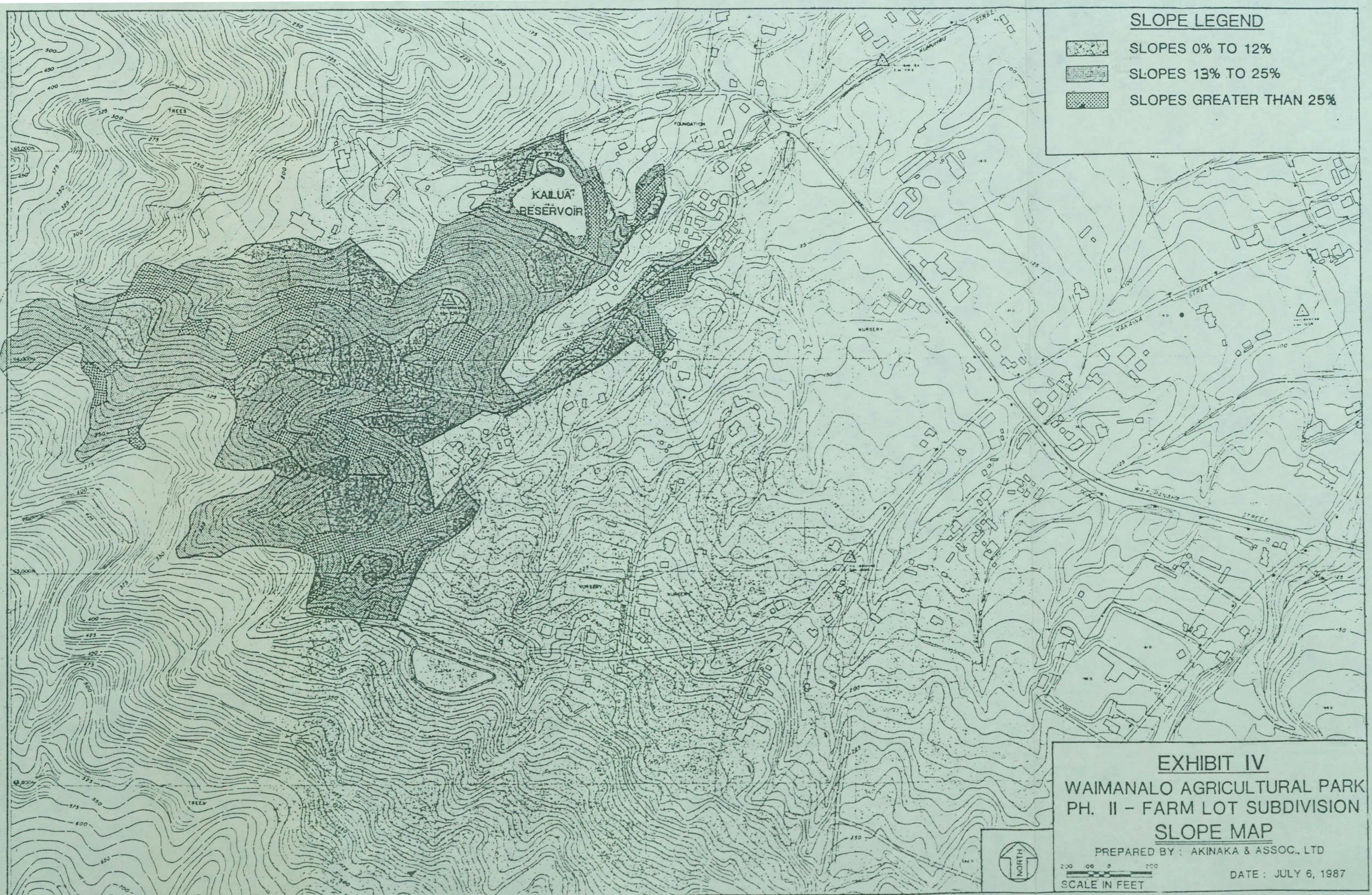
WAIMANALO AGRICULTURAL PARK PH. II - FARM LOT SUBDIVISION

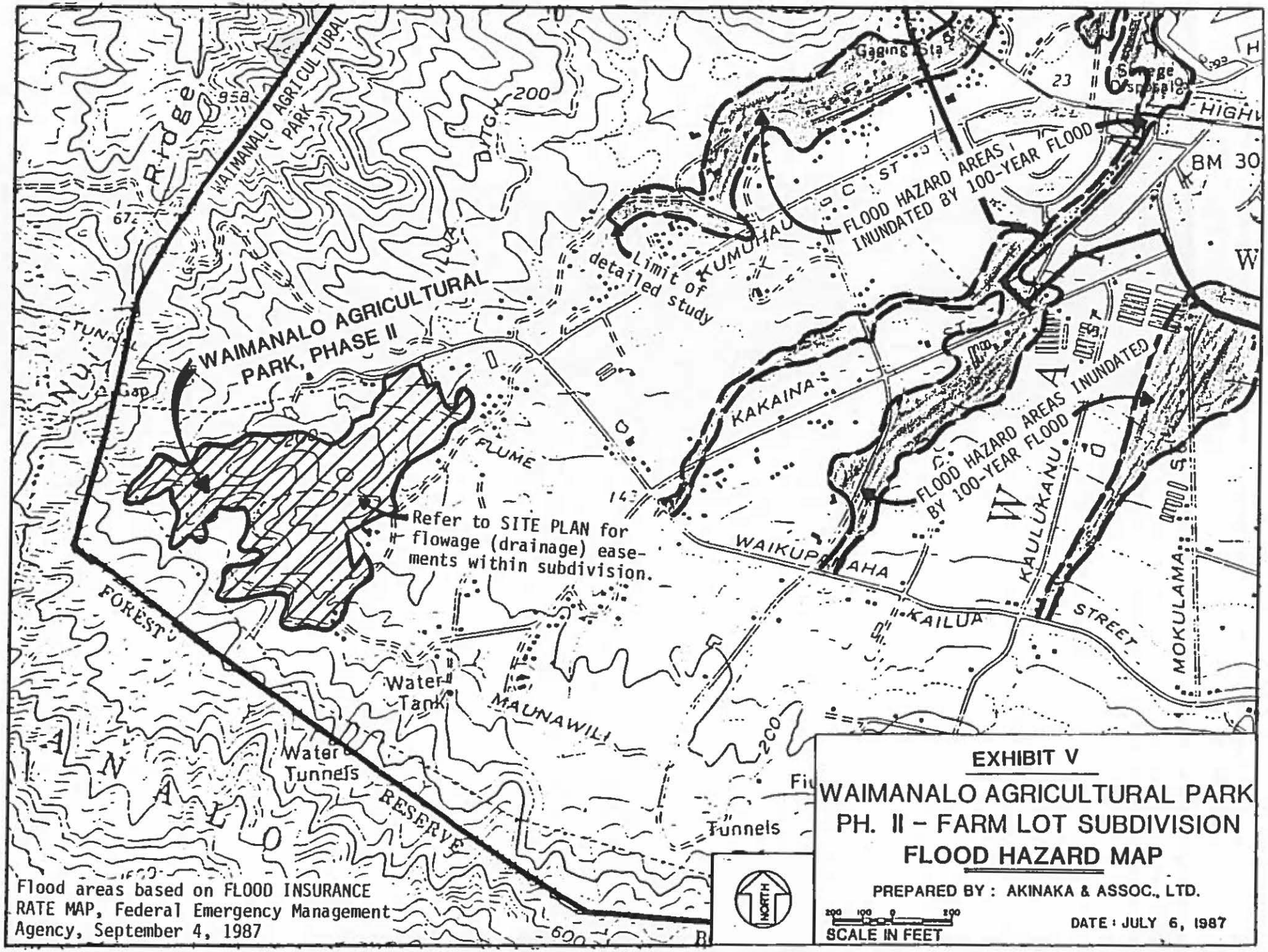
SITE PLAN

PREPARED BY: AKINAKA & ASSOC., LTD

APPROX. SCALE IN FEET

DATE: JULY 6, 1987


SLOPE LEGEND
SLOPES 0% TO 12%
SLOPES 13% TO 25%
SLOPES GREATER THAN 25%
KAILUA RESERVOIR
NURSERY
KAMANA STREET
NORTH
SCALE IN FEET
EXHIBIT IV
WAIMANALO AGRICULTURAL PARK
PH. II - FARM LOT SUBDIVISION
SLOPE MAP
PREPARED BY : AKINAKA & ASSOC., LTD
DATE : JULY 6, 1987


WAIMANALO AGRICULTURAL PARK, PHASE II
Limit of detailed study
FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD
FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD
Refer to SITE PLAN for flowage (drainage) easements within subdivision.
KUMUHAU ST
KAKAINA
FLUME
WAIKUPANAHA
KAULUKANU
KAILUA
STREET
MOKULAMA
MAUNAWILI
Water Tank
Water Tunnels
Tunnels
FOREST
RESERVE
WAIMANALO AGRICULTURAL PARK
Ridge
Gap
Gaging Sta
HIGHW
BM 30
200
600
NORTH
Flood areas based on FLOOD INSURANCE RATE MAP, Federal Emergency Management Agency, September 4, 1987
EXHIBIT V
WAIMANALO AGRICULTURAL PARK
PH. II – FARM LOT SUBDIVISION
FLOOD HAZARD MAP
PREPARED BY : AKINAKA & ASSOC., LTD.
200 100 0 200
SCALE IN FEET
DATE : JULY 6, 1987

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF:

April 11, 1988

Planning Branch

Dr. Marvin T. Miura, Interim Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Thank you for the opportunity to review the Supplemental EIS for the Waimanalo Agricultural Park Phase II Farm Lot Subdivision. The following comments are offered:

a. It appears that a Department of the Army (DA) permit is not required; however, any work in Waimanalo Stream associated with the development or initiated by individual lot leaseholders should be coordinated with Operations Branch (telephone 438-9258) for permit requirements.

b. The comments in the document concerning flood hazards (page 4-2, paragraph 4.7) appear to be correct.

Sincerely,

Kisuk Cheung
Chief, Engineering Division

Copy furnished:

Mr. Henry Morita
Akinaka & Associates, Ltd.
250 N. Beretania St., Suite 300
Honolulu, HI 96817

UNITED STATES
DEPARTMENT OF
AGRICULTURE

SOIL
CONSERVATION
SERVICE

P. O. BOX 50004
HONOLULU, HAWAII
96850

April 18, 1988

Dr. Marvin T. Miura, Interim Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, HI 96813

Dear Dr. Miura:

Subject: Supplemental EIS for the Waimanalo Agricultural Park,
Phase II Farm Lot Subdivision - Waimanalo, Oahu

We have no comment to offer at this time, however, we would appreciate the opportunity to review the final EIS.

Sincerely,

RICHARD N. DUNCAN
State Conservationist

cc:
Mr. Henry Morita, Akinaka & Associates, Ltd., 250 N. Beretania St.,
Suite 300, Honolulu, HI 96817

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P. O. BOX 50167
HONOLULU, HAWAII 96850

ES
Room 6307

APR 25 1988

RECEIVED

APR 26 1988

AKINAKA & ASSOCIATES, LTD.

Dr. Marvin T. Miura, Interim Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Re: Supplemental Environmental Impact Statement, Agricultural Park Phase II Farm Lot Subdivision, Waimanalo, Oahu

Dear Dr. Miura:

We have reviewed the referenced document and have no comments to offer at this time.

We appreciate the opportunity to comment.

Sincerely,

for Ernest Kosaka, Field Supervisor
Environmental Services
Pacific Islands Office

✓ cc: Akinaka and Associates, Ltd.

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

DEPARTMENT OF THE AIR FORCE

HEADQUARTERS 15TH AIR BASE WING (PACAF)
HICKAM AIR FORCE BASE, HAWAII 96853 - 5000

REPLY TO ATTN OF: DEEV

22 MAR 1988

SUBJECT: Supplemental Environmental Impact Statement (SEIS) for Waimanalo Agricultural Park, Phase II, TMK: 4-1-10: 66, 79, 80, 82, 85, 86, 87, 88 and 91

TO: Akinaka & Associates, Ltd
250 North Beretania Street, Suite 300
Honolulu, Hawaii 96817-4716

1. Reference State DLNR letter, 8 March 1988, same subject.

2. We have reviewed subject SEIS and anticipate no significant impacts upon known Air Force activities. We appreciate the opportunity to review and comment on subject document.

3. If there are any questions, please contact Mr Gaylord Higa at 449-7519.

VIRGIL J. CARR, JR., Colonel, USAF
Director of Civil Engineering

cc: 15 ABW/LGC

RECEIVED
MAR 24 1988
AKINAKA & ASSOCIATES, LTD.

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

IN REPLY REFER TO:

5090 (14B)
Ser N5B/657
11 MAR 1988

Dr. Marvin T. Miura, Interim Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, HI 96813

Dear Dr. Miura:

DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (DSEIS)
PHASE II FARM LOT SUBDIVISION

The Draft Supplemental EIS for the Phase II Farm Lot Subdivision has been reviewed and we have no comments to offer. Since we have no further use for the EIS, it is being returned to your office.

Thank you for the opportunity to review the Draft Supplemental EIS.

Sincerely,

W. K. Lin

W. K. Lin
Assistant Base Civil Engineer
By Direction of
the Commander

Enclosure

Copy to:
Mr. Henry Morita
Akinaka & Associates, Ltd.
250 N. Beretania St., Suite 300
Honolulu, HI 96817

(P)1200.8

MAR 1 1 1988

RECEIVED

MAR 15 1988

AKINAKA & ASSOCIATES, LTD.

Dr. Marvin T. Miura
Interim Director
Office of Environmental
Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Draft Supplemental EIS for the
Waimanalo Agricultural Park Phase II
Farm Lot Subdivision

We have reviewed the subject document and have no comments to offer.

Very truly yours,

TEUANE TOMINAGA
State Public Works Engineer

SS:jk
cc: Mr. Henry Morita

JOHN WAIHEE
GOVERNOR

SUZANNE D. PETERSON
CHAIRPERSON, BOARD OF AGRICULTURE

DEPUTY TO THE CHAIRPERSON

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

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

January 25, 1988

RECEIVED
JAN 28 1988
AKINAKA & ASSOCIATES, LTD.

Mr. Robert Y. Akinaka, President
Akinaka & Associates, Ltd.
250 North Beretania St., Suite 300
Honolulu, HI 96817

Subject: Supplemental Environmental Impact Statement (SEIS) for
Waimanalo Agricultural Park, Phase II
TMK: 4-1-10: 66, 79, 80, 82, 85, 86, 87, 88, 91
Waimanalo, Oahu
Area: 124.8 acres

Dear Mr. Akinaka:

The Department of Agriculture has reviewed the Pre-Final Draft Supplemental Environmental Impact Statement and offers the following comments:

1. Six (6) lots will be made available for agricultural purposes, yet references to seven (7) lots are made on pages 3-1, 6-1 and 6-5. This should be corrected to eliminate misunderstanding or confusion.

2. Subsection 6.2A.2. on page 6-2 states that, "Burning of clearing and grubbing material will not be allowed during construction of the subdivision." Subsection 7.2, second paragraph on page 7-1, appears to contradict this statement by stating that, "...smoke from burning activity will undoubtedly occur." These statements should be clarified.

Thank you for the opportunity to review and comment on the subject report.

Sincerely,

Suzanne D Peterson

SUZANNE D. PETERSON
Chairperson, Board of Agriculture

cc: DLNR (Attn: Gordon Akita, DOWALD)

19.002.1j(8)
2395

STP 8.2919

June 14, 1988

Dr. Marvin Miura, Interim Director
Office of Environmental Quality Control
465 South King Street, Room 115
Honolulu, Hawaii 96813

Dear Dr. Miura:

Supplemental Environmental Impact Statement
Waimanalo Agricultural Park, Phase II
Waimanalo, Oahu

We have no objections to the development of the Waimanalo Agricultural Park, Phase II farm lot subdivision.

Thank you for this opportunity to provide comments.

Very truly yours,

Edward Y. Hirata
Director of Transportation

DT:ko

cc: HWY-P, STP(dt)
Mr. Henry Morita, Akinaka & Assoc.

JOHN WAIHEE
GOVERNOR
STATE OF HAWAII

ILIMA A. PIIANAIA
CHAIRMAN
HAWAIIAN HOMES COMMISSION

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P. O. BOX 1879
HONOLULU, HAWAII 96805

April 27, 1988

MEMORANDUM

TO: The Honorable Marvin Miura, Interim Director
Office of Environmental Quality Control

FROM: Ilima A. Piianaia, Chairman
Hawaiian Homes Commission

SUBJECT: Supplemental Environmental Impact Statement
Waimanalo Farm Lot Subdivision, Phase II

Thank you for the opportunity to comment on the Supplemental Environmental Impact Statement (EIS) prepared for the Waimanalo Farm Lot Subdivision, Phase II.

The project does not directly affect Hawaiian Home Lands. Water supply for the project does involve the use of a small portion of Hawaiian Home Lands for a transmission tunnel, but this does not provide us any special concerns.

The Department of Hawaiian Home Lands has no comment on the EIS.

IAP:CI:eh

cc: Mr. Henry Morita, Akinaka & Associates

JOHN WAIHEE
GOVERNOR OF HAWAII

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

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

April 25, 1988

In reply, please refer to:
EPHSD

MEMORANDUM

To: Dr. Marvin T. Miura, Interim Director
Office of Environmental Quality Control

From: Director of Health

Subject: Draft Supplemental Environmental Impact Statement for Waimanalo Agricultural Park, Phase II Farm Lot Subdivision, Waimanalo, Koolaupoko District, Oahu

Wastewater Disposal

The individual wastewater system for any dwelling or building in the subdivision shall meet all the requirements of Act 282, SLH 1985.

Drinking Water

The List of Necessary Approvals on page 11-1 should include the Department of Health as one of the approving agencies for potable water. In accordance with Chapter 20, Title 11, Administrative Rules, approval by the Department of Health is required for new sources of potable water and substantial modifications to new or existing water distribution systems. The Department of Health should be listed even though the Honolulu Board of Water Supply (BWS) has been delegated the approval authority for modifications to BWS systems.

The supplemental EIS discusses two distinct water systems. Lots 1 and 2, designated for nursery use, would receive potable water from the BWS through an 8-inch municipal water line connected to the BWS's Waimanalo Well. With respect to lots 3, 4, 5 and 6 recommended for orchard use, irrigation quality water would be provided by a 12-inch pipeline connecting the subdivision to the Waimanalo Irrigation System (WIS) from the intersection of Waikupanaha Street and Kumuhau Street. It is not clear if potable water is needed and provided for the workers and families of the farmers on lots 3, 4, 5 and 6. This matter should be classified.

Cross connections between the potable and nonpotable water systems is a major concern and should be avoided. Nonpotable taps should be clearly labeled.

Noise

1. Activities associated with the construction phase of the project must comply with the provisions of Title 11, Administrative Rules Chapter 43, Community Noise Control for Oahu.

   a. The contractor must obtain a noise permit if the noise levels are expected to exceed the allowable levels of the rules.

   b. Construction equipment and onsite vehicles requiring an exhaust of gas or air must be equipped with mufflers.

   c. The contractor must comply with the conditional use of the permit as specified in the rules and conditions issued with the permit.

2. Traffic noise from heavy vehicles travelling to and from the construction site must be minimized near existing residential areas and must comply with the provisions of Title 11, Chapter 42, Vehicular Noise Control for Oahu.

JOHN C. LEWIN, M.D.

cc: Mr. Henry Morita ✓

JOHN WAIHEE
GOVERNOR
ROGER A. ULVELING
DIRECTOR
BARBARA KIM STANTON
DEPUTY DIRECTOR
LESLIE S. MATSUBARA
DEPUTY DIRECTOR

DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

KAMAMALU BUILDING, 250 SOUTH KING ST., HONOLULU, HAWAII
MAILING ADDRESS: P.O. BOX 2359, HONOLULU, HAWAII 96804 TELEX: 7430250 HIDPED

Ref. No. P-8234

April 6, 1988

RECEIVED
APR 9 1988
AKINAKA & ASSOCIATES, LTD.

MEMORANDUM

TO: Dr. Marvin T. Miura, Director
Office of Environmental Quality Control

FROM: Roger A. Ulveling

SUBJECT: Draft Environmental Impact Statement (DEIS) for Waimanalo Agricultural Park, Phase II, Farm Lot Subdivision

We have reviewed the subject DEIS and have the following comments to offer relative to the Hawaii Coastal Zone Management (CZM) Program.

A CZM objective is to protect, preserve, and where desirable, restore those natural and man-made historic and prehistoric resources. In the section identifying probable environmental impacts, the applicant states that if archaeological remains or artifacts are uncovered during construction of the agricultural subdivision, work will be halted and the State Historic Preservation Officer will be notified. However, this statement does not address the resources identified in the archaeological survey provided in Appendix A. The survey indicates two significant prehistoric taro terrace complexes located adjacent to the project area and recommends two measures to protect them from potential secondary effects of the proposed subdivision. We concur with these recommendations and suggest that the archaeological impact statement reflect the survey results.

Thank you for the opportunity to review this DEIS. If you have any questions regarding this matter, please feel free to contact our CZM office at 548-8467.

ORIGINAL SIGNED BY
ROGER A. ULVELING

cc: Mr. Henry Morita
Akinaka & Associates, Ltd.

JOHN WAIHEE
GOVERNOR OF HAWAII

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

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

LIBERT K. LANDGRAF
DEPUTY

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

MAY 27 1988

Honorable Roger A. Ulveling, Director
Dept. of Business and Economic Development
State of Hawaii
P. O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Ulveling:

Waimanalo Agricultural Park, Phase II

In response to your April 6, 1988 comments, the final Environmental Impact Statement (EIS) will be revised to reflect the following:

1. The two taro terraces will be flagged to identify them in the field and the lesees of Lots 4 and 6 will be informed that disturbance of these terraces and farming outside of the lots will not be permitted.

2. The Department is considering the nomination of these sites to the State and National Registers.

Should you have any further questions, please have your staff contact Mr. Manabu Tagomori of the Division of Water and Land Development at 548-7533.

Very truly yours,

WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources

cc: Akinaka & Associates
Dept. of Agriculture, Attention: Mr. Paul Schwind
State Historic Preservation Office
Land Management Division, Attention: Herbert Yanamura

JOHN WAIHEE
GOVERNOR

Joseph K. Conant
Executive Director

STATE OF HAWAII
Department of Business and Economic Development
Housing Finance and Development Corporation

P. O. BOX 17907
HONOLULU, HAWAII 96817

IN REPLY REFER TO:
88:PLNG/1373JT

March 24, 1988

Dr. Marvin T. Miura, Interim Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Mr. Miura:

Re: Supplemental Environmental Impact Statement (EIS) for the Waimanalo Agricultural Park Phase II Farm Lot Subdivision

Thank you for the opportunity to review the subject supplemental EIS. The Housing Finance and Development Corporation has no comments to offer.

Sincerely,

JOSEPH K. CONANT
Executive Director

cc: Mr. Henry Morita

STATE OF HAWAII
DEPARTMENT OF BUSINESS
AND ECONOMIC DEVELOPMENT

LAND USE COMMISSION

Room 104, Old Federal Bldg., 335 Merchant Street
Honolulu, Hawaii 96813 Telephone: 548-4811

JOHN WAIHEE
Governor

TEOFILO PHIL TACBIAN
Chairman

FREDERICK P. WHITTEMORE
Vice Chairman

COMMISSION MEMBERS:
Richard B.F. Choy
Lawrence F. Chun
Everett L. Cuskaden
Sharon R. Himeno
Toru Suzuki
Robert S. Tamaye
Renton L.K. Nip

ESTHER UEDA
Executive Officer

March 22, 1988

Dr. Marvin T. Miura, Interim Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Draft Supplemental Environmental Impact Statement for Waimanalo Agricultural Park Phase II Farm Lot Subdivision

Based on our review of the subject project, we have confirmed that the proposed Park Subdivision is within the State Land Use Agricultural District as stated in Section 5-2 of the Draft Environmental Impact Statement.

We have no other comments to offer at this time.

Sincerely,

ESTHER UEDA
Executive Officer

EU:to

cc: ✓Henry Morita

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD, HONOLULU, HAWAII 96816-4495

MAR 15 1988

RECEIVED
MAR 18 1988
AKINAKA & ASSOCIATES, LTD.

Engineering Office

Dr. Marvin T. Miura, Interim Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Supplemental EIS for the Waimanalo Agricultural Park
Phase II Farm Lot Subdivision
Waimanalo, Koolaupoko Distric, Oahu

Thank you for providing us the opportunity to review the above subject project.

We have no comments to offer at this time regarding this project.

Sincerely,

Jerry M. Matsuda
Major, Hawaii Air
National Guard
Contr & Engr Officer

Enclosure

cc:
Mr. Henry Morita

University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

April 22, 1988
RE:0492

Dr. Harvin T. Miura, Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Supplemental Environmental Impact Statement
Waimanalo Agriculture Park Phase II
(Farm Lot Subdivision)
Waimanalo, Oahu

This project involves development of 70 acres of State land into 6 leasehold farm lots and installation of new irrigation and domestic water systems for these lots. The Environmental Center has conducted a brief review of this document with the assistance of Luciano Minerbi, Urban and Regional Planning; and Jennifer Crummer, Environmental Center.

It is our understanding that there were complaints regarding unauthorized burning of logs and agricultural debris during land clearing as well as sedimentation and clogging within waterways during phase I of this plan. We see it appropriate to assess the merit of those complaints within this Environmental Impact Statement and to detail some monitoring of any such practices that may arise in phase II. The steps which will be needed to minimize such impacts should also be incorporated within this document.

Two organizations which would have a direct interest in this project are the Waimanalo Military-Civilian Coalition and the Native Hawaiian Homestead Association. These groups may have some constructive input on this project and should be consulted or included in the review process.

Presently, there is no statement within the EIS whether the two recomendations for adjacent sites will be carried out. As it has been stated within the document that secondary impacts to these sites may occur, such a discussion should be included. It has been suggested that the new archaeological finds be linked to other known sites within the area. These linkages could be discussed in terms of integrated access among sites, protection, possible restoration and use.

We have no further comments to offer at this time. We thank you for the opportunity to review this document and look forward to your consideration and response to our comments.

Yours truly,

John T. Harrison, Ph.D.
Environmental Coordinator

cc: ~~OEQC~~
Henry Morita, Akinaka & Associates
L. Stephen Lau
Luciano Minerbi
Jennifer Crummer

JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT
P. O. BOX 373
HONOLULU, HAWAII 96809

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

LIBERT K. LANDGRAF
DEPUTY

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

JUL 27 1989

Dr. John T. Harrison
Environmental Coordinator
University of Hawaii
Environmental Center
2550 Campus Road
Honolulu, Hawaii 96822

Dear Dr. Harrison:

Waimanalo Agricultural Park Phase II

In response to your comments on the Supplemental Environmental Impact Statement (SEIS) for the subject project, we provide the following:

1. We understand that there were complaints regarding unauthorized burning of agricultural debris and grading work during Phase I. To minimize the occurrence of any such events, all farmers for Phase II will be required to obtain an Agricultural Burning Permit from the Department of Health and carry out a conservation program for his lot developed in cooperation with Soil Conservation Service. For your information, we also understand that the State Department of Health and the City's Office of Information and Complaints and Department of Public Works did not receive any such complaints.

2. The Waimanalo Military-Civilian Coalition and the Native Hawaiian Homestead Association did not express any interest in being consulted on the preparation of this SEIS.

3. The two recommendations from the archaeological survey will be addressed in the SEIS as follows:

   a. The two taro terraces will be flagged to identify them in the field and lessees of Lots 4 and 6 will be informed that disturbance of these terraces and farming outside of the lots will not be permitted.

   b. The Department is considering the nomination of these sites to the State and National Registers.

Thank you for your comments. Your letter will be included in the final SEIS for this project.

Sincerely,

MANABU TAGOMORI
Deputy for Water Resource Management

HY:fc

cc: Akinaka & Associates, Ltd.

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
1455 S. BERETANIA STREET, ROOM 305
HONOLULU, HAWAII 96814

FRANK F. FASI
MAYOR

FRANK K. KAHOOHANOHANO
FIRE CHIEF

LIONEL E. CAMARA
DEPUTY FIRE CHIEF

April 6, 1988

Dr. Marvin T. Miura, Interim Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

SUBJECT: Supplemental EIS for the Waimanalo Agricultural Park Phase II Farm Lot Subdivision

We have reviewed the subject EIS material provided and foresee no adverse impact on fire protection facilities or services planned or now provided. Fire protection is considered adequate.

Thank you for the opportunity to review and comment on this matter. We are returning the EIS to you.

Should you have any questions, please contact Battalion Chief Kenneth Word of our Administrative Services Bureau at 943-3838.

Very truly yours,

Lionel E. Camara

LIONEL E. CAMARA
Acting Fire Chief

LEC/KAW:lm
Enclosure

cc: Mr. Henry Morita, ✓
Akinaka & Associates, Ltd.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

April 19, 1988

Dr. Marvin T. Miura,
Interim Director
Office of Environmental
Quality Control
465 South King Street,
Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Your Letter of March 8, 1988 on the Supplemental EIS for the Waimanalo Agricultural Park, Phase II Farm Lot Subdivision, TMK: 4-1-10: 66, 79, 80, 82, 85, 86, 87, 88, and 91

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

We have the following comments:

1. The Waimanalo Irrigation System (WIS) should be clearly identified to distinguish the system from the potable water system. Adequate measures should be taken to prevent cross connection of WIS with the potable water system. A reduced pressure principle backflow prevention device should be installed for each domestic service connection as a safeguard against contamination of the domestic water system.

2. In describing the location of cesspools for proposed dwellings, the word "beyond" should be changed to "makai of" to clarify that the cesspools will be located in the "Pass Zone" area (page 3-2).

3. The term "development charges" should be changed to "Water System Facilities Charges" (page 3-3).

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

4. The requirement for potable water for Phase II should be based on both irrigation (58,000 gpd) and domestic (4,500 gpd) needs. A total of 63,300 gpd will be required for Phase II (page 6-11, b. Potable Water).

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Mr. Henry Morita
(Akinaka and Associates, Ltd.)

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

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

PL 1.1051
TE-1694

April 15, 1988

Dr. Marvin T. Miura, Interim Director
Office of Environmental Quality Control
465 South King Street, Suite 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Waimanalo Agricultural Park - Phase II
Draft Supplemental Environmental Impact Statement
TMK: 4-1-10

This is in response to your letter of March 8, 1988 requesting our comments on the subject project.

A field investigation was conducted and based on our review, Kumuhau Street between Waikupanaha Street to Humuniki Street should be widened to a minimum of 24 feet to accommodate the anticipated increase in truck traffic.

Should you have further questions, please contact Wayne Nakamoto of my staff at 523-4190.

Yours truly,

for JOHN E. HIRTEN

cc: Mr. Henry Morita

JUN - 2 1988

Mr. John E. Hirten, Director
Dept. of Transportation Services
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Hirten:

Waimanalo Agricultural Park - Phase II
Draft Supplemental Environmental Impact Statement
Waimanalo, Oahu, Hawaii TMK: 4-1-10

This is in response to your April 15, 1988 letter commenting that Kumuhau Street between Waikupanaha and Humuniki Streets be widened to 24 feet to accommodate increase in truck traffic.

Kumuhau Street is approximately 20 feet wide uncurbed and asphalt concrete surfaced roadway. It is the most direct route from the project site and the existing 22 farm lots to Kalanianaole Highway. The six additional lots of this project will not significantly increase the truck traffic on Kumuhau Street. In addition, other less direct feeder streets such as Kakaina/Hihimanu Streets also provide access.

Your letter will be appended to the final SEIS document.

Sincerely,

MANABU TAGOMORI
Deputy for Water Resource Management

GA:fc

ENV 88-74

March 30, 1988

RECEIVED

APR 1 1988

AKINAKA & ASSOCIATES, LTD.

Dr. Marvin T. Miura
Interim Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Draft Supplemental EIS for the Waimanalo Agricultural Park Phase II Farm Lot Subdivision, Waimanalo, Koolaupoko Oahu, Hawaii (Tax Map Key: 4-1-10: 66, 79, 80, 82, 85-88, 91)

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

1. There are no plans to install sanitary sewers in the area.

2. The drainage discussion is satisfactory.

Very truly yours,

Sam Callejo

ALFRED J. THIEDE
Director and Chief Engineer

cc: Akinaka & Associates, Ltd.

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

FRANK F. FASI
MAYOR

HIRAM K. KAMAKA
DIRECTOR

WALTER M. OZAWA
DEPUTY DIRECTOR

March 29, 1988

Dr. Marvin S. Miura, Director
Office of Environmental Quality Control
State of Hawaii
Kekuanaoa Building, Room 115
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Supplemental Environmental Impact Statement (EIS) for the Waimanalo Agricultural Park, Phase II Farm Lot Subdivision, Waimanalo, Oahu

Thank you for providing the Department of Parks & Recreation the opportunity to review the above-referenced project. We have no comments to offer at this time.

Sincerely,

HIRAM K. KAMAKA, Director

HKK:ei

cc: Mr. Henry Morita, Akinaka & Associates, Ltd.

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

FRANK F. FASI
MAYOR

DONALD A. CLEGG
CHIEF PLANNING OFFICER

GENE CONNELL
DEPUTY CHIEF PLANNING OFFICER

VW/DGP 3/88-986

April 21, 1988

Honorable Marvin T. Miura, Interim Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Draft Environmental Impact Statement (DEIS)
for Waimanalo Agricultural Park, Phase II,
Farm Lot Subdivision

We have reviewed the subject Draft Environmental Impact Statement and offer these comments:

1. Probable environmental impacts are described and analyzed in Section 6. All economic impacts are beneficial; precautions to preserve air and water quality are reasonable; and recommended agricultural uses with appropriate conservation are designed to minimize soil erosion on these sloping lands. However, estimated demand for irrigation water appears to require upgrading the Waimanalo Irrigation System with a new 60 million gallon reservoir at the end of Mahailua Street in FY 1991. This reservoir site does not appear on our Koolaupoko Development Plan Public Facilities Map; therefore, we suggest that the applicant and the Department of Land and Natural Resources request an amendment to the Koolaupoko Development Plan Public Facilities Map by adding this proposed reservoir at the end of Mahailua Street as site determined, within 6 years.

2. Adverse environmental effects which cannot be avoided appear to be adequately described in the DEIS. It should be more clearly stated in the Final EIS that the proposed new agricultural activities - bananas and nursery crops will have a negative impact upon existing farming activities in this area until the proposed 60 million gallon reservoir is completed and the water transmission system is reconstructed.

3. This DEIS briefly examines possible alternatives to this proposal, namely: (1) no action; (2) alternative sites; (3) alternative land use; (4) alternative agricultural use; and (5) alternative site improvements. More analysis should be provided in the Final EIS for each of these alternatives except the "no action alternative."

Thank you for giving us the opportunity to comment. If you have any questions, please contact Verne Winquist of my staff at 527-6044.

Sincerely,

DONALD A. CLEGG
Chief Planning Officer

cc: Mr. Henry Morita, Akinaka & Associates, Ltd.

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4161

FRANK F. FASI
MAYOR

MIKE MOON
DIRECTOR

ROBERT MIYASATO
DEPUTY DIRECTOR

April 20, 1988

Dr. Marvin Miura, Interim Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Supplemental Environmental Impact Statement
for the Waimanalo Agricultural Park Phase II
Farm Lot Subdivision

We have reviewed the Supplemental Environmental Impact Statement for the subject project and have no comments.

Sincerely,

Robert Miyasato

MIKE MOON
Director

cc: Mr. Henry Morita

1694

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to DOWALY

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

FRANK F. FASI
MAYOR

JOHN P. WHALEN
DIRECTOR

BENJAMIN B. LEE
DEPUTY DIRECTOR

March 28, 1088

APR 14 1988

AKINAKA & ASSOCIATES, LTD.

Mr. William W. Paty, Chairperson
Board of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Paty:

Supplemental Environmental Impact Statement (SEIS)
for Waimanalo Agricultural Park, Phase II
Tax Map Key: 4-1-10: 66, 79, 80, 82, 85-88 and 91

Thank you for transmitting a copy of the subject SEIS. We have no comments to offer at this time.

Very truly yours,

for JOHN P. WHALEN
Director of Land Utilization

JPW:sl
1725B

FROM: Dr. Robert E. Gibson
President,
Neighborhood Board No. 32
Waimanalo, Hawaii 96795

April 21, 1988

TO: Dr. Marvin T. Miura, Interim Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, HI 96813

RE: Supplemental EIS for the Waimanalo Agricultural Park
Phase II Farm Lot Subdivision
Review and Comments

The following comments were contributed by community members at a meeting of the planning and zoning committee members on April 18, 1988.

Philosophical Concerns The land being considered for the Agricultural Park, Phase II, has always been considered marginal agricultural lands. In ancient Hawaii there were taro lo'i along at least two of the stream bottoms located within or abutting the proposed project. However, the remainder of the land was probably used for house sites or was vacant. This can be deduced from the location of the kuleanas which were awarded to the native Hawaiians who lived in the area in 1850. The only kuleana located wholly within the project area, L.C.A. 235c, apana 2 to Kaanana, was officially described as "a house lot". Sugar was grown on the land for a time, but from around the late 40's and early 50's this land has only been marginal pasture land. In fact, the entire proposed project area is today heavily forested except for the above mentioned L.C.A. 235c which today is owned by Roger and Ellen Watson, tax map key number 4-1-10-62. A large portion of the steep hillsides within the project area were reforested in Eucalyptus trees in an apparent attempt to prevent further erosion probably caused when the land was stripped and graded for the planting of sugar. Given this background, why does the Dept. of Agriculture feel it will be of long term benefit to turn this forest area into farmland? If the farmers who eventually win these farm lots are allowed to strip the land of trees in order to plant crops on marginal lands will either the State or the farmers gain from the experience? The Site Plan Map, Exhibit III in the EIS, shows that lots 5 and 6 extend largely into an area which even the sugar company never tried to cultivate due to the steepness of the terrain. The map of the Waimanalo Sugar Company, circa 1935, which is Figure 5 in the EIS clearly shows the area of lots 5 and 6 to consist largely of what many would consider a pali. How can it possibly be considered a good site for farming activities? Will the projected expenses for development of the Ag Park be a wise expenditure if the effort required to produce a marginal return be beyond the means or abilities of the farmers? The EIS states again and again that the mauka lots are good for orchards, specifically banana. However, the banana farmers who have seen the project area have rejected the land as too steep and too low in rainfall for good banana production. We feel that the land chosen for the proposed project area might better serve the Waimanalo area if it were left as a forest reserve or wildlife area. We are also desirous that agriculture be encouraged, but the potential for damage from developing this proposed Ag Park would seem to far outway the gains to be derived. Because we would like more information about the project we are planning to invite the planners involved to our next committee meeting in order that we might hear their response to our questions.

Survey Questions The layout of the lots raises several questions as to the logic involved when the proposed project area was cut up. Lots 1 and 2 are proposed for nursery and shadehouse potted plant production. The EIS on page 6-8, paragraph 4. Erosion Impacts talks about the grading required to prepare shadehouse pads so that the slope not exceed 5 percent. The topography of the land in the two lots however, is not only heavily forested but exceeds a 15% slope throughout most of area. Both lots have areas that exceed a 25% slope. It is hard to see how a shadehouse operation could be installed in these lots without major grading and reshaping of the land. And, if this is the case, will the fill for the lower portions of both lots be stripped away from the higher portions of those same lots? It seems hardly a suitable agricultural use of the land if in order to be used for agriculture the topography of the land must first be destroyed.

The Site Plan Map, Exhibit III of the EIS, shows a remnant lot with a long, long extension to the cul-de-sac of the proposed roadway into the project area. The remnant lot itself lies along and is bisected by the present roadway which serves the approximately 40 homes, including the Watson residence, which are located within or abut the project area on the southeastern and eastern side. The present roadway is accessed from Waikupanaha Street where Kumuhau Street dead ends. The long extension of the remnant lot to the cul-de-sac is therefore not self-explanatory. What reason is there for providing this extension?

The remaining lots, the so-called banana lots, have been drawn in such a way that they cross over ridges , drop down into gullies, cross stream beds, and go up ridges again until they terminate at the mauka end of the project at the Maunawili ditch. Grading roads into the mauka portions of these lots may require the building of bridges over some of the streams. Will the farmers be required to provide EIS booklets of their own when they construct roadways around, over, or along the waters of these perennial streams? How will these waterways be protected when the lots are laid out in such a way that the farmers will be forced to encroach into the stream areas?

Lots 5 and 6 include very steep and heavily forested (Eucalyptus) slopes, which were planted by the Civilian Conservation Corps to prevent erosion. It would appear that well over half of each of these lots is affected. Are these forests going to be destroyed by the farmers? What will prevent severe erosion of these very steep hillsides? It would make more sense to have the mauka portion divided into two lots. One lot on the relatively level plateau now crossed by a portion of lots 3 and 4 to the west of the kuleana owned by William Chinen. The second lot on the other plateau where the Watson Kuleana is located now crossed by a portion of lots 4 and 5. The dividing line could be the gully between the two plateaus. Neither lot should extend beyond or cross the streams on either side or even include the very steep pali located now within the Northwestern part of lot 5.

Grading,Grubbing,Disposal of Material The EIS talks about protecting the land from soil erosion, the streams from sedimentation, and the air from pollution. Page 6-2 states that burning of cleared material will not be allowed. Yet Phase I Ag Park, located nearby, suffered for months from the constant burning of the cleared material. Nothing was ever done then to enforce any rules against burning. Wahat chance is there that the rules will be enforced in Phase II? Also, on the same page there is mentions of conforming to strict erosion control measures. Anyone who lives near the Phase I project knows that erosion was a severe problem there due to uncontrolled clearing of the hillsides. Where was the control or enforcement when it was needed? Why should it be any different for the Phase II project?

Air Quality Impacts Page 6-6 talks about the very real possibility that toxic chemicals could be generated by the agricultural activities within the Ag Park. It goes on to say that the prevailing tradewinds will blow those pollutants away from populated areas and Kalanianaole Highway. However, for some reason, the EIS chooses to ignore the fact that the Watson residence is located in the middle of the proposed project. How will this family be protected from pollutants and toxic chemicals? Also, how will the streams, which are now pristine when they enter and exit the proposed project area, be protected from run-off from the farm lots?

Sewage Disposal The EIS proposes that when the homes are built on the farm lots of the Ag Park, sewage disposal will be too expensive if lines must extended to the Waimanalo sewage treatment facility. Therefore, the owners of the farm lots will be allowed to build cesspools makai of a no-pass line drawn through the project area. Our understanding is that the Dept. of Health has a map of the area which shows that the entire project area is regarded as no-pass. Any sewage generated in this area by new homes must be stored in holding tanks and pumped out by qualified tanker companies and disposed of elsewhere. The reason this area was designated as no-pass by the Dept. of Health was in order to protect ground water sources from possible pollution so that the BWS might develop future potable water resources. The EIS however has drawn the line as shown on the Site Plan Map, Exhibit III conveniently mauka of the proposed roadway. Does this proposed plan truly conform to the original intent of the no-pass ruling?

Archeological Survey It is interesting to read this portion of the EIS because the persons who wrote it walked the area in a way they described as a sweep. They found many things and describe them in their section. However, what they omit is puzzling because of the questions those omissions raise. The abstract, page i of the EIS mentions that the survey area for their study was the mauka portion of the proposed project, from the 250 foot elevation to the Maunawili ditch. As can be seen from their map on page 4, Figure 4, the 250 foot contour runs through the lower portion of the Watson Kuleana. This map also shows a dirt road running through the middle of the Watson property. It is obvious that the archeologists never saw the Watson property because they would have seen that the dirt road runs alongside that property and not through the middle of it. Secondly, they never mention this kuleana even though it is the only privately owned property which intrudes into the archeological survey and the only kuleana which is wholly within the proposed project area. Also, downstream from the site 1 terraces is a rock structure of some type along the stream banks which may be ancient. It certainly deserves a look before the farmers of lots 3 and 4 are allowed to grade and destroy the area. It is hard to understand why the archeologists who did the survey chose not to ask questions of anyone living in the area. Some of their speculations about the land and some plantings (coffee trees) they observed could have been aided greatly by tapping into the resource of local knowledge of the area. Though they mention some concern for protecting the extensive lo'i mauka of the Maunawili ditch, which we agree is a historical treasure that should be preserved, we wonder how the State will enforce any protection if the farmers are going to be brought in such close proximity to the area?

Watson Kuleana The EIS never once mentions this property or attempts to address any concerns for the protection of this kuleana from erosion, noise, dust or toxic chemical exposure. We wonder if the proposing party chose to wilfully ignore the fact that this property is the only private property

to lie wholly within the proposed project area. A worse thought is that the proposing party is unaware of this property. If this latter is true, then we can only wonder what else has been left out of the EIS and considerations for the merit of the proposed Ag Park Phase II.

EIS and Reality Reading the EIS one gets a feeling that responsibility for actions is always clearly defined, regulations are always understood and adhered to, rules are easy to enforce, compliance is easy to attain, and everyone involved, community, farmers, contractors, agency personnel and others are mutually agreed that this project is good and makes sense. We have had the impression that an EIS needs to fully address the impact a proposed project will have on an area. That an EIS needs to include the realities of past similar projects in the area. We feel that the problems which were generated by the Phase I Ag Park have been largely ignored or glossed over in this EIS as though they could not possibly happen again. Since the EIS for Phase I was very similar to this EIS with regard to soil conservation, sedimentation, air pollution, etc., we can only wonder what motivation lies behind so glibly dismissiing or ignoring the fact that there has been wholesale disregard for compliance with the ordinances that should have affected the Phase I project. The naivete' implied in the EIS for Phase II can only make one ponder what pressures might lie behind the need to publish such a positive statement for the project, when what was needed was a critical examination of the real impact this Ag Park will have on the environment, who will really benefit from the development, and what realistic returns the State could expect. We don't think this EIS portrays an objective picture of the project. We can only ask why there seems to be such a push to get the project through?

Thank you for letting us comment on this very interesting document. We look forward to your reply.

Respectfully,

Robert E. Gibson

Dr. Robert E. Gibson, President
Waimanalo Neighborhood Board No. 32

ccs Mr. Henry Morita Akinaka & Associates, Ltd.
Mr. William Paty Dept. of Land and Natural Resources
Mr. Herb Yanimura DLNR
Mr. Mason Young DLNR
Mr. Gordon Akita DLNR
Mr. Paul Schwind Dept. of Agriculture

JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT
P. O. BOX 373
HONOLULU, HAWAII 96809

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

LIBERT K. LANDGRAF
DEPUTY

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

July 14, 1988

Dr. Robert E. Gibson, President
Neighborhood Board No. 32
Waimanalo, Hawaii 96795

Dear Dr. Gibson:

Supplemental EIS For Waimanalo Agricultural Park,
Phase II Farm Lot Subdivision

In response to your April 21, 1988 comments we provide the following:

I. A. ...WHY DOES THE DEPARTMENT OF AGRICULTURE FEEL IT WILL BE OF LONG TERM BENEFIT TO TURN THIS FOREST AREA INTO FARMLAND?

The State Department of Agriculture performed a study to ascertain the need for an agricultural park in Waimanalo as directed by the Ninth Legislature of the State of Hawaii, Regular Session of 1977. The study recommended that a large scale agricultural park be established on 1800 acres of State land in Waimanalo. This project, which is located on land that is zoned for agriculture and is a part of the 1800 acres, conforms to the State Plan for continued growth and development of diversified agriculture throughout the State. In addition, the economic feasibility analysis shows that adequate returns can be achieved to support a family owned agricultural operation. For your information, there are presently 24 farmers who have expressed interest in applying for the six lots in the proposed project.

B. IF THE FARMERS WHO EVENTUALLY WIN THESE FARM LOTS ARE ALLOWED TO STRIP THE LAND OF TREES IN ORDER TO PLANT CROPS ON MARGINAL LANDS, WILL EITHER THE STATE OR THE FARMERS GAIN?

The project area is classified under the Agricultural Lands of Importance to the State of Hawaii (ALISH) System as "Other Important Agricultural Lands." These lands are considered important to the production of food and fiber, but are not considered as "Prime or Unique Agricultural Land." The ALISH System classifies the soils of the proposed park as satisfactory for

a wide range of agricultural uses. The Agricultural Feasibility Analysis prepared for this project recommends banana farming and potted foliage nursery after considering site soils, slopes, climate and other technical factors. Since crop selection is extremely important in the management of the area - annually tilled crops will not be recommended to be planted on the steeply sloping areas. The State and farmers will gain from increased production of the recommended commodities.

C. ...THE BANANA FARMERS WHO HAVE SEEN THE PROJECT AREA HAVE REJECTED THE LAND AS TOO STEEP AND TOO LOW IN RAINFALL FOR GOOD BANANA PRODUCTION.

The Luluku banana farmers are currently farming on similar sloped lands in Kaneohe. During low rainfall periods, irrigation water is available from the Waimanalo Irrigation System.

II. SURVEY QUESTIONS:

A. ..WILL THE FILL FOR THE LOWER PORTIONS OF BOTH LOTS (lots 1 & 2) BE STRIPPED AWAY FROM THE HIGHER PORTIONS OF THOSE SAME LOTS?

Lot grading and soil erosion is controlled by either the City grading ordinance permit or in cooperation with the Soil Conservation Service. Grading of 15% sloped lands to construct 25-30 feet wide pads at 5% slope would require approximately 1.5 feet of cuts and fills.

B. WHAT REASON IS THERE FOR PROVIDING THIS EXTENSION (flag stem 4.8 acre remnant lot)?

The extension is required to provide access to Remnant Lot 10. This access is required by City and County of Honolulu's Department of Land Utilization.

C. WILL THE FARMERS BE REQUIRED TO PROVIDE EIS BOOKLETS OF THEIR OWN WHEN THEY CONSTRUCT ROADWAYS AROUND, OVER, OR ALONG THE WATERS OF THESE PERENNIAL STREAMS?

The proposed farmers will not be required to prepare EIS's for their individual lots.

D. HOW WILL THESE WATERWAYS BE PROTECTED WHEN THE LOTS ARE LAID OUT IN SUCH A WAY THAT THE FARMERS WILL BE FORCED TO ENCROACH INTO THE STREAM AREAS?

Flowage easements are provided to protect the drainageways from encroachment and will be a stipulation within the lease agreement. Each farmer will be required to carry out a program of conservation for his farm lot developed in cooperation with the Soil Conservation

Service. The farmer's conservation program will address farm management practices, including implementing an appropriate storm runoff control system. Proper maintenance of drainageways will also be a part of this conservation program.

E. ARE THESE FORESTS (Eucalyptus trees in lots 5 & 6) TO BE DESTROYED BY THE FARMERS?

Destruction of the Eucalyptus trees will occur only if necessary and only as part of an approved conservation plan. The conservation plan for these parcels will describe the conservation treatments to the area if the trees are removed.

F. WHAT WILL PREVENT SEVERE EROSION OF THESE VERY STEEP HILLSIDES (Lots 5 & 6)?

The agricultural park was analyzed on the basis that hillsides with slopes in excess of 25 percent are not to be farmed. Each farmer will be required to carry out a program of conservation for his farm lot developed in cooperation with the Soil Conservation Service.

G. IT WOULD MAKE MORE SENSE TO HAVE THE MAUKA PORTION DIVIDED INTO TWO LOTS.

The agricultural park program, consistent with the legislative intent (Chapter 171-111, HRS), is to make lots available in minimum size economic units sufficient for the intended uses. Planning for the park has shown that the mauka portion can be divided economically into four lots.

III. GRADING, GRUBBING, DISPOSAL OF MATERIAL

A. PAGE 6-2 STATES THAT BURNING OF CLEARED MATERIAL WILL NOT BE ALLOWED. YET PHASE 1 AG PARK, LOCATED NEARBY, SUFFERED FOR MONTHS FROM THE CONSTANT BURNING OF CLEARED MATERIAL.

Page 6-2 discusses material resulting from the project construction. This material must be disposed of at landfills and burning is not permitted. Burning of cleared materials resulting from agricultural operations is allowed by permit issued by the Department of Health. Farmers for this proposed project will be required to obtain a permit prior to any burning of the cleared material.

B. WHAT CHANCE IS THERE THAT THE RULES WILL BE ENFORCED IN PHASE II?

Actions for enforcement and inspection are triggered by complaints rather than scheduled inspections. Records for previous Ag Parks show minimal complaints resulting in few agency actions. For this

project, lease stipulations will be stringently monitored and enforced by the Department of Agriculture.

IV. AIR QUALITY IMPACTS:

A. HOW WILL THIS FAMILY (Watson residence) BE PROTECTED FROM POLLUTANTS AND TOXIC CHEMICALS?

The application of chemicals by growers to control insects and plant diseases is subject to a stringent EPA registration process. No chemical may be used on a crop unless it has been registered specifically for that crop. The registration process requires extensive studies to determine a chemical's safety, taking into consideration its effects, both on the crop as food and on the human, plant and animal environment in which the chemical is used. Permitted use of EPA approved herbicides and pesticides require applicator (farmer) certification with the Department of Agriculture before use of the chemical is permitted. Chemicals applied according to label directions should not pose a problem for residences in the park area. The Watson residence will be protected similarly to other residences in the agricultural community by compliance to pesticide label instructions and by vegetation buffers.

B. ALSO, HOW WILL THE STREAMS, WHICH ARE NOW PRISTINE WHEN THEY ENTER AND EXIT THE PROPOSED PROJECT AREA, BE PROTECTED FROM RUN-OFF FROM THE FARM LOTS?

Flowage easements and appropriate conservation practices in conjunction with the recommended types of agricultural uses, banana cropping and potted foliage nurseries, should minimize the risk of soil erosion and runoff. Currently, none of the streams in the Waimanalo area are classified pristine by the Department of Health.

V. SEWAGE DISPOSAL

A. ...THE DEPARTMENT OF HEALTH HAS A MAP OF THE AREA WHICH SHOWS THAT THE ENTIRE PROJECT AREA IS REGARDED AS NO-PASS.

The document described in your letter is called the Underground Injection Control (UIC) map. The map is used by the Department of Health (DOH) to regulate the use of injection wells. According to DOH, individual cesspools used for the disposal of domestic sewage are exempt from the UIC regulations.

B. DOES THIS PROPOSED PLAN TRULY CONFORM TO THE ORIGINAL INTENT OF THE NO-PASS RULING?

Yes, the proposed plan conforms to the present interpretation of the no-pass designation by the Board of Water Supply.

VI. ARCHAEOLOGICAL SURVEY

A. HOWEVER, WHAT THEY OMIT IS PUZZLING BECAUSE OF THE QUESTIONS THOSE OMISSIONS RAISE.

The survey limits were established with the Historic Preservation section of the Department of Land and Natural Resources. The project area below elevation 250 was not included because of disturbance of that area by past sugar cultivation.

B. ...THE ARCHAEOLOGIST NEVER SAW THE WATSON PROPERTY...

There is a discrepancy in the recorded metes and bounds vs. the actual location of the Watson's property. The existing dirt road is shown in relationship to the recorded metes and bounds of the property.

C. ALSO, DOWNSTREAM FROM THE SITE 1 TERRACES IS A ROCK STRUCTURE OF SOME TYPE ALONG THE STREAM BANKS WHICH MAY BE ANCIENT.

The structure is discussed on page 23 and shown on Figure 4 of the archaeological reconnaissance report. The rock structure is a terraced bank 8 to 10 feet high and 50 feet long. The large size of the boulders and general lack of sorting show mechanical clearing with heavy equipment. This site is almost certainly the result of rock clearing and area grading by heavy equipment. A second rock structure which is located out of the project area will be examined by the archaeologist for historic significance.

VII. WATSON KULEANA

A. THE EIS NEVER ONCE MENTIONS THIS PROPERTY ...

The property is shown on Exhibit III. This property cannot be ignored as the project land survey has shown that the residence is constructed outside the kuleana on State property. The State is investigating several alternatives to rectify the matter.

VIII. EIS AND REALITY

A. ...EIS NEEDS TO INCLUDE THE REALITIES OF PAST SIMILAR PROJECTS IN THE AREA (Phase I AG Park).

The Phase I problems of site clearing and burning will be included in the final document. The agricultural feasibility study considers the soil and slopes of the project area and recommends an orchard crop rather than the truck crops planted in the Phase I Park.

B. WE CAN ONLY ASK WHY THERE SEEMS TO BE SUCH A PUSH TO GET THE PROJECT THROUGH?

Additional farmlots is consistent with State policy. As noted, there are many potential applicants, in particular new and displaced farmers, seeking agricultural land. The benefits from the development and the realistic returns to the State are discussed in detail within the agricultural feasibility analysis for the project. EIS review comments were solicited from agencies with regulatory responsibilities by the Office of Environmental Quality Control and all replies are included in the final report.

Thank you for your review and comments on this document. Your letter and this response will be included in the EIS document.

Sincerely,

MANABU TAGOMORI
Deputy for Water Resource Management

cc: Akinaka & Associates, Ltd.
Dept. of Agriculture, Atten.: Dr. Paul Schwind

HAWAIIAN TEL GTE

Hawaiian Telephone Company
P.O. Box 2200
Honolulu, Hawaii 96841

Telephone (808) 546-4511

April 14, 1988

Akinaka & Associates, Ltd.
250 North Beretania Street
Suite 300
Honolulu, Hawaii 96817-4716

APR 15 1988

Gentlemen:

Supplemental Environmental Impact Statement
(SEIS) for Waimanalo Agriculture Park, Phase II
TMK: 4-1-10: 66,79,80,82,85,86,87,88 & 91

We have reviewed the above-referenced SEIS and have no comments to offer concerning the project's impact on the environment.

However, to insure that GTE Hawaiian Tel facilities do not conflict with the project, please submit construction plans to this office as soon as telephone requirements are identified. This information should be forwarded at the earliest possible date.

Thank you for the opportunity to comment on the project. Should there be any questions, please call Senior Engineer Nils Ito at 834-6245.

Sincerely,

Walter Matsumoto
Oahu Engineering and
Construction Manager

Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-0001

ENV 2-1
JA/G

Brenner Munger, Ph.D., P.E.
Manager
Environmental Department
(808) 548-6880

March 23, 1988

Dr. Marvin T. Miura, Interim Director
Office of Environmental Control
465 South King Street, Rm 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Draft Supplemental Environmental Impact Statement (EIS) for the Waimanalo Agricultural Park Phase II Farm Lot Subdivision Waimanalo, Kuolaupoko District, Oahu

We have reviewed the above draft EIS and have the following comment.

1. The spelling of the HECO substation located near the Waimanalo Reservior, and listed in Exhibit II is incorrect. The correct spelling should be "Aniani".

Sincerely,

Brenner Munger

cc: [redacted]
Akinaka & Associates, Ltd.

PB 88-288

March 21, 1988

Dr. Marvin T. Miura, Interim Director
Office of Environmental Quality Control
465 S. King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Supplemental EIS for
Waimanalo Agricultural Park
Phase II Farm Lot Subdivision

We have reviewed the Supplemental EIS for the Waimanalo Agricultural Park, Phase II Farm Lot Subdivision, and have no comments.

Thank you for the opportunity to review the supplemental EIS.

Very truly yours,

HERBERT K. MURAOKA
Director and Building Superintendent

TH:jo
cc: J. Harada
Akinaka & Assoc. (H. Morita)

ARCHAEOLOGICAL RECONNAISSANCE OF THE MAUKA PORTION OF PHASE II WAIMANALO AGRICULTURAL PARK WAIMANALO, O'AHU

by

Hallett H. Hammatt, Ph.D.
Douglas Borthwick, B.A.

prepared for

AKINAKA AND ASSOCIATES

Cultural Surveys Hawaii
January 1988

ABSTRACT

An archaeological reconnaissance survey was conducted of a 31.4-acre portion of the Phase II Waimanalo Agricultural Park. The survey area was designated at the mauka portion of the proposed park from the 250 foot contour up slope to the Maunawili Ditch (the mauka boundary of the Park). Observations of the existing ground conditions show convincingly that the entire survey area was formerly in cane cultivation and was a portion of field .17 of the Waimanalo Sugar Company (as shown on a 1935 map). There were a number of Land Court Awards abutting the survey area with Native and Foreign Testimonies mentioning abundant taro fields. This area of Waimanalo was once productive taro lands. However, large-scale commercial sugar cultivation erased all remnants of terraces within the project area. There are two surviving terrace complexes mauka of the Maunawili Ditch and both are in good state of preservation. One of these correlates to Land Court Award 2635 to Kahuna nui and is the better preserved of the 2 complexes. Development of the Phase II Waimanalo Agricultural Park will not impact archaeological resources. However, it is recommended that the tenants of Lots 4 and 6 be informed of the presence of archaeological sites above their lots to prevent secondary impact. It is further recommended that these two complexes (Both on state land) be nominated to the State and National Registers.

ACKNOWLEDGMENTS

Field work for this project was conducted by the authors, Mr. Mark Stride and Dr. Robert Factor.

Mr. Henry Morita of Akinaka and Associates provided much useful information and coordination throughout the project. Mr. James Respescio and Mr. Andy Limasa of the Waimanalo Irrigation Office kindly provided access to the survey area through the Maunawili Reservoir. We would also like to thank Mr. Gordon Akita of the Department of Land and Water Development for his assistance. This project was coordinated by Dr. Joyce Bath of the State Historic Preservation Office. Typing services were provided by Ms. Vicki Creed of WindWord Processing and drafting by Mr. Steve Clark. All this assistance is gratefully acknowledged.

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GLOSSARY

Ahu	-heap, pile, collection, mass, altar, shrine; a traplike stone enclosure made by fishermen for fish
Ahupua'a	-a traditional Hawaiian land unit extending from the mountain to the sea
Ali'i	-chief, chiefess, nobility
Archaeological feature	-the discrete remains of post activity preserved in the ground
Historic	-in Hawaii, the period after the landing of (post contact) Captain Cook in 1778.
'ili	-a small land unit, a subdivision of an ahupua'a
in situ	-the place of original deposition
kihapai	-small land division, garden plot
loi	- a wetland taro field
makai	-towards the sea
mauka	-towards the mountains
midden	-faunal and floral remains from archaeological deposits, usually food remains
ohana	-a kin group of extended families
pali	-cliff, precipice, steep hill
volcanic glass	-a structureless cooled lava which occurs naturally in lava flows and was used by Hawaiians as small cutting tools.

I. INTRODUCTION

The project area is shown in Figs. 1-4. The Land Court Awards abutting the survey area, as well as Sugar fields of the Waimanalo Sugar Company, are shown in Fig. 5. Both maps can be compared by locating the Maunawili Ditch where the route has not changed since its construction at or before the turn of this century. Section VI describes the results of the survey with observations on existing land conditions and mention of site complexes mauka of the survey area. Section VII provides a summary and is most useful for planning purposes.

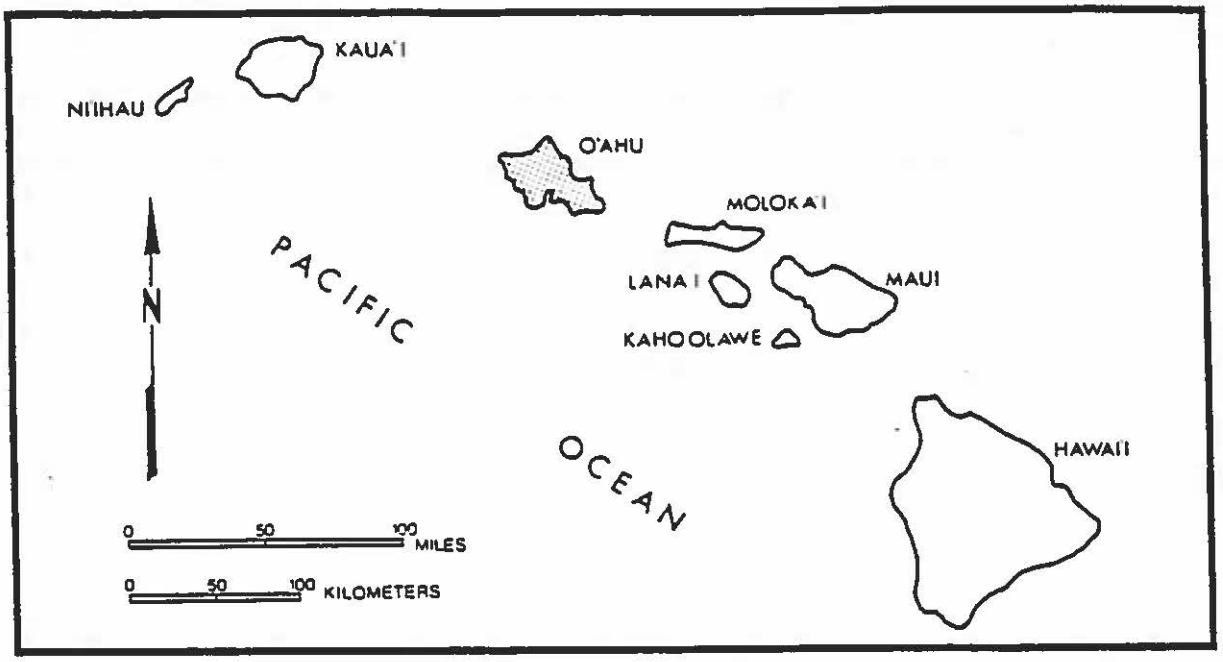

Fig. 1. State of Hawai'i

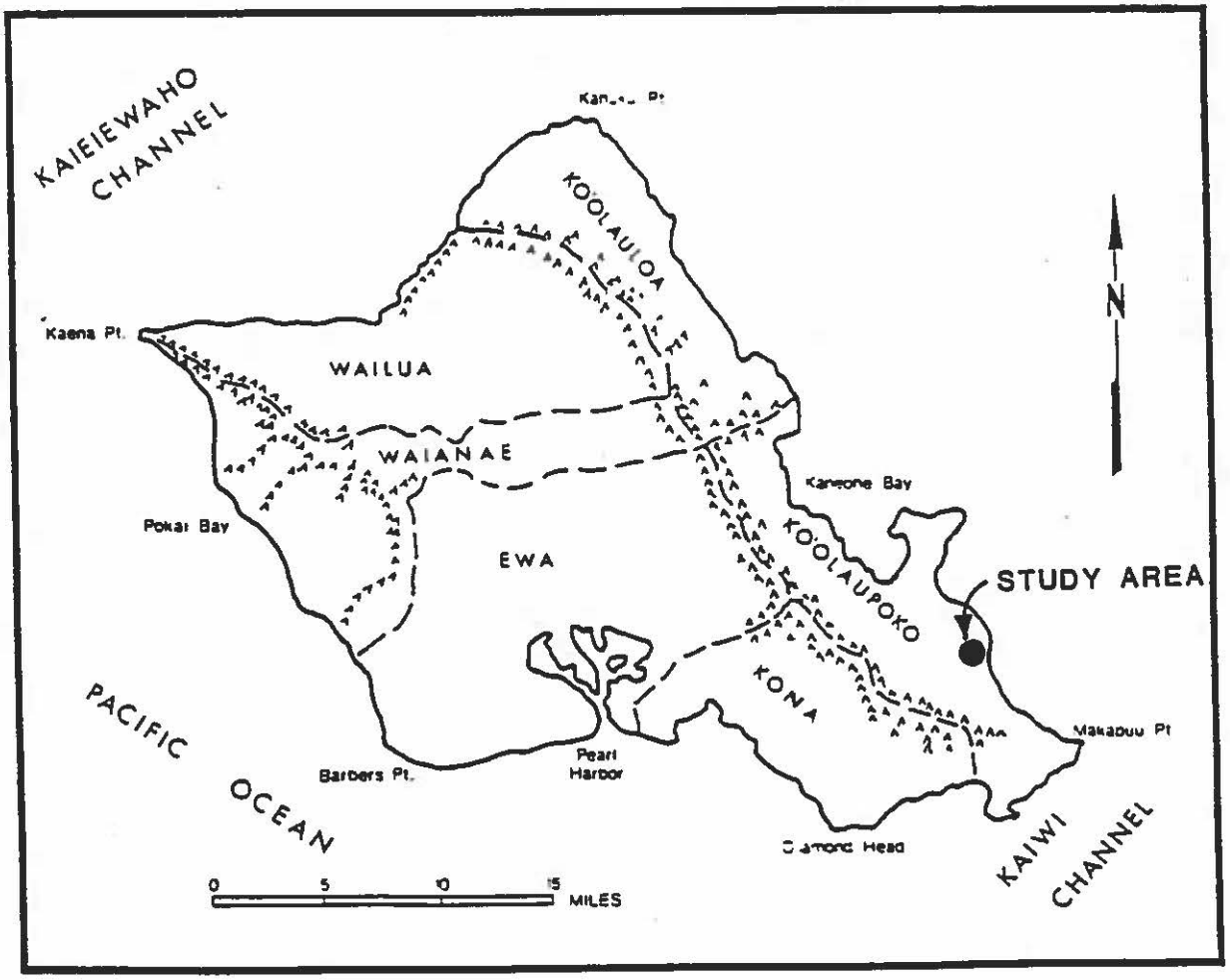

Fig. 2. General Location Map, O'ahu Island.

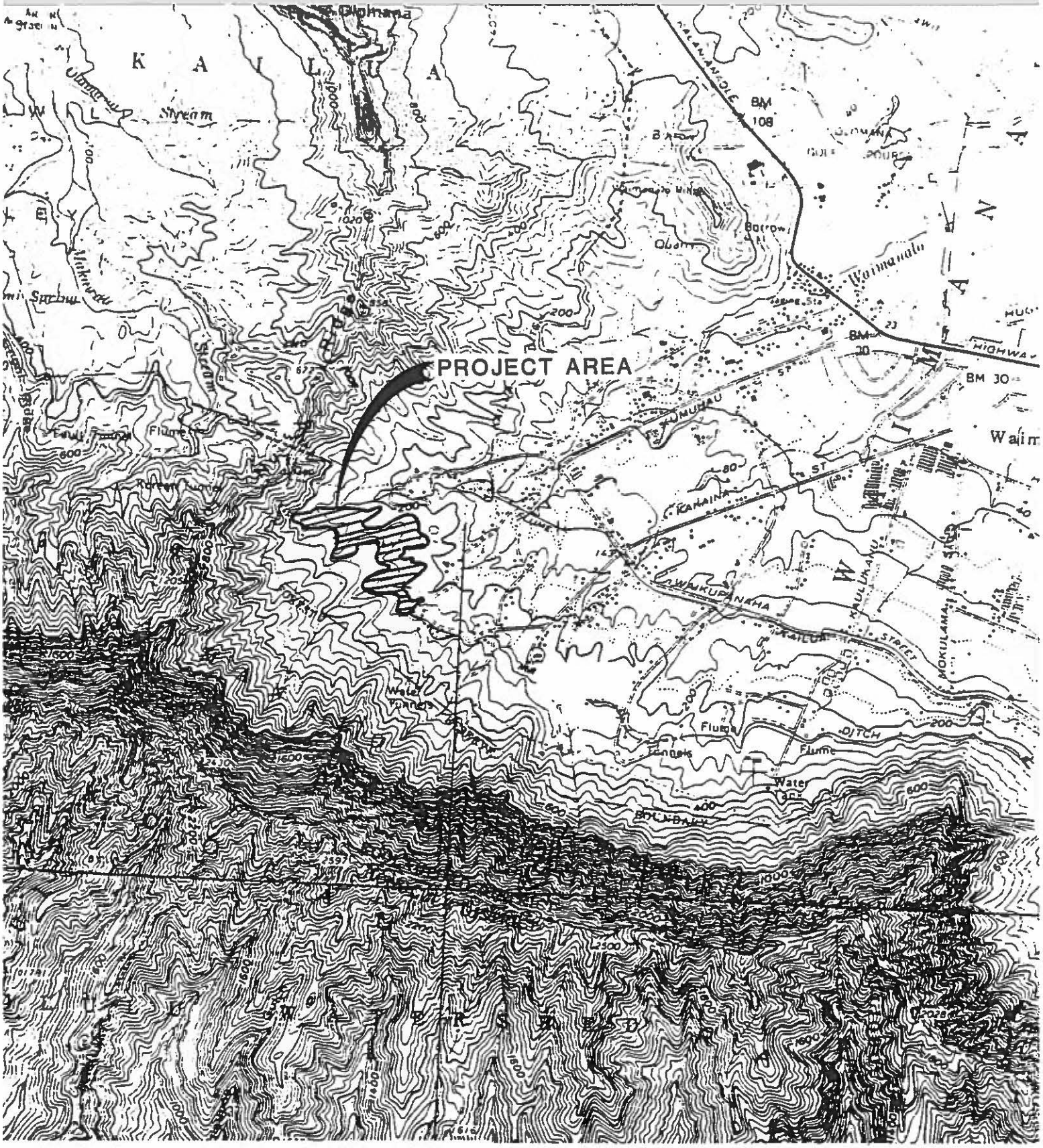

Figure 3. U.S.G.S. Koko Head Quadrangle Map Showing Project Area

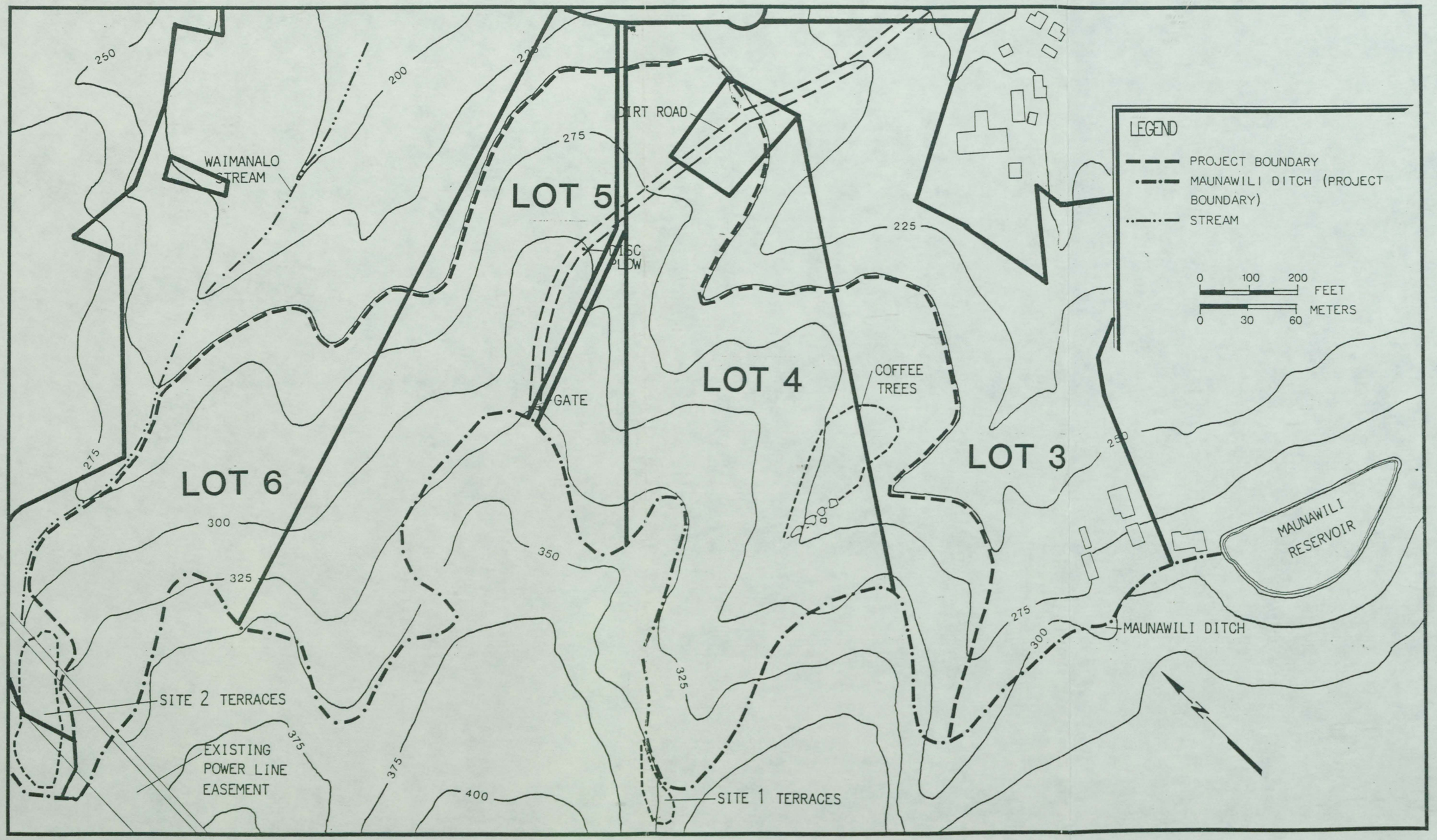

Fig 4. Waimanalo Agricultural Park, Phase II, Showing Archaeological Survey Area.

II. SCOPE OF WORK AND FIELD METHODS

A. Scope of Work

This reconnaissance survey was conducted at the request of Akinaka and Associates for the purpose of locating, describing and evaluating the significance of archaeological sites in the mauka area of the proposed Phase II Waimanalo Agricultural Park. This information would be compiled to make an assessment of impact of the proposed development on archaeological resources. The scope of the project was to include the following:

1. a complete surface survey of a 31.4-acre parcel comprising the mauka portion of the proposed Park Development;
2. a Map of the study area showing the location of all sites;
3. detailed descriptions of all sites in the project area with scale drawings and selected photographs;
4. historical and archaeological background on the specific area and the ahupua'a;
5. a summary with discussion of site functions, significance evaluations, assessment of impact and recommendations.

The makai area of the Phase II Agricultural Park including proposed lots 1, 2, and 3 have been heavily impacted by modern residential and agricultural activities. Archaeological features would have been destroyed by these activities. However, because the mauka portions of proposed lots 4-7 are not under cultivation

and are adjacent to Waimanalo Stream and its tributaries there was a definite possibility of locating archaeological remains, particularly ancient agricultural terraces. This possibility was reinforced by the presence of ancient taro terraces in an unnamed tributary of Waimanalo Stream along the base of the pali, less than 1/2 mile southeast of the present project area. (National Register of Historic Places site 50-80-15-516.) In the Hawaii Inventory Site Form other terraces are reported to extend makai of those recorded on the register form. Thus, special attention was given to the narrow tributary flood plains during the field survey.

B. Description of the Survey Area

The 31.4-acre survey area (Fig. 4) is bounded by the Maunawili Irrigation Ditch on the mauka (southwest) side and the 250-foot contour line on the makai (northeast) side. The project area extends from the main branch of Waimanalo Stream on the northwest side to the houselots adjacent to Maunawili Reservoir.

Except for some open farm lots and pasture land in the makai portion, the entire area is forested. Guava (Psidium guajava) and Java Plum (Eugenia sp.) and in some areas, particularly steep slopes Eucalyptus (Eucalyptus sp.)and Ironwood (Casuarina sp.) trees grow to great heights. The understory varies from various species of ginger (Hedychium sp.) and Job's Tears (Coix lacryma-jobi) in wet lowlands to Koa Haole (Leucaena glauca) and strawberry guava (Psidium cattleianum) on well-drained slopes and ridges. Ti (Cordyline terminalis) and wild taro (Colocasia

esculenta) appear along wet banks and slopes. In one flat area in the southern portion of the study area, stands of coffee trees (Coffea sp.) probably indicate former cultivation.

The majority of the land is steeply dissected by tributary gullies of Waimanalo Stream. Two of these gullies are carrying water and appear to be perennial. They are separated by smaller soil-filled gullies and fairly steep ridges.

C. Field Methods

Field survey was accomplished during the week of December 21 with entry to the property gained from the end of the Maunawili Reservoir access road. Four archaeologists were spaced from 50 to 100 feet apart depending on vegetation and proceeded northwest parallel and on the makai side of the Maunawili Ditch. The survey extended mauka of the Ditch upstream along both perennial streams to confirm the presence of ancient terraces and to make comparisons of land conditions both mauka and makai of the Ditch.

III. NATURAL SETTING

The project area is located on the Windward side of the Island of O'ahu, in the District of Ko'olaupoko within the Ahupua'a of Waimanalo. Waimanalo is a broad amphitheater-shaped valley in the "late mature to old Age" stage of erosional development (MacDonald and Abbott). The elevation ranges from 250 to 350 feet (AMSL) putting the project area at the interface between the "Koolau Cliff and Valley and Waimanalo Plain" physiographic types (Armstrong, et al. 1973). Waimanalo Stream, which is the western boundary of the property, is a perennial fresh-water stream. Rainfall is relatively high, averaging between 50 and 75 inches per year (Armstrong, et al. 1973). The soils within the project area fall under the general term ultisols, which develop on "old geomorphic surfaces" and are "on steeper slopes and the more unstable landscape of the higher elevations." (Armstrong, et al. 1973:41). The specific soil association is mainly lolekaa silty clay (LoE 25 to 40% slope and LoD 15 to 25% slope). This type of soil is described as "deep, nearly level to very steep, well-drained with dominantly fine textured subsoils, on fans, terraces, and uplands, adjacent to the Koolau Ridge with runoff medium to rapid and erosion hazard moderate to severe" (Foote, et al. 1972). Vegetation is dominated by exotic (introduced) species which are listed in the description of the survey area portion of this report.

IV. HISTORIC SETTING

A. Introduction

A number of historical sketches of the Waimanalo area have been done, notably, the mythological and archaeological material on Waimanalo found in Sites of O'ahu (Sterling and Summers, 1978), "A General Plan for Waimanalo Valley, Island of Oahu (Harold Bartholomew and Associates, 1959), and the "Historical Documentary Research" of Waimanalo with specific reference(s) to Bellows Air Force Station by Carol L. Silva (in Rosendahl, ARA-20-020781, 1981). The following brief synopsis owes much to these works and credit must be given the authors for the bulk of the research.

Waimanalo "potable water" (Pukui, et al. 225:1974) is a large Ahupua'a located in the district of Ko'olaupoko, O'ahu. Ahupua'a refers to the traditional land divisions that were basic units of social, economic, and political life in pre-contact Hawaii. "Ideally an Ahupua'a land section stretched in a wedge from its apex at a mountain top to its base in the sea, thereby including within its boundaries all environments necessary for a self-sustaining community. Again, ideally the inhabitants of an Ahupua'a were related by blood and through children and could claim some degree of relationship to the chiefly family to whom the Ahupua'a had originally been assigned." (D. Barrere, 1970:3).

Mythological and early historical references about Waimanalo attest to the importance of the area during traditional Hawaiian

times. Archaeological work along the shoreline of Waimanalo (Bellows Air Force Station) has detailed some of the earliest known sites in the Hawaiian Islands. Site 50-80-15-18 (018 Dune Site), which is situated at the present mouth of Waimanalo Stream, has an early date of circa A.D. 400 and is included on the National Register of Historic Places (as part of site 50-80-15-511). However, the focus of this present research is generally the mauka (inland) portion of Waimanalo with specific references to the upper portion of Waimanalo Stream.

B. Traditional Accounts

The traditional accounts infer some generally recurring themes about Waimanalo. The themes include the scarcity of water except for small springs and Waimanalo or Puha Stream, the abundance of food crops along Puha Stream, and the good fishing resources of the ocean fronting Waimanalo. Also the somewhat isolated nature of Waimanalo, especially in terms of land routes, but with the sandy beach frontage allowing access by sea.

An example of the mythological references to Waimanalo, from the Pele and Hi'iaka epic states: "As they traveled on, Makapu'u and its neighbor hills passed out of sight. Arriving at Ka-ala-pueo, they caught view of the desolate hill Pohaku-loa, faint, famished, forlorn ....

It is indeed a barren land. Fish is the only food it produces. Our vegetables come from Wai-manalo. When the people of the district bring down bundles of food we barter for it our fish" (Emerson 1915:89 from Silva 1981:A-14). Another myth

includes references to the surf of Waimanalo in which two lovers swim till they are out of sight of land and eventually land on Moloka'i.

Late pre-historic and early historic accounts also give evidence of who controlled Waimanalo. "When King Kahekili of Maui heard of the death of the priest Kaopulupulu by Kahahana (a chief appointed by Kahekili to govern Oahu), he sent some of his men thither by canoe, who landed at Waimanalo, Koolau, where as spies, they learned from the people respecting Kaopulupulu and his death, with that of his son; therefore they returned and told the King the truth of these reports, at which the affection of Kahekili welled up for the dead priest, and he condemned the King he had established. Coming with an army from Maui, he landed at Waikiki without meeting Kahahana, and took back the government of Oahu under his own kingship. The chiefs and people of Oahu all joined under Kahekili for Kahahana had been a chief of wrong-doing... (Thrum 1904:212-3; in Silva 1981:A-15). Samuel Kamakau in 1875 related "The Ahupua'a of Waimanalo, including the fish-pond at Maunalua and the travelling uhu of Makapu'u belonged to Maui-mua (First Maui), (Kuokoa Nov. 27, 1875; in Sterling and Summers 1973:244).

During Kamehameha's conquest of O'ahu part of his fleet landed near Makapu'u and then joined with Kamehameha's other forces, finally conquering O'ahu. Prior to the invasion, Kamehameha sent a messenger to Kahekili; "Ki'Kane, Kamehameha's messenger to Kahekili, threw down two maika stones, this stone (the

white) brings life through farming and fishing, rearing men, and providing them with food; this other stone (the black) brings war. Let the reader ponder the meaning of this answer. Kahekili asked, Is Kamehameha coming to O'ahu to fight? 'Yes' answered Ki-Kane. What harbor will he choose? It was Kiko'o's counsel to make Waimanalo the harbor and battle site. 'It is too low there to cast sling stones to reach the heights. It is good only for food and fish..." (Kamakau 1961:250; in Silva 1981 A-16).

After Kamehameha's conquest of O'ahu and his apportionment of the island, among his chiefs, Waimanalo apparently was retained as his personal property. This seems to be the case as in 1845, when Kamehameha III, Kauikeaouli, who had "inherited" the land, as a son of Kamehameha I, claims the Ahupua'a of Waimanalo "to be the private lands of his Majesty Kamehameha III, to have and to hold to himself, his heirs and successors, forever; and said lands shall be regulated and disposed of according to his Royal will and pleasure, subject only to the rights of tenants" (Com. of Public Lands, 1929:28).

C. Early Historic Accounts

Two early foreign visitors, both missionaries were generally unimpressed with Waimanalo, however, their descriptions are of interest. Levi Chamberlain in 1828 comments on Waimanalo being a "considerable settlement" and while there, stayed in a native house," a miserable place for the abode of human beings and presented a motley group of children and women, dogs, hogs and fowls (Chamberlain 1857:80-1, in Silva 1981:A-20). In 1830 Edwin

Hall writes, "we could not however, but notice, that most of the inhabitants on the eastern end of the island were much more degraded, and exhibited far less evidence of improvement than any we saw on other parts of the island; a fact calling for our sympathy and pity, and for our endeavors to enlighten and elevate them" (Hall 1939:111; in Silva 1981:A-21).

The 1840's and early 1850's were a time of major change for all Hawaii, including Waimanalo. It was during this period that the Great Mahele took place. Traditional land use rights of the Hawaiians were replaced by private land ownership. As mentioned earlier, Kamehameha III claimed virtually the entire Ahupua'a of Waimanalo as his. Individual land holdings (Kuleanas) were registered to native farmers. The greatest number of these were along the banks of Waimanalo Stream (Fig. 5). The kuleanas within or abutting the project area include:

LCA #	Awarder	Description
2635	Kahunanui	8 taro patches
5390	Hikalani	25 taro patches and house lot
7089	Kaiwinui	13 taro patches
7088	Kahopuna	9 taro patches
234T	Wahinemaikai	72 taro patches and a house lot
2645	Paumano	5 taro patches and a house lot
235C	Kaanana	17 taro patches and a house lot
235D	Kuahili	8 taro patches and 2 house lots

The information for the descriptions was extracted from the native and foreign registers and testimonies which are available at the Hawaii State Archives. Other pertinent information gleaned from these sources indicate that there were two separate "ili" or land divisions encompassed within the project area. The eastern portion of the project area was within the 'ili of Mooiki

Figure 5 Circa 1935. Map of the Waimanalo Sugar Company Showing Field 17 and Land Court Awards

with the western portion, being the 'ili of Ohea. A number of claimants related that they received their lands" in the time of Kinau." Kinau was a daughter of Kamehameha I, half-sister to Kamehameha II and III and was "Kuhina-nui" from 1832 to 1839 as well as governor of O'ahu. Though Kamehameha III (Kauikeaouli) was ruler during this period Kinau was very influential. "A reconciliation was affected between the King (Kauikeaouli) and Kinau, and from about the beginning of 1835, the King left the responsibility of government very largely in her hands" (Kuykendall 1947:136).

The native and foreign testimonies indicate that this portion of Waimanalo had well-developed and functioning lo'i (ponded taro patches) around 1850. Though Waimanalo Stream was by far the most important water source, other "creeks" fed by mountain runoff and/or springs were also utilized. The references to obtaining these kuleanas "in the time of Kinau" (ca. 1832-1839) may suggest an intensification of cultivation in the post-Kamehameha I era and/or the degree of control she wielded as governor of O'ahu and Kuhina Nui of the Hawaiian Kingdom.

D. Ranching Period

In 1850 Kamehameha III leases the entire Ahupua'a Waimanalo (except for the Kuleanas) to an Englishman Thomas Cummins. The original deed is dated Feb. 12, 1850 and was for a period of 50 years for 6,970 acres at $350.00 per annum. However, there was confusion over land title. Kamehameha IV, Alexander Liholiho, "deeded" Waimanalo to a Wm. Webster in 1855 for $1. Wm. Webster

mortgaged the land for some $2,000 with the mortgage being released in 1857. The same thing happened again in 1857 with the mortgage clearing by April 1858. These deeds and mortgages did not actually cause the control of lands to change as Thomas Cummins retained his lease, but they apparently served as security for loans made to Alexander Liholiho.

Thomas Cummins and his son John A. Cummins turned Waimanalo into a large cattle and horse ranch. The Cummins Estate was known for its lavish parties; "Cummins was also host to American and British officers on warships visiting in Hawaiian waters. The Kamehamehas, King Kalakaua and Queen Liliuokalani all made this part of the island their home, and they spent a great part of their time at the Cummins Estate" (Star Bulletin 6/22/1935:9; in Silva 1981:A-22). However, it appears as if not all were enthusiastic about the cattle ranching.

> At the time, it seemed that the valley was filled with breadfruit, mountain apples, kukui and coconut trees. There were taro patches, with banks covered with ti and wauke plants. Grass houses occupied the dry lands, a hundred of them here and sweet potatoes and sugar cane were much grown. It was a great help toward their livlihood.... The whole Ahupua'a of Waimanalo was leased to white men except the native kuleanas and because the cattle wandered over them, they were compelled to build fences for protection. The taro patches that were neatly built in the time when chiefs ruled over the people and the land, were broken up. The sugar cane, ti and wauke plants were destroyed. The big trees that grew in those days, died because the roots could not get moisture. The valley became a place for animals (Kuokoa, Oct. 26, 1906; in Sterling and Summers 1973:244).

E. The Waimanalo Sugar Company

The Cummins Estate eventually began to buy up the kuleanas of the native farmers, gaining some 200 acres in fee. By the early 1870's Chinese rice farmers were using some of these lands under agreement with John A. Cummins. In 1876 the Hawaiian Kingdom entered into a Reciprocity Treaty with the United States. This allowed the growing Hawaiian sugar industry a free market and the potential for great profits. One of the Chinese rice farmers, Tai Lee, began sugar cultivation on Cummins' land. Eventually Tai Lee and other Chinese farmers cultivated up to 1,200 acres of cane in Waimanalo.

John A. Cummins saw the potential and in 1880 started construction of a sugar mill. In 1890, J.A. Cummins renegotiates his father's lease for an additional 30 years and "sub-lets the lands of Waimanalo to the Waimanalo Sugar Company (W.S.C.) which he then controlled" (Bartholomew and Ass., 1959:14). The plantation continued to buy sugar from the Chinese farmers until around 1900, when W.S.C. did most of its own cultivating.

During this time, sugar and most goods were transported between Honolulu and Waimanalo by steamer. The Cummins Estate was still renowned for its extravagant hospitality. Lavish week-long luaus were given for Hawaiian Royalty. King Kalakaua came and rode on the newly built railroad in 1882 and in 1885 Cummins was host in celebrating Queen Kapiolani's birthday.

Waimanalo Sugar Co. continued growing and was doing good business. More lands were being put under cultivation. New

tracks were being laid and another locomotive was ordered. Interest in W.S.C. grew, and in 1885 W.G. Irwin of the W.G. Irwin & Co., agents for W.S.C. gain control with J.A. Cummins staying on as overseer. In 1894 J.A. Cummins sells the majority of shares in W.S.C. to two California men and a Kohala sugar planter Robt. R. Hind, with George Chalmers taking over duties as plantation manager. J.A. Cummins died in 1913 and his estate sold the remaining fee simple lands and the unexpired lease of Waimanalo to W.S.C. for $52,000.

Water was a continuous problem for most sugar companies, including Waimanalo. Irrigation for W.S.C. was dependent on three ditch and tunnel systems. The Maunawili Ditch and Tunnel is the uppermost system and is the mauka project boundary for this present study. It is unclear when this ditch system was built, but water from Maunawili was used in Waimanalo as early as 1878. "Water sources in upper Maunawili Valley were first utilized prior to 1878 and have remained the basic supply for Waimanalo since that time" (Bartholomew and Ass. 1959:53). Maunawili Ditch does appear on a 1911 map (Carol Wilcox), but its present course and construction style probably relate more specifically to major reconstruction undertaken in the 1930's. This was done under the managership of W.S.C. by George Bennett. "During the last five years (i.e. prior to 1940) Mr. Bennett has rebuilt all the old flumes which bring the Maunawili water to the fields using redwood, good for 15 years or more; concreted the open ditches; and has replaced the old wooden pipes with concrete

siphons" (Conde and Best 1973:367). The rebuilding of the water system was part of a general modernization in the 1930's which continued a trend which began in the 1920's, with the construction of a new mill. Other facets of modernization included mechanized land clearing and the opening of Pali Road in 1924 with improvements in the 1930's which also saw the opening of the Kokohead to Waimanalo Road. The paved roads to Honolulu ended the need to ship sugar and molasses to the Honolulu Plantation Refinery by steamer. The mechanized land preparation enabled more land to be cleared in a shorter amount of time. The Hawaii Sugar Manual of 1931 stated: Mechanical power has been substituted almost entirely for mules in soil preparation, but have 32 mules on the property using them for plowing odd corners and steep hillsides... (in Conde and Best 1973:366).

In 1910 W.G. Irwin and Co. merged with C. Brewer and C. Brewer controlled W.S.C. till liquidation in 1947.

The acquisition of the Bellows area, which was part of the original Cummins lease, began in 1916 and is well-documented elsewhere.

F. Summary

Traditional Hawaiian accounts indicate that the Waimanalo area and specifically the area associated with Waimanalo or Puha Stream was agriculturally very productive. The Mahele records of the 1850's also indicate much taro was still being grown within the project area at that time. However, with the lease of Waimanalo to the Cummins family in 1850, rapid change not only of

land tenure, but also to the landscape takes place. Taro patches, fruit trees, and other gardens give way to pasture land and rice fields. By the 1880's pasture land is being replaced by cultivated sugar cane, first grown by Chinese rice farmers. The early 1900's see an expansion of the Waimanalo Sugar Co., including water resource procurement from Maunawili Valley and Kawainui Marsh.

Waimanalo Sugar Co. eventually had some 2,600 acres under mechanized cultivation with the present project area within the most mauka portions of fields No. 17 and 19. C. Brewer and Co., which gained control of W.S.C. in 1910, liquidated in 1947, ending nearly 70 years of sugar cultivation. Since the lands within the project area were leased government lands, they reverted first to the Territory of Hawaii and are now under State of Hawaii jurisdiction.

V. PREVIOUS ARCHAEOLOGICAL RESEARCH

There has been no previous archaeological research for this specific survey area. The closest reported archaeological remains are the "Taro Terraces (Hawaii Site 50-80-15-516) described in the National Register Nomination Form, dated 1972 and located adjacent to the Forest Reserve to the east of the present survey area.

Waimanalo, in general, is distinguished as being the place of one of the earliest archaeological investigations in the Hawaiian Islands. In 1879 Mr. Otto Finsch reported on human burials in sand deposits and associated artifacts in an area which is now Bellows Air Force Base (Finsch 1879).

McAllister, in his 1930's Survey of the Island of Oahu, reports two sites in this area of mauka Waimanalo (McAllister 1933:191). Both of these sites are heiau. Site 381 is located on the slope below Mr. Olomana to the northwest of the Agricultural Park. This heiau was reported to be 250 feet long and 130 feet wide, but its present condition is not known. Site 381 is referred to by the name of the place - Pohakunui - and is 90 feet lang and 50 feet wide (Ibid.:191). The structure stands on a hill near the top of Mahailua Road and has been visited by both authors and is still in a good state of preservation. The structure is on state land approximately one mile south of the Agricultural Park. It is of special interest to note that McAllister makes no mention of taro terraces in his 1930's survey. This would indicate that at this time taro cultivation had long been

abandoned and the lo'i that survived were overgrown by forest.

With the exception of these early surveys, the major focus in archaeological research in Waimanalo has been the Bellows area.

Bellows Air force Station is one of the most extensively studied areas on O'ahu. Beginning in the 1960's, over 30 separate reconnaissance, survey, excavation and monitoring projects have taken place, most in conjunction with construction activity. A partial list of these projects is provided in Rosendahl (1981:16) and again in Leidemann and Cleghorn (1983:7). Human burials, lithic scatters, soil features and/or occupation layers have been found almost everywhere archaeological investigation has taken place. Possibly, the most important finds occurred in dune deposits adjacent to the mouth of Waimanalo Stream. these dune deposits referred to as Site 018 yielded archaeological materials which are still considered to be among the oldest in Hawaii (Pearson et al. 1972, Cordy and Tuggle, 1976 and Kirch, 1985:71). Radiocarbon dates on charcoal from cultural layers within the dune would place the earliest occupation to around 300-400 C14 years A.D. (Tuggle et al. 1978). Much of the research since this discovery of early Bellows Dune occupation has focussed on attempting to connect other archaeological finds in more inland areas of Bellows to this early Polynesian settlement.

VI. RECONNAISSANCE SURVEY RESULTS

A. The Survey Area

The entire 31.4-acre project area was covered on foot by 4 archaeologists. Visibility of the ground surface was good due to the fairly dense tree canopy. As mentioned previously, gulch areas and stream valleys were given special attention due to the possibility of locating agricultural terraces and associated occupation sites.

No prehistoric archaeological features were observed. The existing ground conditions show overwhelming evidence of former sugar cane cultivation (and coffee plantings in one small plot) with dramatic modification of the land surface in all areas except the steepest slopes. This evidence is summarized as follows:

1. Flat areas in gullies and stream valleys, as well as gently sloping ridges are generally free of rock scatters and whatever traditional terracing for taro cultivation which was present before plantation agriculture was graded away for sugar fields. In contrast, the landscape above the Ditch is rocky and shows no mechanical modification.
2. In one specific case, a small flood plain had been graded with all the boulders piled adjacent to the stream to form a 8 to 10 foot high and 50 foot long terraced bank. The large size of the boulders and general lack of sorting show mechanical clearing with

heavy equipment. The flat land retained by this terrace has a fairly thick planting of coffee trees (Fig. 4). The terrace itself is certainly the result of mechanical clearing by the sugar company. However, the coffee trees may be related to LCA 235C to Ka'anana (Fig. 5). This testimony for this mentions 17 lo'i and 1 house lot. Coffee planting may have been a later activity.

3. There are two specific areas where well-constructed traditional Hawaiian wetland agricultural terraces occur upslope from the Maunawili Ditch. Since this Ditch defines the mauka limit of the survey project these archaeological sites are outside of the study area. However, the makai boundary of both of these terrace complexes is the Ditch itself. There is every indication that these features once extended downslope through the narrow level land adjacent to the streams, but were entirely removed by large-scale sugar planting in the late 19th Century.

4. Explicit evidence of sugar cultivation is present in the form of a large disc plow which lies abandoned next to a dirt road in the center of the survey area (Figs. 6, 7). This implement is far too large to have been horse drawn and must have been dragged by a steam or diesel tractor.

5. In many slope and ridge areas there are mature Eucalyptus trees (Eucalyptus sp.) which appear to have been

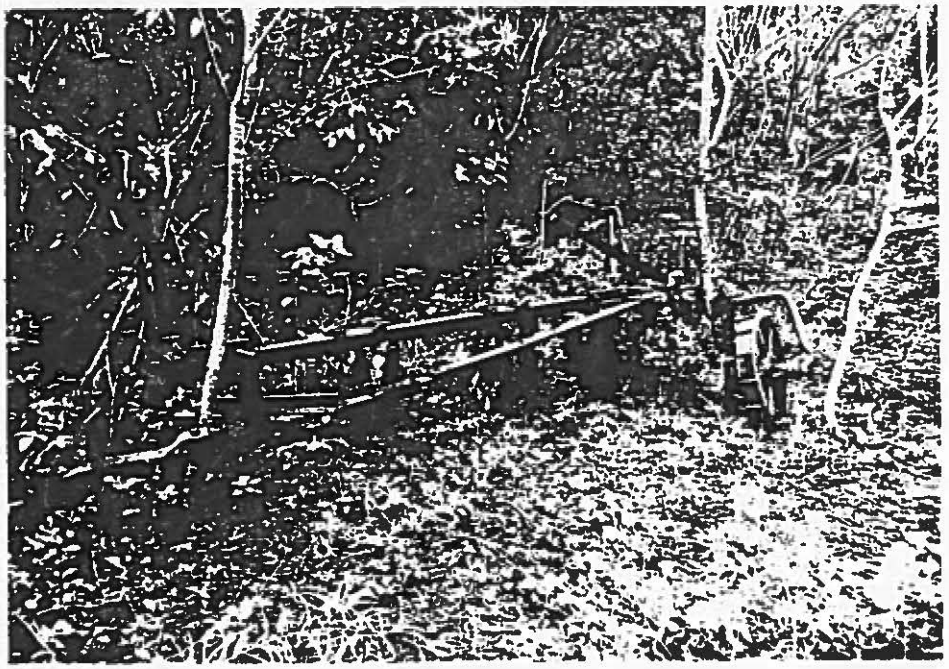

Figure 6 Large Abandoned Disc Plow for Sugar Cultivation.

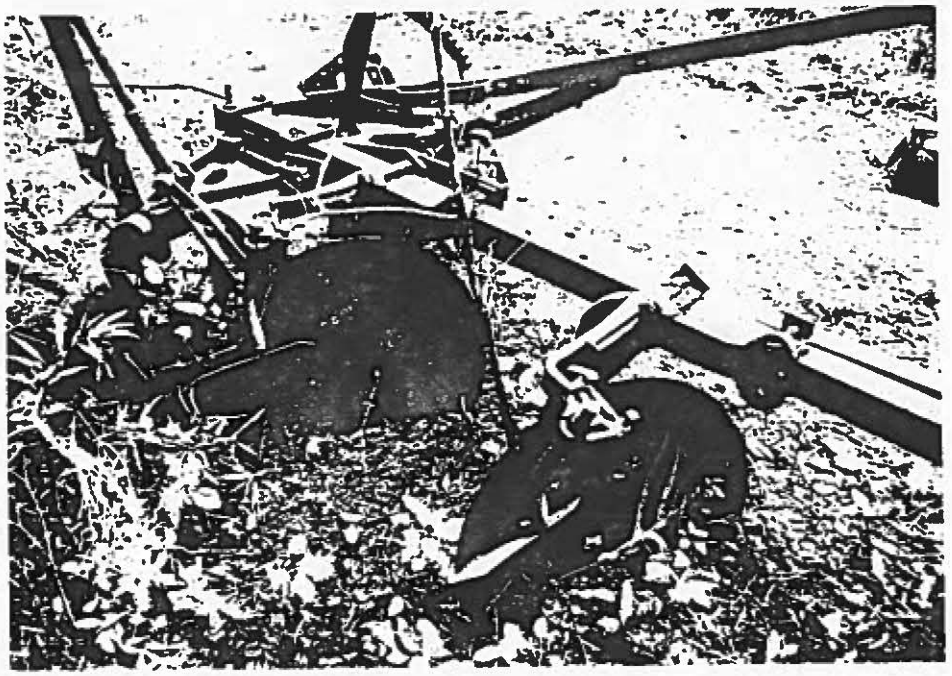

Figure 7 Close-up of Disc Plow for Sugar Cultivation.

planted in a linear pattern, indicating planned reforestation, since the closing of the Waimanalo Sugar Company in 1947. The Eucalyptus and other mature trees could easily have reached their present height in the last 40 years.

6. Finally, a 1935 Waimanalo sugar Company map of a portion of Waimanalo shows both Land Court Awards and specific fields. The present survey area is entirely within field number 17, whose mauka boundary is the Maunawili Ditch (Fig. 5).

B. Archaeological Sites Mauka of the Project Area.

As mentioned, there are two well-defined wetland agricultural complexes (lo'i) directly mauka of the project area. Their location is shown on Figure 4. Because they are only indirectly relevant to the present survey and are outside the proposed Waimanalo Park, they have been assigned temporary field numbers, and are not described in detail.

1. Site 1

This site is a complex of wetland agricultural terraces on the west bank of a small tributary stream at and above the 350 foot contour. At this point the stream is channelled over the Maunawili Ditch by a concrete spillway. Following the stream valley mauka are multiple terrace walls, defining small lo'i, averaging 20 to 60 feet in length. Generally, the terrace walls are perpendicular to the stream flow and are 2-3 feet high (Fig.

8). The walls are of well-sorted small to medium boulders and are in fair condition. there are some wall sections collapsed by stream flooding. No associated habitation sites were observed. This lo'i complex does not correspond to a known 19th Century Land Court Award. It lies in the area between circled numbers 6 and 5 on the 1935 map (Fig. 5) and there are no kuleana plots in this area. The lo'i are generally smaller and in poorer condition than those of the second site, which may indicate that they were abandoned earlier.

2. Site 2

This site is located at and above the 360 foot contour mauka of the Maunawili Ditch and off the extreme northwest corner of the survey area (Fig 4). It consists of multiple terrace or lo'i walls which extend upwards along both sides of Waimanalo Stream, as well as into at least one tributary entering the main stream from the west. The walls are well-sorted small to medium boulders reaching heights of 4-5 feet and are in excellent condition (Figs9,10). Thick underbrush hampered full view of the complex. No associated habitation sites were observed. Careful observation of the level land along the stream makai of the Maunawili Ditch showed no terraces extending into the project area, although the land is highly suitable for wetland irrigation. There are plentiful feral taro plants (Colocasia esculenta) in waterlogged areas both above and below the Ditch. The excellent condition of the walls may indicate the use of the lo'i until late in the 19th Century or early 20th Century.

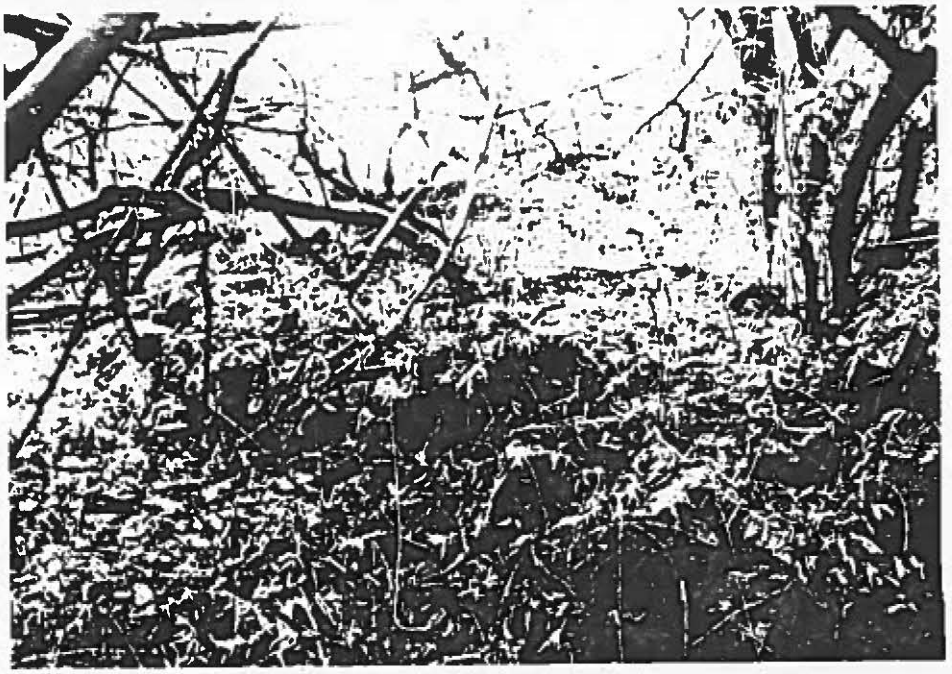

Figure 8 Site 1. Terrace Wall, View Mauka.

Figure 9. Site 2. Terrace Wall 4-5 feet high, View Mauka

The location of these lo'i correspond exactly to LCA 2635 (Fig. 5) to Kahunanui for which 8 lo'i are listed.

C. The Maunawili Ditch

The Maunawili ditch system itself has a definite historical interest as an illustration of water engineering associated with the sugar industry in Hawaii. This ditch system is one of three which carried water to the Waimanalo fields and is in active use today. It is at the highest elevation of the three systems and carries water through a ditch tunnel from Maunawili Valley at least 4 miles into upper Waimanalo Valley. There are a number of earthen tunnels cutting through ridges and wooden flumes carry water over gullies. Generally, the Ditch runs along slopes with a simple bank and ditch construction (Fig. 11) with occasional dressed and mortared rock lining. One of the ongoing problems, of this Ditch system, was illustrated during the present survey which took place after heavy December rains. Many of the flumes were broken by water flowing down gullies and banks were eroded by excess runoff. The problem is particularly severe where the Ditch crosses Waimanalo Stream and various tributaries to the east.

The Maunawili ditch system is shown on a 1911 map, but may considerably predate this time, as water for sugar irrigation was being taken from Maunawili Valley as early as 1878. Major repairs of the Ditch were undertaken in the 1920's and 1930's (Bartholomew and Associates 1959:53). It is certainly not the oldest or longest sugar ditch in Hawaii, but it may be one of the

Figure 10 Site 2 Terrace Wall 2-3 Feet High. View Mauka

Figure 11 Maunawili Ditch Showing Earthen Construction

few still operating and is maintained at or near its original design.

VII. SUMMARY AND RECOMMENDATIONS

Although there is only one Land Court Award which extends into the present survey area (LCA 2635) (Fig. 5) there are many LCA parcels which abut the survey area to the north and east. All of these kuleanas were associated with wetland taro cultivation and give a clear picture that all flowing streams supported traditional agriculture up to the middle of the 19th Century. However, all physical remains of taro cultivation were destroyed first by cattle grazing and then by large-scale commercial sugar planting of the Waimanalo Sugar Company. The present condition of the landscape is dominated by the dramatic changes associated with plantation agriculture.

No prehistoric or historic period archaeological sites were located within the survey area and therefore, development of Phase II of the Waimanalo Agricultural Park will have no direct impact on archaeological resources.

There is, however, a potential or indirect impact on two prehistoric taro terrace complexes which lie immediately mauka of the project area (Fig. 4). These two complexes are significant archaeological resources in that they represent the only surviving remnants of one of Windward O'ahu's smallest taro growing areas. These lo'i must have been important to Waimanalo Ahupua'a as a whole and to the rest of the generally dry southeastern portion of the Island.

Two simple steps could be taken to preserve these sites, which are as follows:

1. Inform the tenants of proposed Agricultural Lots 4 and 6 of the existence of these sites mauka of the Mauna-wili Ditch and permit no land modification in these areas (There may be more terraces mauka of lot 5, however, the terrain is too steep to allow easy access).

2. Since the two site areas are on state land, it would be an easy process to nominate both complexes to the State and National Registers as was done with the terraces recorded to the east of the project area (State Site 50-80-15-516). This action would ensure future protection of the sites.

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