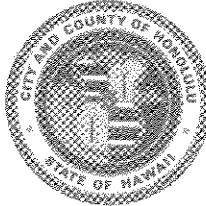


DEPARTMENT OF GENERAL PLANNING  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET  
HONOLULU, HAWAII 96813



FRANK F. FASI  
MAYOR

DONALD A. CLEGG  
CHIEF PLANNING OFFICER

1988 MAY 5 10 23 39  
GENE CONNELL  
DEPUTY CHIEF PLANNING OFFICER

RH/DGP 4/88-1578  
88/W-1

May 2, 1988

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

Dear Dr. Miura:

Final Environmental Impact Statement (FEIS)  
Maili Kai Property  
Tax Map Key 8-7-10: 02 and 14

We have determined that the above is an acceptable Final Environmental Impact Statement for the proposed project. This determination in no way implies a favorable recommendation on the applicant's request for any approvals or permits required by the Department of General Planning for this project.

There are a number of concerns that must be addressed which are included in the acceptance report which is attached.

If there are any questions, please contact Randy Hara of my staff at 523-4483.

Sincerely,

*Donald A. Clegg*  
DONALD A. CLEGG  
Chief Planning Officer

Attach.

cc: Mr. Frank Brandt, PBR Hawaii  
Department of Land Utilization

ACCEPTANCE REPORT: CHAPTER 343, HRS  
FINAL ENVIRONMENTAL IMPACT STATEMENT  
MAILI KAI PROPERTY  
KAISER CEMENT CORPORATION  
MAILI, WAIANAЕ, OAHU, HAWAII  
TAX MAP KEY: 8-7-10: 02 AND 14

A. BACKGROUND

Kaiser Cement Corporation is proposing to develop a 1,435 unit residential and apartment project including a 9-hole golf course and a park.

In accordance with Chapter 343, HRS, this Final Environmental Impact Statement has been prepared in conjunction with an application for an amendment to change the Waianae Development Plan Land Use Map from Agriculture (168.5 acres) to Residential (124.5 acres), Low-Density Apartment (32.5 acres) and a Park (11.5 acres).

This 415-acre vacant property has the following current Development Plan land uses: 46 acres of Residential, 280 acres of Agriculture, 87 acres of Preservation, and 2 acres of Public Facility.

The site is located on the Kaena side of Puu O Hulu ridge in Waianae, approximately 2,000 feet mauka of Farrington Highway on Kaukama Road. The property is irregularly shaped and slopes gently upward from about 25 feet Mean Sea Level (MSL) to approximately 200 feet MSL and then rises steeply to the top of Puu O Hulu Ridge at a maximum elevation of about 850 feet MSL. A slope analysis of the site indicated that 288 acres (67%) have slopes less than 20% and 127 acres (33%) have slopes more than 20%.

Approximately 10% of the property is classified as Prime Agricultural land and 25% as Other Important Agricultural Land according to the Agricultural Lands of Importance to the State of Hawaii (ALISH) system. The property is rated E according to the Land Study Bureau (A represents highest productivity and E lowest productivity).

Preliminary soil investigations indicated that coral and coral sand to about 15 foot depths were found on the lower flat portions of the site and slickensided clays were found along the higher sloping areas along the foothill of the ridge within the project site.

The Waianae Development Plan Land Use Map designates land for agricultural use in the mauka direction where existing livestock (cattle and swine) and poultry farms are located. Land designated for Agriculture use in the Kaena Point direction includes a temporarily discontinued extraction operation for coral mining by Lone Star Hawaii and a vacant parcel owned by the United States of America. Residential land in the makai direction includes the Hookele residential subdivision and the makai end of Puu O Hulu Ridge. Puu O Hulu Ridge occupies Preservation land in the Ewa direction.

The primary access to the Maili Kai property is via Farrington Highway and Kaukama Road. Traffic improvements are planned for the Farrington Highway/Kaukama Road intersection.

Water requirements are estimated at 700,000 gpd for domestic purposes and 404,000 gpd for irrigation purposes. The applicant proposes to extend water transmission and distribution lines, to construct a 1.0 mgd storage reservoir to store potable water, and to develop on-site wells which will provide non-potable water for golf course irrigation.

This project is estimated to generate approximately 400,000 gpd of wastewater. The applicant proposes to connect to the existing 18-inch sewer line in Maipalooa Road. Wastewater will flow to the Waianae Wastewater Treatment Plant for disposal.

The project timetable includes 2 1/2 years for Development Plan amendments, rezoning, Conditional Use Permit, and subdivision approval. Start of construction of utility improvements is estimated in early 1990, and total build-out completed by 1995. Total development costs including roadway, infrastructure, recreational, and housing construction is estimated to range from \$105-\$110 million.

## B. PROCEDURES

1. An EIS Preparation Notice, prepared by the applicant's consultant, appeared in the "Environmental Quality Commission (EQC) Bulletin" on December 8, 1987. This was distributed to all interested Federal, State, and City and County agencies, as well as community interest groups.
2. Comments from consulted parties were received until January 22, 1988, allowing all parties the required 30-day minimum consultation period. Seventeen parties submitted written comments during this period, which were responded to in writing by the applicant.

3. The Draft EIS was filed on February 5, 1988 and notice published in the OEQC Bulletin on February 8, 1988. The deadline for public review was then set for March 24, 1988.
4. Twenty-five parties made replies to the Draft EIS. Comments and concerns which were raised were addressed in the Draft EIS and Final EIS which was submitted on April 20, 1988.

C. Content

The Final EIS for the proposed Maili Kai Property Development adequately addresses the content requirements specified in Sections 11-200-17 and 11-200-18 of the EIS Rules.

D. RESPONSES TO COMMENT

The applicant provided adequate point-by-point responses to all comments received within the 45-day response period established for the Draft EIS.

E. CONTROVERSIAL ISSUES

The agricultural odor, vector control, noise and air pollution (dust) issues regarding the proposed project were considered to be controversial. These are potential problems that are anticipated due to the location of this residential development near agricultural and quarry activities and are considered in the Final EIS as having impacts which are difficult or impossible to mitigate.

F. UNRESOLVED ENVIRONMENTAL ISSUES

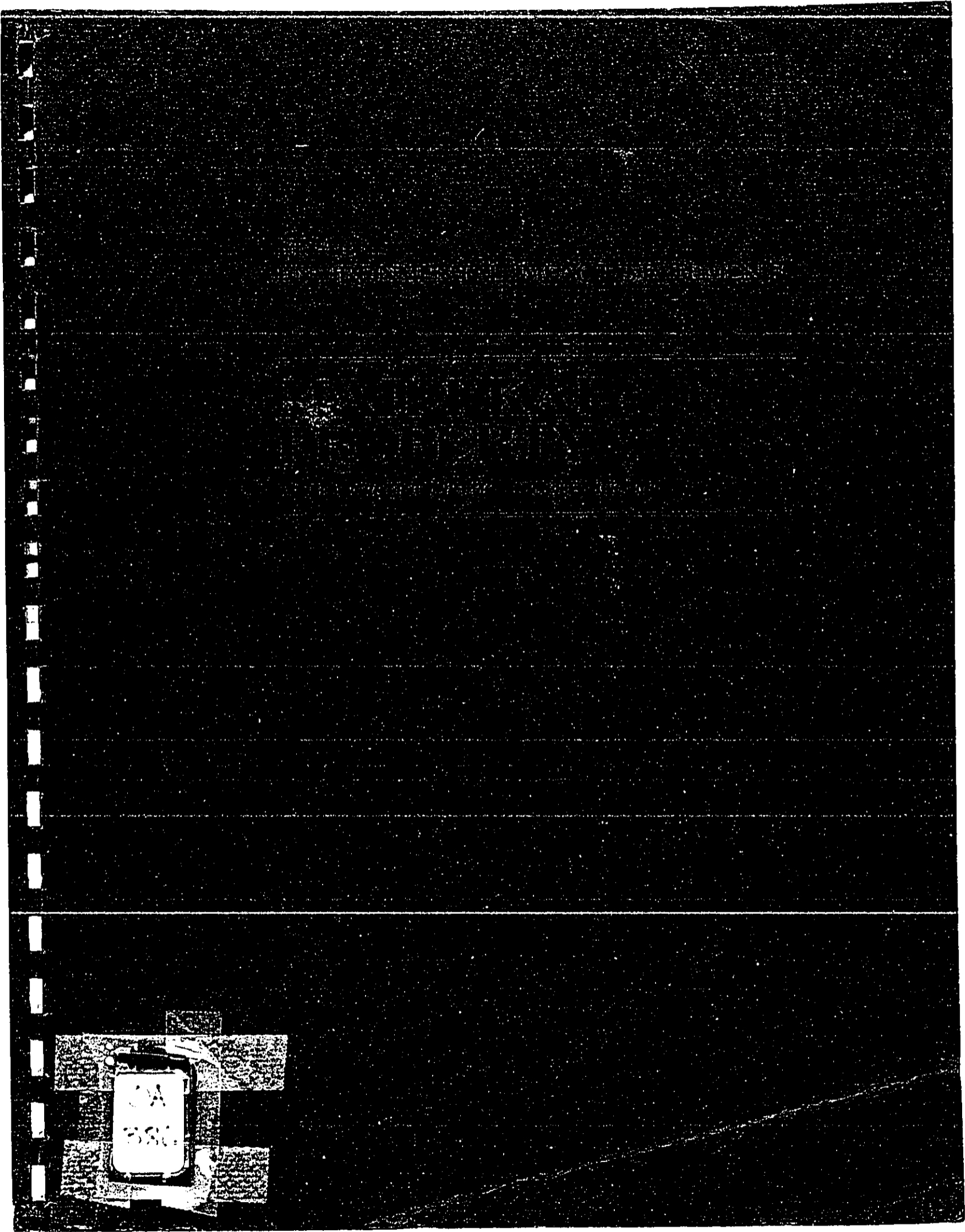
1. Development of new wells will require approval from the Board of Land and Natural Resources, and a water master plan will require approval from the Board of Water Supply. The Board of Water Supply will not provide any potable water for irrigation purposes and requires the developer to pay a proportionate share of the water development and transmission costs.
2. A sewer and drainage master plan approved by the Department of Public Works.
3. Approval by the Department of Land Utilization in consultation with the State Department of Health of a mitigation plan to address the agricultural odor, vector, noise and air pollution problems including, if appropriate, necessary covenants, conditions, and restrictions to protect the farmer's right to farm.

4. Submission of a soil study and approval from the Department of Land Utilization in consultation with the Department of Public Works of a mitigation plan to minimize impacts of foundation problems and soil slippage.
5. An archaeological report on the results of the mitigation measures recommended by the Final EIS submitted to the Department of Land Utilization in consultation with the Department of Land and Natural Resources Historic Sites Section as part of the rezoning application.

G. DETERMINATION

The Final EIS is determined to be acceptable under the procedures and requirements established in Chapter 343, HRS, and the State "EIS Rules." This determination in no way implies a favorable recommendation on the applicant's request for any approvals required by the Department of General Planning.

  
\_\_\_\_\_  
DONALD A. CLEGG  
Chief Planning Officer





FINAL  
ENVIRONMENTAL IMPACT STATEMENT

---

**MAILI KAI  
PROPERTY**

*Maili, Waianae District, Oahu, Hawaii*

---

PREPARED FOR: KAISER CEMENT CORPORATION

PREPARED BY: PBR HAWAII

APRIL 1988




FINAL  
ENVIRONMENTAL IMPACT STATEMENT

MAILI KAI PROPERTY  
Maili, Waianae, Oahu

Tax Map Key: 8-7-10:02 and 14

This Environmental Document is Submitted  
Pursuant to Chapter 343, HRS

Prepared for:  
KAISER CEMENT CORPORATION

  
Wm. Frank Brandt, President  
PBR HAWAII

April 20, 1988  
Date

Prepared by:  
PBR HAWAII

## FORWARD

This Environmental Impact Statement has been prepared for Kaiser Cement Corporation to disclose information on its proposed Maili Kai Property situated on that certain property at Maili, Waianae, Island of Oahu.

The preparation and submittal of this document is pursuant to Hawaii Revised Statutes, Chapter 343, Environmental Impact Statements, Chapter 200 of Title 11, Environmental Impact Statement Rules, and Chapter 201 of Title 11, Environmental Council Rules of Practice and Procedure.

The City and County of Oahu, Department of General Planning reviewed the environmental assessment, Maili Kai Property, November 1987, which was prepared by PBR HAWAII as part of a General Plan Amendment Application, and determined that an Environmental Impact Statement (EIS) is required. The Environmental Impact Statement Preparation Notice appeared in the OEQC Bulletins dated December 8, 1987 and December 23, 1987. The deadline for requests to be a consulted party was January 22, 1988.

The Draft EIS for the proposed Maili Kai Property project was prepared and published in February 1988. Notice of its availability and initiation of the 45-day review period was published in the OEQC Bulletin on February 8, 1988. The deadline for submittal of review comments on the Draft EIS was March 24, 1988. Draft EIS comment letters and responses thereto are included in Chapter XII of this Final EIS.

TABLE OF CONTENTS

	<u>Page No.</u>
<b><u>CHAPTER I</u></b>	
INTRODUCTION AND SUMMARY . . . . .	I- 1
1. PURPOSE OF THIS DOCUMENT . . . . .	I- 1
2. PROPOSED GOVERNMENTAL ACTION . . . . .	I- 1
3. PROJECT DESCRIPTION . . . . .	I- 2
4. NEED FOR THE PROJECT . . . . .	I- 3
5. SUMMARY OF ENVIRONMENTAL IMPACTS . . . . .	I- 6
5.1 PHYSICAL ENVIRONMENT . . . . .	I- 6
5.1.1 Physiography and Geology . . . . .	I- 6
5.1.2 Soils and Agricultural Potential . . . . .	I- 7
5.1.3 Hydrology and Drainage . . . . .	I- 7
5.1.4 Natural and Man-Induced Hazards . . . . .	I- 8
5.1.5 Climate and Meteorology . . . . .	I- 9
5.1.6 Air Quality . . . . .	I- 9
5.1.7 Noise Quality . . . . .	I-10
5.1.8 Visual Attributes . . . . .	I-10
5.2 NATURAL ENVIRONMENT . . . . .	I-10
5.2.1 Flora . . . . .	I-10
5.2.2 Fauna . . . . .	I-11
5.3 HISTORICAL AND ARCHAEOLOGICAL RESOURCES . . . . .	I-11
5.4 SOCIOECONOMIC ENVIRONMENT . . . . .	I-12
5.5 INFRASTRUCTURE . . . . .	I-13
5.6 PUBLIC SERVICES AND FACILITIES . . . . .	I-14
6. SUMMARY OF PROPOSED MITIGATION MEASURES . . . . .	I-14
7. SUMMARY OF ALTERNATIVES . . . . .	I-15
8. SUMMARY OF UNRESOLVED ISSUES . . . . .	I-16
9. SUMMARY OF COMPATIBILITY OF LAND USE POLICIES AND CONTROLS . . . . .	I-16

TABLE OF CONTENTS

	<u>Page No.</u>
10. NECESSARY APPROVALS AND PERMITS . . . . .	1-17
11. LIST OF DRAFT EIS PREPARERS . . . . .	1-17

CHAPTER II

DESCRIPTION OF THE PROPOSED PROJECT . . . . .	II- 1
1. REGIONAL SETTING . . . . .	II- 1
1.1 DESCRIPTION OF PROPERTY . . . . .	II- 2
2. BACKGROUND AND HISTORY OF PROPERTY AND PROJECT . .	II- 3
3. DEVELOPMENT CONCEPT . . . . .	II- 5
3.1 PROJECT OBJECTIVES . . . . .	II- 5
3.2 DESCRIPTION OF THE PROPOSED PROJECT . . . . .	II- 6
4. NEED FOR THE PROPOSED PROJECT: MARKET ASSESSMENT .	II- 8
4.1 MARKET ASSESSMENT - AFFORDABLE UNITS . . . . .	II- 8
4.1.1 Study Approach . . . . .	II- 8
4.1.2 Regional Background . . . . .	II-10
4.1.3 Definition of Gap Group . . . . .	II-11
4.1.4 Gap Group Market . . . . .	II-11
4.1.5 Gap Group Housing Inventory . . . . .	II-12
4.1.6 Planned and Projected Inventory . . . . .	II-15
4.1.7 Estimated Market Support for Affordable Housing . .	II-16
4.1.8 Market Assessment for Maili Kai Affordable Units .	II-17
4.1.9 Design Considerations . . . . .	II-21
4.2 MARKET ASSESSMENT - VIEW UNITS . . . . .	II-22
4.2.1 Study Approach . . . . .	II-22
4.2.2 Current Housing Demand . . . . .	II-22
4.2.3 Projected Housing Demand . . . . .	II-24
4.2.4 Existing and Projected Housing Inventory . . . . .	II-26
4.2.5 Estimated Market Support For Housing Development . . . . .	II-29
4.2.6 Market Assessment for Maili Kai View Units . . . .	II-29
4.2.7 Design Considerations . . . . .	II-31
4.2.8 Project/Development Amenities . . . . .	II-31

TABLE OF CONTENTS

	<u>Page No.</u>
5. PROJECT SCHEDULE . . . . .	II-32
6. ESTIMATED PROJECT COSTS . . . . .	II-32
 <u>CHAPTER III</u>	
ALTERNATIVES TO THE PROPOSED PROJECT . . . . .	III- 1
1. INTRODUCTION . . . . .	III- 1
2. ALTERNATIVES ANALYZED . . . . .	III- 2
3. COMPARATIVE EVALUATION . . . . .	III- 5
 <u>CHAPTER IV</u>	
DESCRIPTION OF THE AFFECTED ENVIRONMENT, PROBABLE ENVIRONMENTAL CONSEQUENCES AND PROPOSED MITIGATION MEASURES . . . . .	IV- 1
1. PHYSICAL ENVIRONMENT . . . . .	IV- 2
1.1 PHYSIOGRAPHY AND GEOLOGY . . . . .	IV- 2
1.1.1 Existing Conditions . . . . .	IV- 2
1.1.2 Probable Impacts . . . . .	IV- 2
1.1.3 Mitigation Measures . . . . .	IV- 3
1.2 SOILS AND AGRICULTURAL POTENTIAL. . . . .	IV- 3
1.2.1 Existing Conditions . . . . .	IV- 3
1.2.2 Probable Impacts . . . . .	IV- 8
1.2.3 Mitigation Measures . . . . .	IV- 9
1.3 HYDROLOGY AND DRAINAGE . . . . .	IV-10
1.3.1 Existing Conditions . . . . .	IV-10
1.3.2 Probable Impacts . . . . .	IV-12
1.3.3 Mitigation Measures . . . . .	IV-13

TABLE OF CONTENTS

	<u>Page No.</u>
1.4 NATURAL AND MAN-INDUCED HAZARDS . . . . .	IV-13
1.4.1 Existing Conditions . . . . .	IV-13
1.4.2 Probable Impacts . . . . .	IV-14
1.4.3 Mitigation Measures . . . . .	IV-14
1.5 CLIMATE AND METEOROLOGY . . . . .	IV-15
1.5.1 Existing Conditions . . . . .	IV-15
1.5.2 Probable Impacts . . . . .	IV-17
1.5.3 Mitigation Measures . . . . .	IV-17
1.6 AIR QUALITY . . . . .	IV-18
1.6.1 Existing Conditions . . . . .	IV-18
1.6.2 Probable Impacts . . . . .	IV-20
1.6.3 Mitigation Measures . . . . .	IV-21
1.7 NOISE QUALITY . . . . .	IV-24
1.7.1 Existing Conditions . . . . .	IV-24
1.7.2 Probable Impacts . . . . .	IV-24
1.7.3 Mitigation Measures . . . . .	IV-26
1.8 VISUAL ATTRIBUTES . . . . .	IV-26
1.8.1 Existing Conditions . . . . .	IV-26
1.8.2 Probable Impacts . . . . .	IV-27
1.8.3 Mitigation Measures . . . . .	IV-27
2. NATURAL ENVIRONMENT . . . . .	IV-28
2.1 FLORA . . . . .	IV-28
2.1.1 Existing Conditions . . . . .	IV-28
2.1.2 Probable Impacts . . . . .	IV-29
2.1.3 Mitigation Measures . . . . .	IV-29
2.2 FAUNA . . . . .	IV-30
2.2.1 Existing Conditions . . . . .	IV-30
2.2.2 Probable Impacts . . . . .	IV-31
2.2.3 Mitigation Measures . . . . .	IV-34
3. HISTORICAL AND ARCHAEOLOGICAL RESOURCES . . . . .	IV-35
3.1 EXISTING CONDITIONS . . . . .	IV-35
3.2 PROBABLE IMPACTS . . . . .	IV-40
3.3 MITIGATION MEASURES . . . . .	IV-43

TABLE OF CONTENTS

	<u>Page No.</u>
4. SOCIOECONOMIC ENVIRONMENT . . . . .	IV-44
4.1 EXISTING CONDITIONS . . . . .	IV-44
4.1.1 Definition of Study Area . . . . .	IV-44
4.1.2 Historic and Geographic Factors Affecting the Community . . . . .	IV-45
4.1.3 Employment and Economic Base . . . . .	IV-49
4.1.4 Population Levels and Socioeconomic Characteristics . . . . .	IV-52
4.1.5 Lifestyle . . . . .	IV-62
4.1.6 Community Issues and Concerns . . . . .	IV-63
4.2 PROBABLE IMPACTS . . . . .	IV-65
4.2.1 Planned and Proposed New Housing . . . . .	IV-65
4.2.2 Employment Prospects . . . . .	IV-67
4.2.3 Major Infrastructure Improvements . . . . .	IV-69
4.3 PROJECT IMPACTS . . . . .	IV-71
4.3.1 Population . . . . .	IV-71
4.3.2 Employment . . . . .	IV-76
4.3.3 Fiscal Impacts . . . . .	IV-77
4.4 MITIGATION MEASURES . . . . .	IV-82
5. INFRASTRUCTURE . . . . .	IV-83
5.1 HIGHWAYS . . . . .	IV-83
5.1.1 Existing Conditions . . . . .	IV-83
5.1.2 Probable Impacts . . . . .	IV-84
5.1.3 Mitigation Measures . . . . .	IV-86
5.2 WATER SUPPLY . . . . .	IV-87
5.2.1 Existing Conditions . . . . .	IV-87
5.2.2 Probable Impacts . . . . .	IV-88
5.2.3 Mitigation Measures . . . . .	IV-89
5.3 WASTEWATER DISPOSAL . . . . .	IV-89
5.3.1 Existing Conditions . . . . .	IV-89
5.3.2 Probable Impacts . . . . .	IV-90
5.3.3 Mitigation Measures . . . . .	IV-90
5.4 SOLID WASTE DISPOSAL . . . . .	IV-91
5.4.1 Existing Conditions . . . . .	IV-91
5.4.2 Probable Impacts . . . . .	IV-91
5.4.3 Mitigation Measures . . . . .	IV-92

TABLE OF CONTENTS

	<u>Page No.</u>
5.5 ELECTRICAL POWER AND COMMUNICATION SYSTEMS . . . . .	IV-92
5.5.1 Existing Conditions . . . . .	IV-92
5.5.2 Probable Impacts . . . . .	IV-93
5.5.3 Mitigation Measures . . . . .	IV-93
6. PUBLIC SERVICES AND FACILITIES . . . . .	IV-94
6.1 PUBLIC SCHOOLS . . . . .	IV-94
6.1.1 Existing Conditions . . . . .	IV-94
6.1.2 Probable Impacts . . . . .	IV-94
6.1.3 Mitigation Measures . . . . .	IV-96
6.2 HEALTH CARE FACILITIES . . . . .	IV-96
6.2.1 Existing Facilities . . . . .	IV-96
6.2.2 Probable Impacts . . . . .	IV-96
6.2.3 Mitigation Measures . . . . .	IV-97
6.3 POLICE AND FIRE PROTECTION . . . . .	IV-97
6.3.1 Existing Conditions . . . . .	IV-97
6.3.2 Probable Impacts . . . . .	IV-98
6.3.3 Mitigation Measures . . . . .	IV-98
6.4 RECREATIONAL FACILITIES . . . . .	IV-98
6.4.1 Existing Conditions . . . . .	IV-98
6.4.2 Probable Impacts . . . . .	IV-99
6.4.3 Mitigation Measures . . . . .	IV-99

CHAPTER V

RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS, POLICIES AND CONTROLS FOR THE AFFECTED AREA . . . . .	V- 1
1. HAWAII STATE PLAN . . . . .	V- 2
1.1 PART I . . . . .	V- 2
1.2 PART III PRIORITY GUIDELINES. . . . .	V- 9
2. STATE FUNCTIONAL PLANS . . . . .	V-13
2.1 STATE HOUSING FUNCTIONAL PLAN . . . . .	V-14
2.2 STATE AGRICULTURAL FUNCTIONAL PLAN (LAND). . . . .	V-15
3. CITY AND COUNTY GENERAL PLAN . . . . .	V-18



TABLE OF CONTENTS

	<u>Page No.</u>
4. WAIANAE DEVELOPMENT PLAN. . . . .	V-23
4.1 COMMON PROVISIONS . . . . .	V-24
4.2 SPECIAL PROVISIONS . . . . .	V-27
5. LAND USE MAP . . . . .	V-29
6. PUBLIC FACILITIES MAP . . . . .	V-29
7. ZONING . . . . .	V-29
8. COASTAL ZONE MANAGEMENT ACT (CHAPTER 205-A, HRS). .	V-29
9. ENVIRONMENTAL IMPACT STATEMENTS (CHAPTER 343, HRS).	V-29

CHAPTER VI

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY . . . . .	VI- 1
---	-------

CHAPTER VII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES. .	VII- 1
--	--------

CHAPTER VIII

CONSIDERATION OF OFFSETTING GOVERNMENTAL POLICIES . . .	VIII- 1
---	---------

CHAPTER IX

UNRESOLVED ISSUES . . . . .	IX- 1
-----------------------------	-------

TABLE OF CONTENTS

	<u>Page No.</u>
 <u>CHAPTER X</u>	
REFERENCES . . . . .	X- 1
 <u>CHAPTER XI</u>	
CONSULTED PARTIES, COMMENTS AND RESPONSES DURING CONSULTATION PERIOD . . . . .	XI- 1
1. CONSULTED PARTIES . . . . .	XI- 1
 <u>CHAPTER XII</u>	
AGENCIES, ORGANIZATIONS AND PERSONS WHO WERE SENT A COPY OF THE DRAFT EIS; WRITTEN COMMENTS RECEIVED DURING THE PUBLIC REVIEW PERIOD; AND RESPONSES . . . . .	XII- 1
 <u>APPENDICES</u>	
A. Market Analysis	
B. Air Quality Impact Analysis Report	
C. Botanical Survey Report	
D. Avifaunal and Feral Mammal Survey of Maili Kai Property	
E. Archaeological Reconnaissance Survey Report	
F. Traffic Assessment	
G. Engineering Report	
H. Agricultural Significance of the Lands on the Maili Kai Property	

LIST OF TABLES

<u>TABLE</u>		<u>Page No.</u>
I- 1	Necessary Permits and Approvals . . . . .	I-17
II- 1	Slope Analysis . . . . .	II- 4
II- 2	Existing Land Use Classifications. . . . .	II- 4
II- 3	Maili Kai Housing Provisions . . . . .	II- 7
II- 4	Land Use Summary . . . . .	II- 8
III- 1	Development Alternatives Considered . . . . .	III- 3
IV- 1	Maili Kai Property Soils Descriptions . . . . .	IV- 4
IV- 2	Inventory of Agricultural Lands by ALISH Classification. . . . .	IV- 7
IV- 3	0700 HST Wind Rose, Barbers Point Naval Air Station, 1984. . . . .	IV-16
IV- 4	Average and Extreme Recorded Temperatures for the Waianae District . . . . .	IV-17
IV- 5	Air Monitoring Data, Campbell Industrial Park, 1971-1985 . . . . .	IV-19
IV- 6	Estimates of Annual Emissions Due to Electrical Generation and Solid Waste Disposal, Maili Kai Project . . . . .	IV-22
IV- 7	1980 Emissions Inventory, City and County of Honolulu. . . . .	IV-23
IV- 8	Summary of Identified Sites, Maili Kai Property Project Area. . . . .	IV-37
IV- 9	Summary of General Significance Assessments and Recommended General Treatments, Maili Kai Property Project Area. . . . .	IV-42
IV-10	Oahu and Study Area Civilian Jobs by Industry, 1980. . . . .	IV-50
IV-11(a)	Population and Demographic Characteristics: City and County of Honolulu and Various Parts of Study Area, 1970 and 1980 . . . . .	IV-53

LIST OF TABLES  
(continued)

<u>TABLE</u>		<u>Page No.</u>
IV-11(b)	Family Characteristics and Income Levels: City and County of Honolulu and Various Parts of Study Area, 1970 and 1980 . . . . .	IV-54
IV-11(c)	Housing Stock and Characteristics: City and County of Honolulu and Various Parts of Study Area, 1970 and 1980 . . . . .	IV-55
IV-11(d)	Labor Force Size and Characteristics: City and County of Honolulu and Various Parts of Study Area, 1970 and 1980 . . . . .	IV-56
IV-12(a)	Population and Demographic Characteristics: Maili, Waianae, Makaha and Nanakuli Area, 1970 and 1980. . . . .	IV-58
IV-12(b)	Family Characteristics and Income Levels: Maili, Waianae, Makaha and Nanakuli Area, 1970 and 1980. . . . .	IV-59
IV-12(c)	Housing Stock and Characteristics: Maili, Waianae, Makaha and Nanakuli Area, 1970 and 1980. . . . .	IV-60
IV-12(d)	Labor Force Size and Characteristics: Maili, Waianae, Makaha and Nanakuli Area, 1970 and 1980. . . . .	IV-61
IV-13	Potential New Study Area Housing Units . . . . .	IV-68
IV-14	Potential New Study Area Employment. . . . .	IV-70
IV-15	Population Trends for City and County of Honolulu, Waianae, Maili and Ewa. . . . .	IV-72
IV-16	City and County of Honolulu Population Guidelines and Projections for the Year 2005. . . . .	IV-75
IV-17	Assumptions. . . . .	IV-79
IV-18	State and County Revenues, Expenditures and Net Impact . . . . .	IV-80
IV-19	Farrington Highway Traffic Volumes . . . . .	IV-84
IV-20	Trip Rates . . . . .	IV-85



LIST OF FIGURES

<u>FIGURE</u>		<u>Following Page No.</u>
II- 1	Location Map . . . . .	II- 2
II- 2	Tax Map Keys . . . . .	II- 2
II- 3	Surrounding Uses . . . . .	II- 2
II- 4	Slopes/Surface Drainage . . . . .	II- 4
II- 5	State Land Use . . . . .	II- 4
II- 6	Waianae Development Plan Land Use . . . . .	II- 4
II- 7	Waianae Development Plan Public Facilities. . . . .	II- 4
II- 8	County Zoning . . . . .	II- 4
II- 9	Conceptual Master Plan. . . . .	II- 8
II-10	Proposed D.P. Land Use Amendment. . . . .	II- 8
III- 1	Alternative One . . . . .	III- 4
III- 2	Alternative Six . . . . .	III- 4
III- 3	Alternative Seven . . . . .	III- 4
III- 4	Alternative Nine . . . . .	III- 4
IV- 1	Detailed Land Classifications . . . . .	IV- 6
IV- 2	Soil Survey Classifications . . . . .	IV- 6
IV- 3	Agricultural Lands of Importance to the State of Hawaii . . . . .	IV- 6
IV- 4	Oahu Mean Annual Rainfall . . . . .	IV-16
IV- 5	Wind Rose N.A.S. Barbers Point. . . . .	IV-16
IV- 6	Barbers Point NAS Morning Wind Speed Distribution . . . . .	IV-16
IV- 7	Barbers Point NAS Morning Wind Direction Distribution . . . . .	IV-16
IV- 8	Site Sections . . . . .	IV-26

LIST OF FIGURES  
(continued)

<u>FIGURE</u>		<u>Following Page No.</u>
IV- 9	Views . . . . .	IV-26
IV-10	Historic Site Locations . . . . .	IV-36
IV-11	Development Plan Areas . . . . .	IV-44
IV-12	Waianae Study Area . . . . .	IV-44
IV-13	Existing Infrastructure . . . . .	IV-90
IV-14	Public Facilities . . . . .	IV-94

INTRODUCTION AND SUMMARY



## CHAPTER I

### INTRODUCTION AND SUMMARY

#### 1. PURPOSE OF THIS DOCUMENT

This environmental impact statement (EIS) has been prepared in support of a Waianae Development Plan (DP) amendment for certain lands (TMK 8-7-10:02 and 14) in Maili, Waianae District, Oahu, Hawaii. Kaiser Cement Corporation, owner in fee of the property, is proposing to develop detached single family and clustered multifamily housing units that would assist in the provision of affordable housing in the area. In addition, this EIS will support future zoning and subdivision requests that would be submitted following approval of the requested DP amendment. This EIS has been prepared in compliance with the provisions of Hawaii Revised Statutes (HRS) Chapter 343 and Sections 11-200-14 through 11-200-17 of Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules and the rules and regulations adopted pursuant thereto. This EIS describes the DP amendment and the proposed housing project; the existing environmental conditions of the proposed project site and surrounding area; the probable environmental impacts that might result from the proposed project; the mitigation measures that would be employed to minimize potential adverse environmental impacts; the alternatives to the proposed project that have been investigated; and the relationship of the proposed project to existing land use policies and controls.

#### 2. PROPOSED GOVERNMENTAL ACTION

Kaiser Cement Corporation is requesting an amendment to the Waianae Development Plan Land Use map from the City and County of

Honolulu, Department of General Planning (DGP) for a portion of the subject property. The amendment request is to redesignate 168.5 acres presently designated Agriculture to Residential, Low Density Apartment and Parks and Recreation. Of the 168.5 acres, approximately 124.5 are to be designated Residential, 32.5 acres designated Low Density Apartment and 4.5 acres designated Parks and Recreation. Other portions of the property that are presently designated as Preservation ( $\pm$  87 acres) and Public Facility ( $\pm$  2 acres) would either be unaffected by the DP amendment request or, in the case of the Public Facilities Map, would require updating. Updating may be required to show the location of a new elementary school and extensions of public utilities (water, sewer, electrical, etc.), and would retain their present land use designations. The proposed DP amendment is shown on Figure II-10 and summarized in Table II-3.

### 3. PROJECT DESCRIPTION

The goal of the proposed Maili Kai housing project is to provide a range of quality housing opportunities in the Maili area. The project would be within a minimally controlled environment, i.e., certain building, maintenance and entry controls, and include on-site public recreational facilities, while maintaining important view planes and the present rural lifestyle of the area. The subject property, which consists of approximately 415 acres, is presently vacant and serves as a convenient illegal dumping area for abandoned vehicles and miscellaneous rubbish, other possible illegal activities and a breeding ground for feral rats and mice that invade the adjacent residential subdivision.

Access to the Maili Kai site is via the H-1 Freeway, which connects to Farrington Highway about six miles south of the property. Maili Kai is about 27 miles from downtown Honolulu and 22 miles from Honolulu International Airport. The towns of Nanakuli and Waianae are approximately 3.5 miles southeasterly

and northwesterly respectively from the project site. The project property is about 2,000 feet mauka (east) of Farrington Highway and is served by Kaukama Road, a 60-foot wide, fully paved roadway complete with concrete curbs, gutters, sidewalks and storm drains and street lights that were installed by the property owner. Recently a chain-link fence has been placed across Kaukama Road to prevent unauthorized entry.

The proposed project concept includes developing a mix of detached single family and clustered multifamily residential units that would be priced for gap group, low- and moderate income groups and at prevailing market prices for comparable homes. As shown in Table II-3, the proposed mix of home prices would be proportioned such that at least 90 percent would be priced for the gap group market; of which ten percent would be priced for the low- moderate income group; and the remainder would be priced at prevailing market prices. In addition to the homes, all necessary infrastructural amenities would be provided, including underground sewer, water, electrical and communication systems; paved collector streets with curbs, gutters, sidewalks and storm drains; public recreational facilities and open spaces. The proposed project concept is shown on Figure II-9.

#### 4. NEED FOR THE PROJECT

The need for appropriate housing for all socioeconomic groups is a constant concern of both public and private agencies charged with assisting potential homeowners in finding suitable housing. This issue is especially critical to gap group and low- and moderate-income groups as housing costs on Oahu generally tend to be above their borrowing capabilities. Both the City and County and State administrations have stated that a primary goal is to provide and promote the establishment and construction of affordable housing projects. There is a continual need for housing, especially in those areas that are relatively close to

"blue collar" employment centers, such as those in leeward Oahu, i.e., Pearl Harbor, Barbers Point NAS, Campbell Industrial Park and for the next several years, the West Beach-Ewa area that is undergoing a relatively high level of resort and market priced housing subdivision construction. The proposed project would fill part of the need for affordable housing close to these employment centers and would complement other projects that are being planned by public agencies and private groups. Based on the marketability study performed for this project (see Chapter II, Section 4), the proposed project is expected to be absorbed during the planned five-year construction period. This is due in part to the apparent pent-up demand for affordable and market priced housing in the project area, and in part to the expected quality and mix of homes and amenities that will be made available.

The immediate demand for gap group housing units on Oahu is presently (January 1988) estimated to be about 3,000 units based on studies prepared for the state and city agencies and additions to the gap group housing inventory in recent years. Public and private developments that have been oriented to the gap group over the recent past have enjoyed very strong market response with interested purchasers far outnumbering available units. However, a sufficient number of gap group units have not been marketed over recent years to significantly reduce overall demand.

A consequence of this imbalance of supply and demand for gap group housing is a very strong demand for all single family gap group housing projects that are located within reasonable travel times to employment. Recent success in marketing housing projects with prices oriented to the gap group market has encouraged more development of affordable housing. The recently announced State of Hawaii requirement for 60 percent of new housing developments to be allocated to affordable housing could

result in significantly more additions in the future, even if that requirement is downscaled to some degree. However, it will require very substantial numbers of housing units oriented to the gap group market before there is a significant change in the supply/demand relationship.

Based on the market study conducted for this EIS, the outlook for the gap group housing units planned at Maili Kai is optimistic. The islandwide market demand for gap group housing is expected to remain very strong over the foreseeable future. While most residential developments in the Waianae/Ewa area will have small portions of their inventory oriented to the gap group market, sufficient demand would exist to accommodate all anticipated supply. Currently, the major competing gap group projects would be Kahi Kani, a proposed 290+-unit single family project in Whitmore Village, Wahiawa and West Loch Estates, a proposed and recently approved 750 unit single family project in Honouliuli, Ewa.

Single family developments located outside of the Waianae Coast and oriented to the gap group market have experienced very rapid absorptions. The recently announced Valley Homes project in Makaha Valley, consisting of 119 single family units, has also received very positive market response. However, other Waianae projects have generally experienced slower absorption rates than comparable projects located elsewhere on Oahu. Maili Kai's convenient location in close proximity to Ko Olina and Campbell Industrial Park, and the anticipated growth of Kapolei, combined with project security features, attractive unit designs and lower unit pricing should mitigate most constraints to project location.

The absorption rates for the single family units at Maili Kai are expected to be significantly faster than the multifamily units. It is projected that the single family units would be absorbed

within three to four years while the multifamily units would be absorbed at a slower rate.

The market outlook for Maili Kai single family view units over the 1990-1995 development period remains relatively strong. It is estimated that the view units at Maili Kai would be expected to sell in about two to three years, with the actual sales performance dependent upon timing, pricing and qualifying requirements and subsidies, if any, offered at West Loch Estates, Ewa by Gentry and Village Park.

## 5. SUMMARY OF ENVIRONMENTAL IMPACTS

In general, the proposed project is expected to have beneficial and/or minimal impacts on the physical, natural and socioeconomic environments of the project area. However, existing and potential future agricultural activities off-site and outside the control of the Maili Kai developer may adversely affect the proposed project. The summary of impacts listed below is based on published information concerning the study area; special studies conducted for the proposed project; and projections of the types of activities that would be associated with the proposed project.

### 5.1 PHYSICAL ENVIRONMENT

#### 5.1.1 Physiography and Geology

The planned alterations to the project site are relatively insignificant compared to the overall physiographic and geologic character of the site and region. Significant impacts resulting from the proposed project are not expected.

### 5.1.2 Soils and Agricultural Potential

The soils of the project site are classified as poor to very poor [Detailed Land Classification, Island of Oahu, classification E62, E64, E71, E72, E102, E114 and E115 (100 percent)] in terms of suitability for agricultural crops. Agriculturally, the Waianae Agricultural Lands of Importance to the State of Hawaii (ALISH) Map designates the property as Prime Agricultural Land (approximately 10 percent of the site) and Other Important Agricultural Land (approximately 25 percent of the site).

The State Land Use (SLU) designations for the site are Urban, Agriculture and Conservation. All three designations would be retained under the proposed plan. The Waianae Development Plan Land Use Map designations for the property are Agriculture, Preservation, Residential and Public Facility. The Preservation land will be retained while 168.5 acres of the Agriculture land is being requested to be redesignated Residential, Low Density Apartment and Parks and Recreation. Based on the detailed soils classifications, the property does not appear suited for crop type agriculture, without significant investments in irrigation systems and removal of rocky materials. The property would be suitable for poultry, swine, dairy or nursery type agricultural activities providing water supplies and long-term land leases at reasonable costs could be obtained. The proposed project will not require the relocation or displacement of any existing residential units, agricultural activities or businesses.

### 5.1.3 Hydrology and Drainage

The Waianae Coast is relatively dry and groundwater resources limited to upper valleys. The City and County of Honolulu Board of Water Supply (BWS) is currently exploring for and developing new sources of potable water in Makaha and Waianae Valleys. Those sources, which would serve the proposed project, are

expected to be on-line around 1990, i.e., at the time construction is presently scheduled to begin for the proposed project. Based upon on-going discussions and negotiations with BWS, it appears that sufficient water from the sources being developed would be available for the project. Impacts to the subsurface hydrological characteristics of the project area are not expected to result from the proposed project.

Surface drainage of the site is from south to north, No natural drainage features are found on the site. The majority of the site drains into Maili Stream via earthen channels and concrete box channels. These channels and concrete drains have been determined adequate to serve the proposed project and no significant impacts to the existing drainage system are expected to result from the proposed project.

#### 5.1.4 Natural and Man-Induced Hazards

Potential natural hazards to which the subject property could be subjected include floods, tsunamis and volcanic eruptions. Man-induced potential hazards include the storage of munitions at the U.S. Navy Lualualei Naval Magazine and radiation from radio transmitter towers located within the Lualualei Military Reservation. Based on the analyses performed, and given the relatively low annual rainfall characteristics of the area, the proposed improvements to the surface drainage system and existing drainage system appear sufficient to significantly reduce or eliminate potential flood hazards. Similarly, the project site is outside the historical tsunami runup level which extends about two blocks inland from the shoreline in the vicinity of the project site. The project site is also outside all Explosive Safety Quantity Distance (ESQD) arcs, as established by the U.S. Navy and outside of possible radiation hazards that might be caused by radio transmitter towers located within the Lualualei Naval Reservation.



#### 5.1.5 Climate and Meteorology

The existing climate and meteorology of the project area is characterized by relatively low rainfall, typically northeast tradewinds and average temperatures between 72 and 80 degrees F. The proposed project will not have any effect on the climate and meteorology of the area.

#### 5.1.6 Air Quality

The proposed project is classified as an "indirect source" of air pollution as defined in the federal Clean Air Act of 1977 because its primary association with air pollution is due to its inherent generation of mobile source, i.e., motor vehicle activity. The proposed project will also have off-site air quality effects due to increased demand for electrical energy, the disposal of refuse and short-term impacts due to construction activities. Based on the analyses performed for this EIS, it appears that the proposed project will not have an adverse effect on either state or federal air quality standards and that all state and federal air quality standards will continue to be met at the project site and along the major corridors to/from the project site. Due to its location in close proximity to existing poultry and swine farming operations, the proposed project will be affected by odors emanating from those sources as are existing residences, schools and other public and private facilities makai of the project site. In general, northeast tradewinds tend to disperse these odors over a fairly wide area and out to sea. However, during calm wind periods and due to localized swirling wind patterns caused by topographic changes, the project site experiences relatively strong agricultural odors.

#### 5.1.7 Noise Quality

The existing noise quality of the project site is dominated by natural factors including wind moving through the vegetation on the site and distant surf sounds. Potential impacts on the noise quality of the site are primarily limited to those generated by increased numbers of vehicles and, in the short-term, construction activities. It is also expected that the general noise level of the area will rise to a limited degree and be comparable to other Oahu residential neighborhoods. The proposed project is not expected to adversely affect the area noise quality, however, it is likely that noise levels in localized areas would increase due to increased human activity. It is expected that the project would comply with applicable State Community Noise Control regulations.

#### 5.1.8 Visual Attributes

The existing visual character of the proposed project site is one of open space, scrub vegetation, barrenness and rubbish dumped in various locations. View planes from the site include a variety of land elevations ranging from relatively flat to extremely steep slopes. Existing views of the Waianae mountain range, Puu O Hulu Kai and Puu O Hulu Uka will be retained under the proposed project design and ground level views would be improved through the addition of landscaping in and around the planned golf course, park and residences.

### 5.2 NATURAL ENVIRONMENT

#### 5.2.1 Flora

The flora of the project site is characteristic of the project area and consists largely of weedy species, Koa-haole and Kiawe trees, and the site shows evidence of repeated disturbance caused

by fires and grading operations. Based on the results of the botanical survey conducted for the proposed project, there are no threatened or endangered species of plants found on the project site. The proposed project is expected to improve the character of the vegetation in and around the project site through the addition of landscaping and removal of weedy pest species.

#### 5.2.2 Fauna

The fauna of the project site is also characteristic of the project area. Based on the faunal survey conducted for the proposed project, no endemic or resident indigenous birds were sighted on the property and the only migratory indigenous bird recorded was the Pacific Golden Plover. No resident indigenous birds were recorded on the site during the survey. The majority of the birds sighted were introduced birds that are common to all areas of Oahu. It is expected that increased landscaping and the establishment of the golf course and park will increase the habitat attractiveness of the site to birds and that populations of some species could be expected to increase.

#### 5.3 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

A surface archaeological reconnaissance survey of the site was performed to identify and evaluate all sites of possible archaeological significance present within the project area. The survey, which covered 100 percent of the project site and was performed in accordance with recommended minimum State Department of Land and Natural Resources, Historic Sites Section and State Historic Preservation Officer guidelines, identified 12 previously unknown archaeological sites and relocated 14 of 25 previously recorded sites. The remaining nine previously recorded sites could not be relocated. Significance categories used in the evaluation process were based on the National Register criteria contained in the Code of Federal Regulations

(36 CFR Part 60). Due to their marginal nature, lack of time depth and disturbed condition, the site in the project area have been evaluated as having minimal scientific research potential and no interpretive potential or cultural significance. As such, it has been determined and concurred with by state historic sites personnel, that the proposed project would not have an adverse impact on any significant cultural resources.

#### 5.4 SOCIOECONOMIC ENVIRONMENT

Although the socioeconomic characteristics and impacts of the proposed project are somewhat difficult to quantify, these characteristics can be relatively qualified based on existing socioeconomic patterns in the Waianae area. In general, based on public opinion surveys conducted to date, housing is not a major concern to most Waianae area residents. However, the relatively low sample population on which these findings have been made may distort the view of the entire community. Similarly, crime, youth concerns and the availability of public services and facilities are major concerns to the residents. As noted in the market assessment section of this EIS (Chapter II, Section 4) the intended market for the Maili Kai project includes all of Oahu and not just the Waianae area. The rural lifestyle and open character of the Waianae area are two characteristics that residents of the area enjoy most. The proposed project would increase population levels in the Waianae Coast area and would most likely bring in new families that currently live on Oahu but reside in other areas. As such, many of the existing residents of the area may feel threatened or intimidated until the new residents are assimilated into the area. Similarly, many existing residents may feel that the limited public facilities that currently exist would be over taxed by the new residents. However, the increase in population may provide the political and economic justification for improving and expanding public services and facilities. Economically, the proposed project can

be expected to create increased job opportunities, tax revenues and an expanded market base for local businesses. Overall, the projected public expenditures resulting from the proposed project are expected to be greater than projected revenues. However, a portion of the projected expenditures represent expenditures that would be required in other areas if the project did not go forward and the residents found housing in those other areas. In general, it is expected that there will be some level of short-term adverse social impacts resulting from the proposed project but the level of these impacts is difficult to quantify and/or determine if they are real or perceived.

#### 5.5 INFRASTRUCTURE

The major impacts on the infrastructural components of the area that will result from the proposed project are (1) an increase in traffic on Farrington Highway into and out of the project site and to a limited extent north of the project site; and (2) the continued development of new water sources in the Waianae and Makaha Valleys. On-going improvements to the Waianae Wastewater Treatment Plant have been designed to accommodate increased population levels in the area, including that which would be generated by the proposed project. Similarly, although there would be increases in the amount of solid waste generated in the area, existing public facilities are presently capable of handling these increases or are being upgraded to handle projected increases. To ensure the smooth and safe flow of traffic into and out of the proposed project and along Farrington Highway, the Farrington Highway/Kaukama Road intersection would be signalized and advance warning signs placed on Farrington Highway. Also, the right turn lane on Farrington Highway westbound approach to Kaukama Road would be lengthened. To aid in the development of water supplies, the developer has initiated negotiations with the Board of Water Supply to participate in those developments.

## 5.6 PUBLIC SERVICES AND FACILITIES

The major impact to public services and facilities that would be caused by the proposed project would be to the schools of the area. Based on information provided by the State Department of Education, a new elementary school would be required to serve the development, but area intermediate and high schools appear to be adequate to serve the project. The developer would work with the State Department of Education regarding the location and cost of a new elementary school. Existing or planned health care, police and fire protection services appear to be adequate to serve the proposed project, but may require a low level of personnel increases. Existing public recreational facilities also appear adequate to serve the proposed project and would be added to with a new public park and golf course.

## 6. SUMMARY OF PROPOSED MITIGATION MEASURES

Mitigation measures to minimize those aspects of the proposed project that may induce potential adverse environmental impacts include the following:

- o Use of appropriate engineering, design and construction measures to minimize potential seismic, volcanic and flood hazards.
- o Use of appropriate engineering, design and construction measures to ensure adequate drainage of the site.
- o Water spraying during construction activities to maintain dust control and landscaping to maintain long-term air quality.

- o Use of appropriate landscaping to increase the habitat attractiveness to birds and to increase the visual attractiveness of the area.
- o Employment of appropriate measures for preservation of historic/archaeologic sites.
- o Appropriate lane marking and signalization to facilitate the safe and efficient flow of traffic.
- o Continued cooperation between the developer and governmental agencies in the development of new water sources, schools and other public facilities and services for the area.
- o Inclusion of clauses in residential unit sales documents informing potential buyers of agricultural odors, vector control conditions and the State's right-to-farm Act (Chapter 165, HRS) and the waiver of rights to attempt to restrict or hinder farmer's rights to farm.

7. SUMMARY OF ALTERNATIVES

Known alternatives which could "feasibly" attain the objectives of the proposed project have been considered and are discussed in detail in Chapter III. "Feasible" actions that potentially reduce or eliminate environmental risks or costs have been evaluated. The alternatives investigated and analyzed have included the following:

- o Various project layouts and combinations of different housing types, i.e., numbers of different unit types.
- o A reduction in the numbers of units and construction of an 18-hole golf course versus the 9-hole course planned.

- o Construction of two 18-hole golf courses with minimal residential units.
- o "No-Action".

In general, none of the alternatives investigated meet the objectives of the project to the degree that the proposed project does. In assessing the alternatives and the proposed project, it has been determined that the proposed action provides the desired benefits to both the community and the developer while minimizing environmental costs and risks.

8. SUMMARY OF UNRESOLVED ISSUES

The developer is aware of concerns regarding the proposed project, as expressed by some of the residents and farmers in the area. These concerns generally include the mix of housing units, traffic and potential complaints regarding odors and vector control caused by agricultural activities. The developer has been and will continue to work with appropriate governmental agencies, residents and farmers of the area to alleviate these concerns and reach agreement regarding the development of the proposed project.

9. SUMMARY OF COMPATIBILITY OF LAND USE POLICIES AND CONTROLS

Based on the analyses conducted and review of applicable state and county land use plans, policies, goals and objectives, it appears that, for the most part, the proposed project is in concert with those plans. With adoption of the proposed Development Plan amendment, the proposed project would be consistent with state and county land use plans and policies.



10. NECESSARY APPROVALS AND PERMITS

The existing land use authorities, designations and related permits or approvals required are listed in Table I-1.

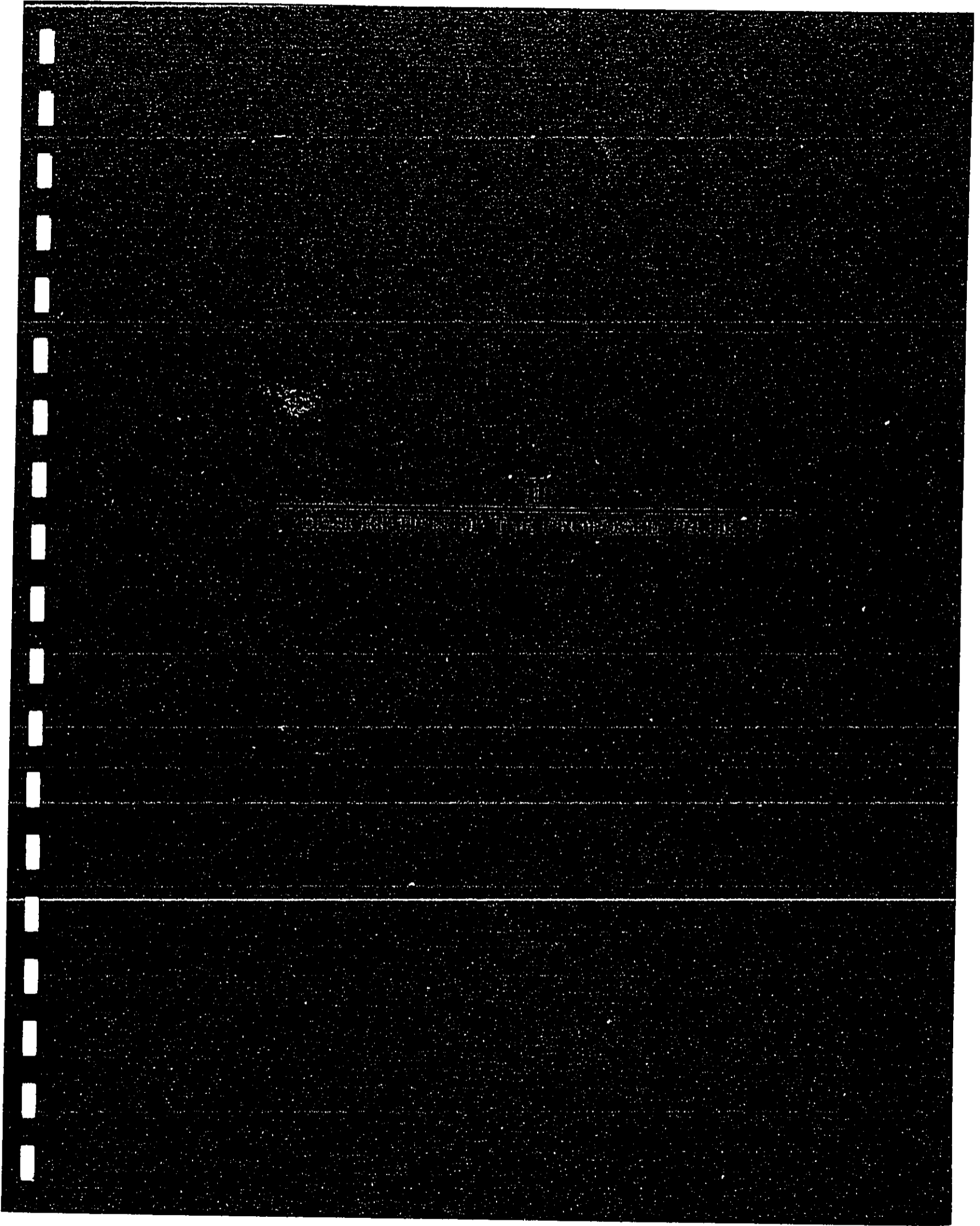
TABLE I-1  
NECESSARY PERMITS AND APPROVALS

<u>Authority</u>	<u>Approval Required</u>
City and County of Honolulu Department of General Planning	Environmental Impact Statement Waianae D. P. Land Use Amendment Waianae D.P. Public Facilities Amendment
Department of Land Utilization	Change of Zone Application Conditional Use Permit Subdivision Approvals
Department of Public Works	Building Permits Grading Permits

11. LIST OF DRAFT EIS PREPARERS

<u>Name/Affiliation</u>	<u>Title</u>	<u>Education</u>	<u>Area of Expertise</u>
Kaiser Cement Corp. J. Janneck	Representative	MBA	Proj. Plan.
Gin Wong Associates Gin D. Wong	President	BA Architecture	Proj. Arch.
PBR HAWAII W. F. Brandt	President	BA Landscape Architecture	Planning, Proj. Mgmt.
M. Grady	Proj. Mgr.	BA Geog./Env. Studies	Proj. Mgmt.
G. Bergdahl	Graphics	BA Geography	Graphics
C. Kimura	Cartographer	BA Geography	Graphics
L. Warning	Editor	BS Landscape Architecture	Editing
C. Fisher	Word Processor		Word Processing
D. Takiguchi	Word Processor		Word Processing

<u>Name/Affiliation</u>	<u>Title</u>	<u>Education</u>	<u>Area of Expertise</u>
Gordon A. Chapman Consulting Services G. A. Chapman	Owner	BS Econ/Zool.	EIS Prep.
Char & Assoc. W. Char	Botanical Consultant	BS & MS Botany	Botany
G. Linney	Botanical Consultant	MS Botany	Botany
Paul H. Rosendahl PH. D., Inc. P. H. Rosendahl J. D. Mayberry	President Superv. Arch.	PhD MA Arch.	Archaeology Archaeology
Community Resources, Inc. J. M. Knox D. Rae D. R. Curry M. Diaz	President Associate Sr. Research. Jr. Research.	PhD MS, MPH MURP BS Env. St.	Soc. Psych. Fiscal Impacts Pop. Forecasts Census/Demogr.
Philip Bruner P. Bruner	Owner	MS	Biol. Avifauna
John Child & Company K. Char, MAI U. Ewart	Exec. V.P. Appraiser	MBA, BBA BA	Market Assmt. Market Assmt.
J. W. Morrow J. W. Morrow	Owner	MPH	Air Qual. Anal.
Community Planning Inc. B. Kea	President	BSCE	Engineering
Parsons Brinkerhoff Quade & Douglas, Inc. J. Ng S. Uejo	Proj. Mgr. Engineer	BSCE BSCE	Traffic Assmt. Traffic Assmt.



# CORRECTION

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

<u>Name/Affiliation</u>	<u>Title</u>	<u>Education</u>	<u>Area of Expertise</u>
Gordon A. Chapman Consulting Services G. A. Chapman	Owner	BS Econ/Zool.	EIS Prep.
Char & Assoc. W. Char	Botanical Consultant	BS & MS Botany	Botany
G. Linney	Botanical Consultant	MS Botany	Botany
Paul H. Rosendahl PH. D., Inc. P. H. Rosendahl J. D. Mayberry	President Superv. Arch.	PhD MA Arch.	Archaeology Archaeology
Community Resources, Inc. J. M. Knox D. Rae D. R. Curry M. Diaz	President Associate Sr. Research. Jr. Research.	PhD MS, MPH MURP BS Env. St.	Soc. Psych. Fiscal Impacts Pop. Forecasts Census/Demogr.
Philip Bruner P. Bruner	Owner	MS	Biol. Avifauna
John Child & Company K. Char, MAI U. Ewart	Exec. V.P. Appraiser	MBA, BBA BA	Market Assmt. Market Assmt.
J. W. Morrow J. W. Morrow	Owner	MPH	Air Qual. Anal.
Community Planning Inc. B. Kea	President	BSCE	Engineering
Parsons Brinkerhoff Quade & Douglas, Inc. J. Ng S. Uejo	Proj. Mgr. Engineer	BSCE BSCE	Traffic Assmt. Traffic Assmt.

DESCRIPTION OF THE PROPOSED PROJECT

## CHAPTER II

### DESCRIPTION OF THE PROPOSED PROJECT

#### 1. REGIONAL SETTING

The proposed project is located in Maili, Waianae District, Oahu, Hawaii (Figure II-1). The Waianae District consists of several communities: Nanakuli, Maili, Lualualei, Waianae, Makaha and Makua. Nanakuli and Waianae towns are approximately 3.5 miles southeasterly and northwesterly respectively from the project site. All of the Waianae communities are geographically located along the coast or within broad arid valleys of the Waianae mountain range. The area has a mean annual rainfall of approximately 20 inches, which occurs primarily during the months of October through April. The mean annual temperature is 74 degrees F, and daily temperatures approach 60 degrees F during winter evenings and 90 degrees F for hot sunny days during the dry months from May through September. The prevailing winds are from the northeast (trades); however, convection winds caused by the heated land mass and local topographic features result in considerable local variations in the prevailing wind patterns along the coast. Similarly, the area experiences midday sea breezes followed by offshore breezes during the evening and night time. Southerly winds (Kona) associated with southerly storms are most common during the late winter and early spring, but can occur at any time of the year. Northerly and northwesterly storms that commonly occur during the early and late winter also affect the coastline. The Waianae Coast is a popular surfing area during the summer southerly swell period and Waianae Harbor (Pokai Bay) serves as a regional commercial and recreational fishing harbor.

1.1 DESCRIPTION OF PROPERTY

The subject property, comprised of two tax map parcels (TMK: 8-7-10: 02, 14) totals approximately 415 acres as shown on Figure II-2. The property is legally defined as follows:

TMK: 8-7-10:02

All those certain parcels of land situated at Lualualei, District of Waianae, City and County of Honolulu, State of Hawaii, described as follows:

First, Lot 201, area 0.722 acre and Lot 203, area 275.691 acres as shown on Map 33, filed in the Office of the Assistant Registrar of the Land Court of the State of Hawaii with Land Court Application No. 130 of Alexander C. Dowsett et al, and being a portion of the lands described in transfer Certificate of Title No. 16,059.

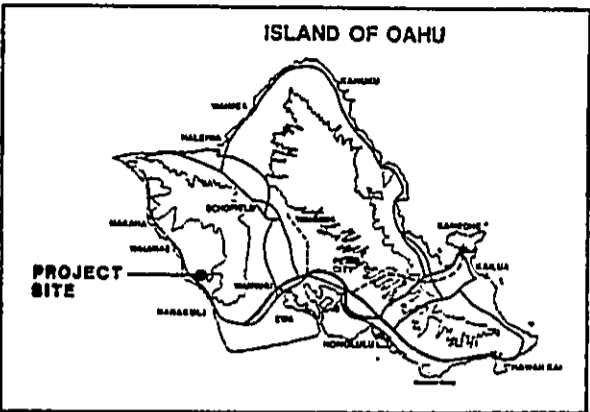
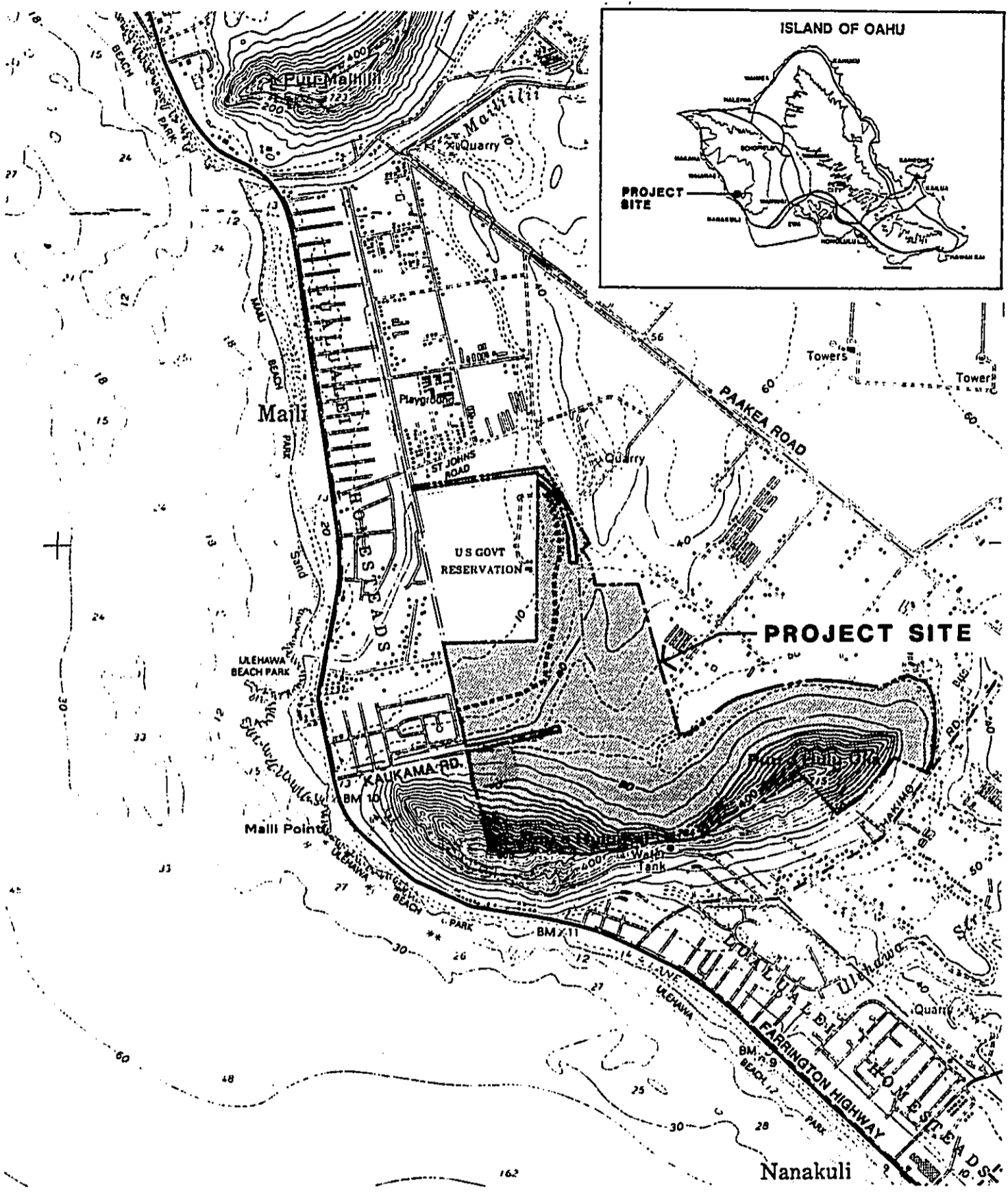
Second, land situated on the south side of Holt Road being a portion of Grant 4751 to H. M. Von Holt.

TMK: 8-7-10:14

Land situated at Lualualei, Waianae, Oahu, Hawaii, being a portion of Grant 4751 to H. M. Von Holt, being also a portion of Lot 203-A of Land Court Application 130... containing an area of 350,899 square feet or 8.056 acres.

The property is owned in fee by the Kaiser Cement Corporation, now an entity of Hanson Trust, with the State of Hawaii, United States of America, Lone Star Cement and Hawaiian Cement owning the larger abutting land parcels (see Figure II-2). Several other owners control smaller abutting parcels that are used for various purposes as depicted on Figure II-3. The proposed project property is irregularly shaped and slopes gently upward from the northern boundary at about 25 feet Mean Sea Level (MSL)



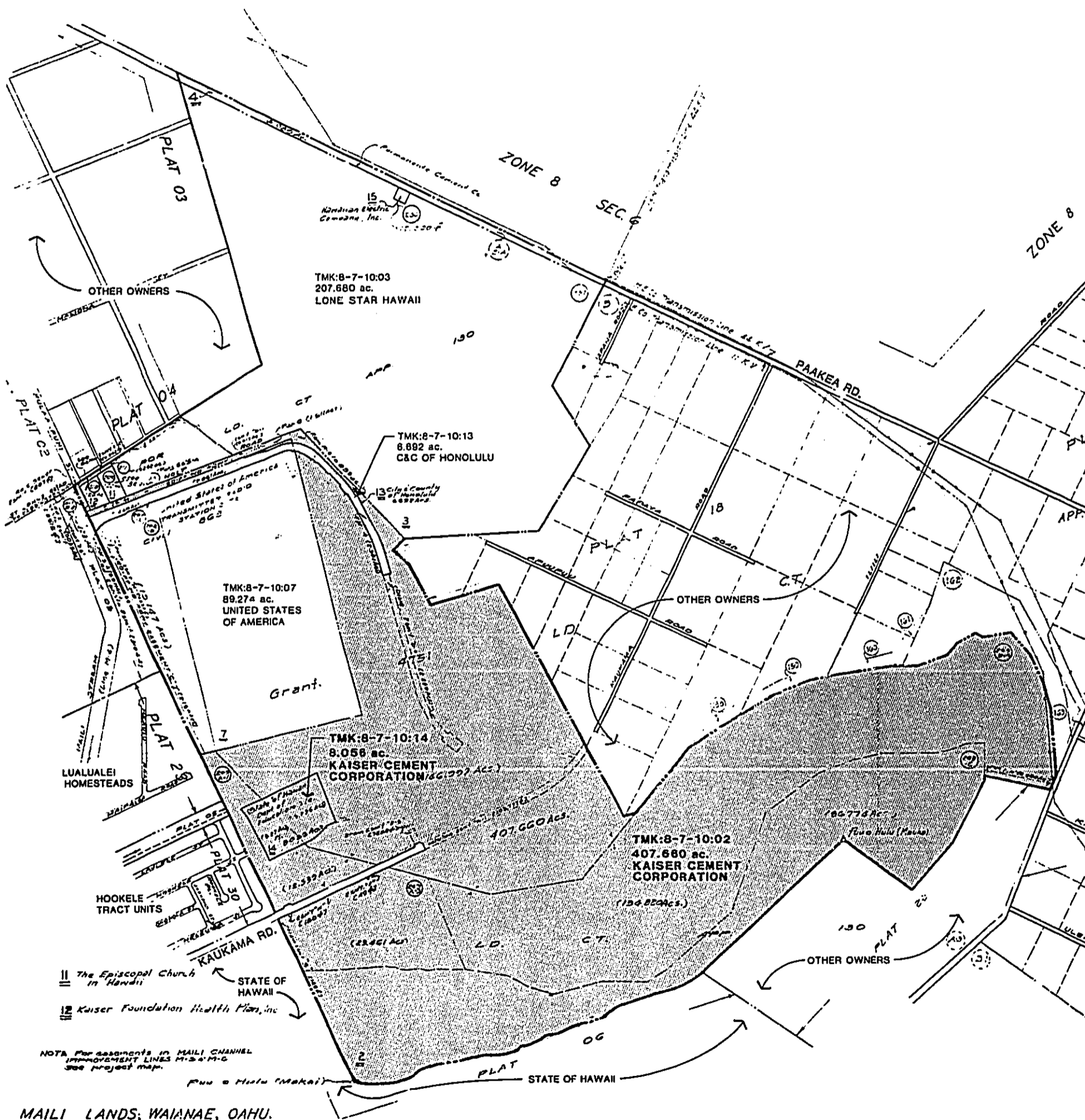


**LOCATION MAP**

SOURCE: U.S.G.S. QUAD, 1968

**FIGURE II-1  
MAILI KAI PROPERTY**





TMK:8-7-10:03  
207.680 ac.  
LONE STAR HAWAII

TMK:8-7-10:13  
6.882 ac.  
C&C OF HONOLULU

TMK:8-7-10:07  
89.274 ac.  
UNITED STATES  
OF AMERICA

TMK:8-7-10:14  
8.056 ac.  
KAISER CEMENT  
CORPORATION (86,199 ac.)

TMK:8-7-10:02  
407.680 ac.  
KAISER CEMENT  
CORPORATION  
(194,824 ac.)

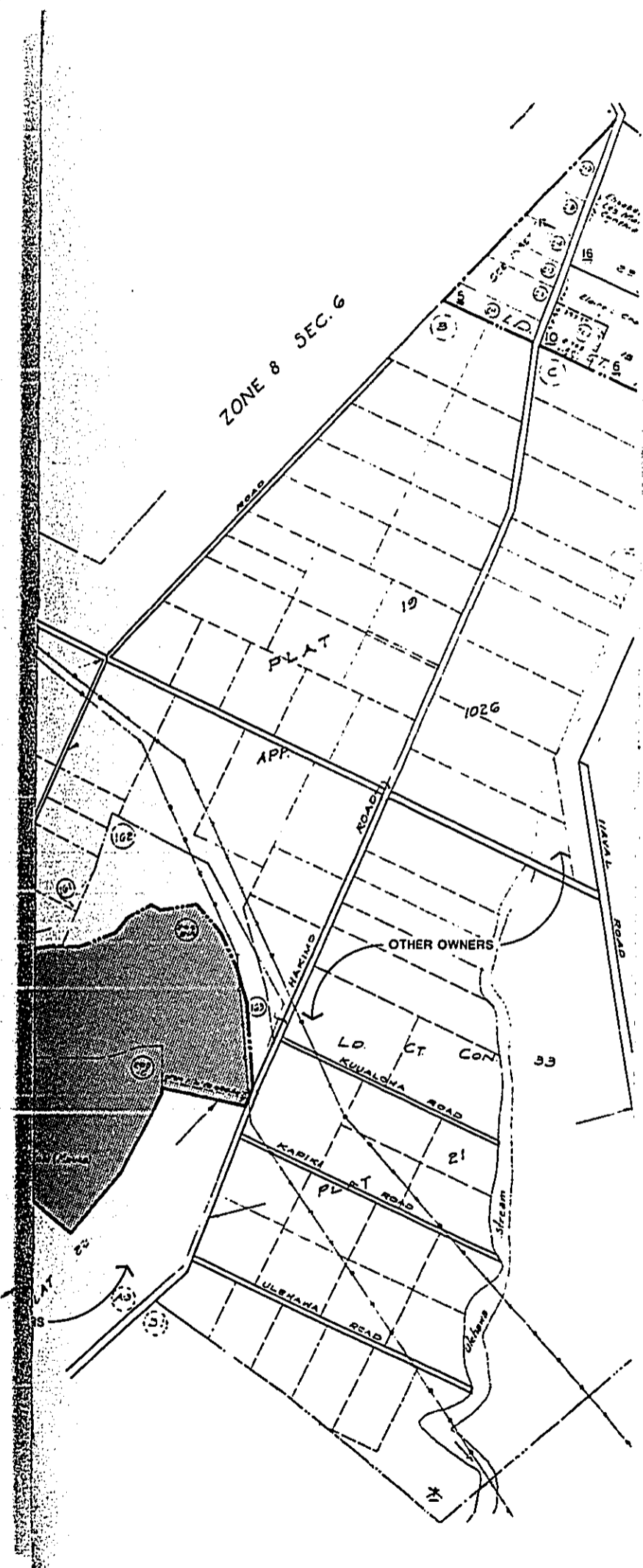
- || The Episcopal Church in Honolulu
- || Kaiser Foundation Health Plan, Inc.

NOTE: For easements in MAILI CHANNEL IMPROVEMENT LINES M-3 & M-6 see project map.

MAILI LANDS, WAIANA, OAHU.

**FIGURE II-2**  
**MAILI KAI PROPERTY**  
 MAILI, OAHU

**TAX MAP KEYS/OWNERSHIP**



*Dropped: 1;*

FIRST DIVISION		
ZONE	SEC.	PLAT
8	7	10
CONTAINING PARCELS		
SCALE: 1 in. = 500ft.		

Owner's, lessee's and vendee names recorded on this tax map print may not be current. Please refer to ownership history sheets and field books for current owners.





MAILI Playground  
MAILI Elementary School

EXTRACTION

VACANT

RESIDENTIAL

AGRICULTURE/RE

CONSERVATION

FARRINGTON HIGHWAY

PAAKEA RD.

KAUKAMA RD.

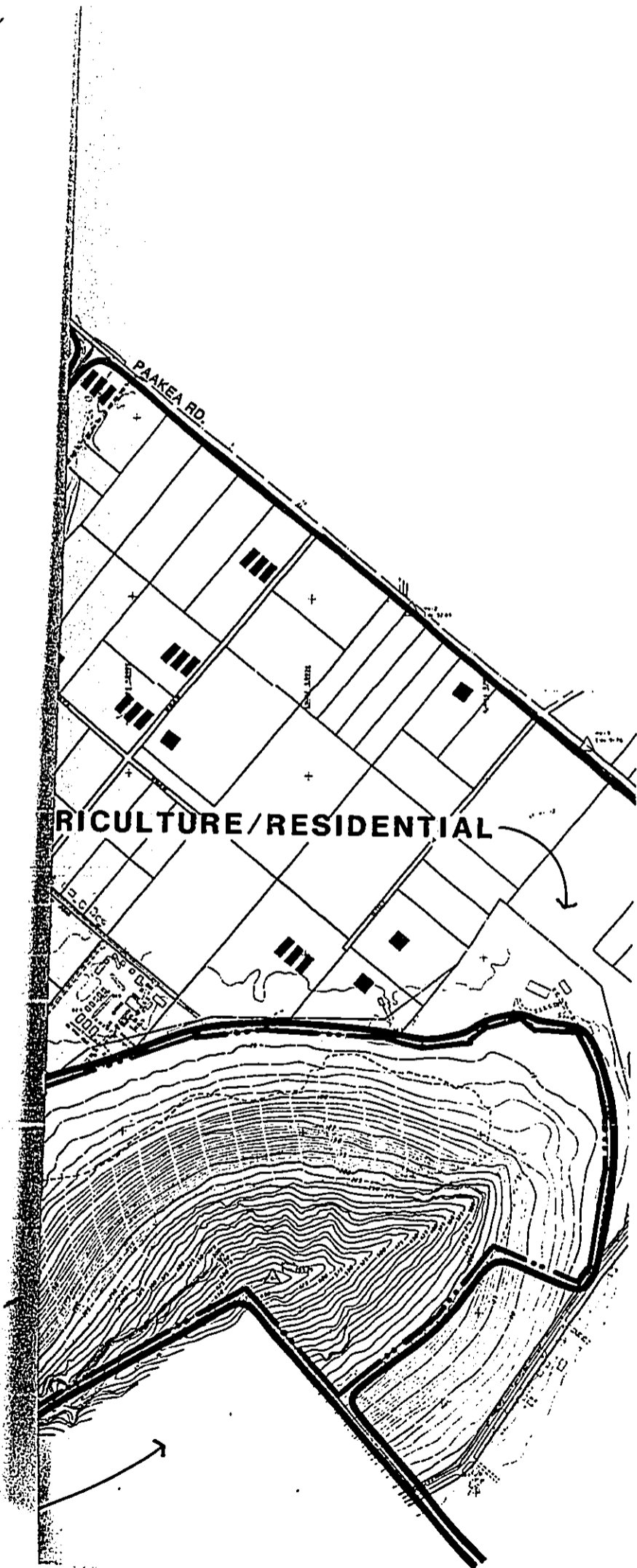
FIGURE II-3  
MAILI KAI PROPERTY  
MAILI, OAHU

**SURROUNDING USES**

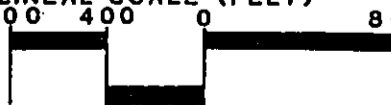
**LEGEND**

-  POULTRY FARM
-  PIGGERY

SOURCE: DEPT. OF HEALTH, 1988  
IDENTIFIED USES ARE GRAPHIC REPRESENTATION  
AND ARE APPROXIMATE LOCATIONS ONLY.



LINEAL SCALE (FEET)  
800 400 0 800



to approximately 200 feet MSL and then rises steeply to the top of Puu O Hulu Ridge at a maximum elevation of about 850 feet MSL. General slope analysis of the site indicates that approximately 312 acres (73 percent of the site) are of slopes less than 20 percent and the remaining 103 acres (27 percent of the site) are of slopes greater than 20 percent as shown on Figure II-4 and in Table II-1. State Land Use, Waianae Development Plan Land Use, Waianae Development Plan Public Facilities and County zoning classifications are summarized in Table II-2 and shown on Figures II-5 through II-8.

The present Waianae Development Plan Land Use and Waianae Development Plan Public Facilities (Figures II-6 and II-7 respectively) indicate four land uses for the proposed project site: Residential, approximately 46 acres; Agriculture, approximately 280 acres; Public Facilities, approximately 2 acres; and Preservation, approximately 87 acres.

## 2. BACKGROUND AND HISTORY OF PROPERTY AND PROJECT

Historically, the Waianae area, including Maili, is generally thought of as "the end of the road." In the mid-nineteenth century a few cattle ranches operated in the area and later, sugar was introduced into the area, making it the second largest settlement outside of Honolulu. Sugar dominated the social and economic life of the Waianae area until shortly after World War II. Although Waianae prospered because of sugar and cattle ranching, Maili because of the lack of water, did not grow until the early 1900's when cattle ranching did become a factor. In 1912, the U.S. Navy established the Lualualei munitions depot and transmitting station. Development of the Maili area has been slow and generally continues to lag behind that of neighboring towns of Nanakuli and Waianae.

TABLE II-1  
SLOPE ANALYSIS

<u>Category</u>	<u>Acres</u>	<u>Percent of Site</u>
Less than 5%	+170	41
6% to 10%	+ 48	12
11% to 15%	+ 16	1
16% to 20%	+ 54	13
Greater than 20%	+127	33
	-----	---
TOTALS	+415	100

TABLE II-2  
EXISTING LAND USE CLASSIFICATIONS

<u>State Land Use:</u>		
Urban		+ 227 Acres
Agriculture		+ 101 Acres
Conservation		+ 87 Acres
		-----
		+ 415 Acres

Development Plan  
Designation:

a. Land Use Map:

Residential	+ 46 Acres
Agriculture	+ 280 Acres
Preservation	+ 87 Acres
Public Facility	+ 2 Acres
	-----
	+ 415 Acres

b. Public  
Facilities Map: No Designation

County Zoning:

Residential (R-5)	+ 34 Acres
Agriculture (Ag-2)	+ 294 Acres
Preservation (P-1)	+ 87 Acres
	-----
	+ 415 Acres





**FIGURE II-4**  
**MAILI KAI PROPERTY**  
**MAILI, OAHU**

**SLOPES/SURFACE DRAINAGE**

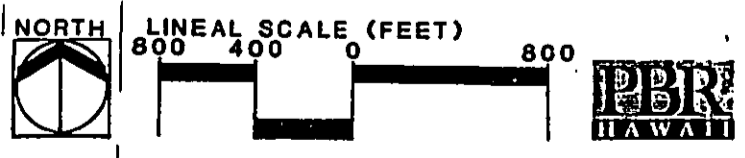
**LEGEND**

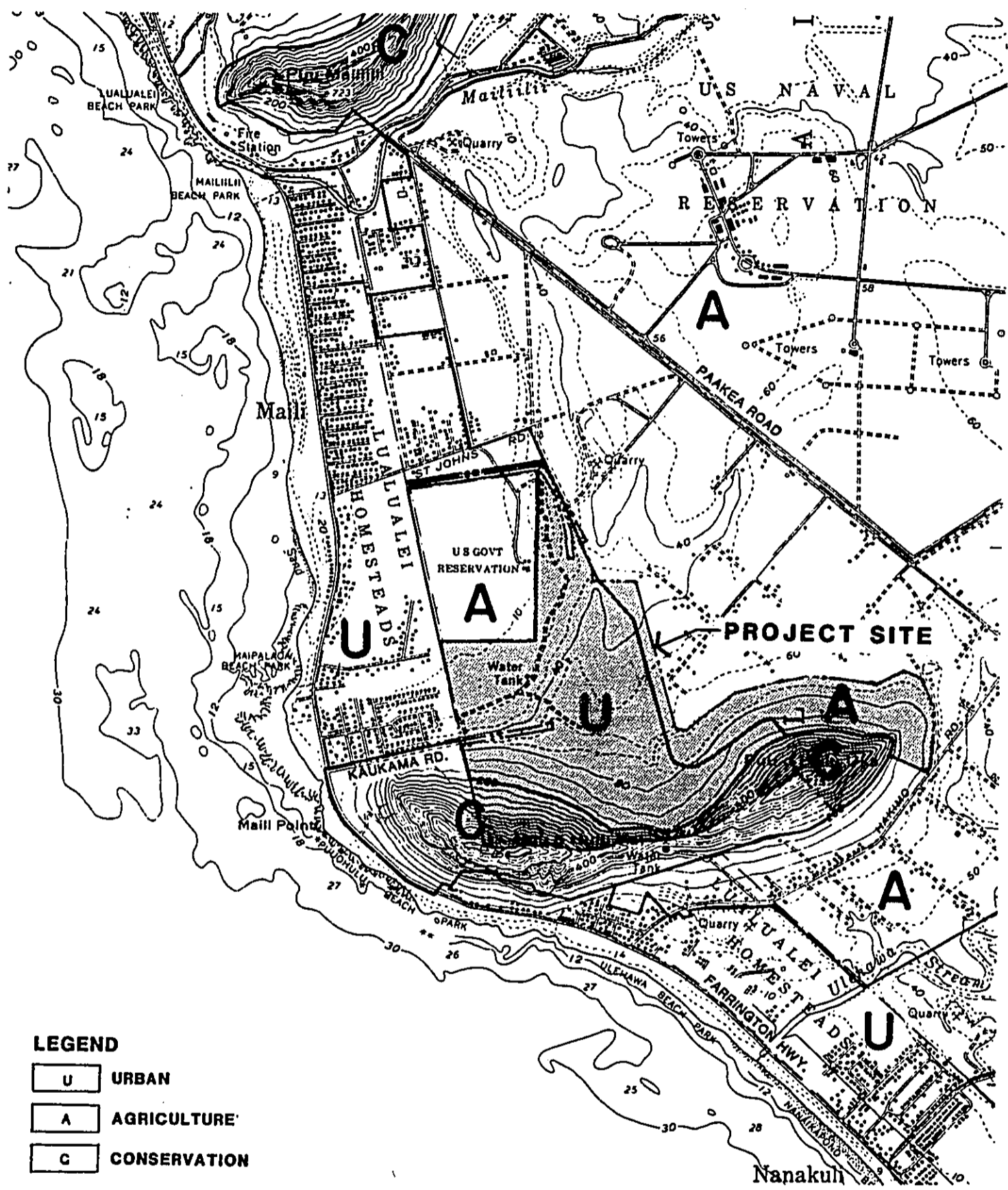
**SLOPES**

- 1** SLOPES LESS THAN 5%
- 2** 6-10%
- 3** 11-15%
- 4** 16-20%
- 5** 20% AND GREATER

**DRAINAGE**

- ||>||** SURFACE DRAINAGE





**LEGEND**

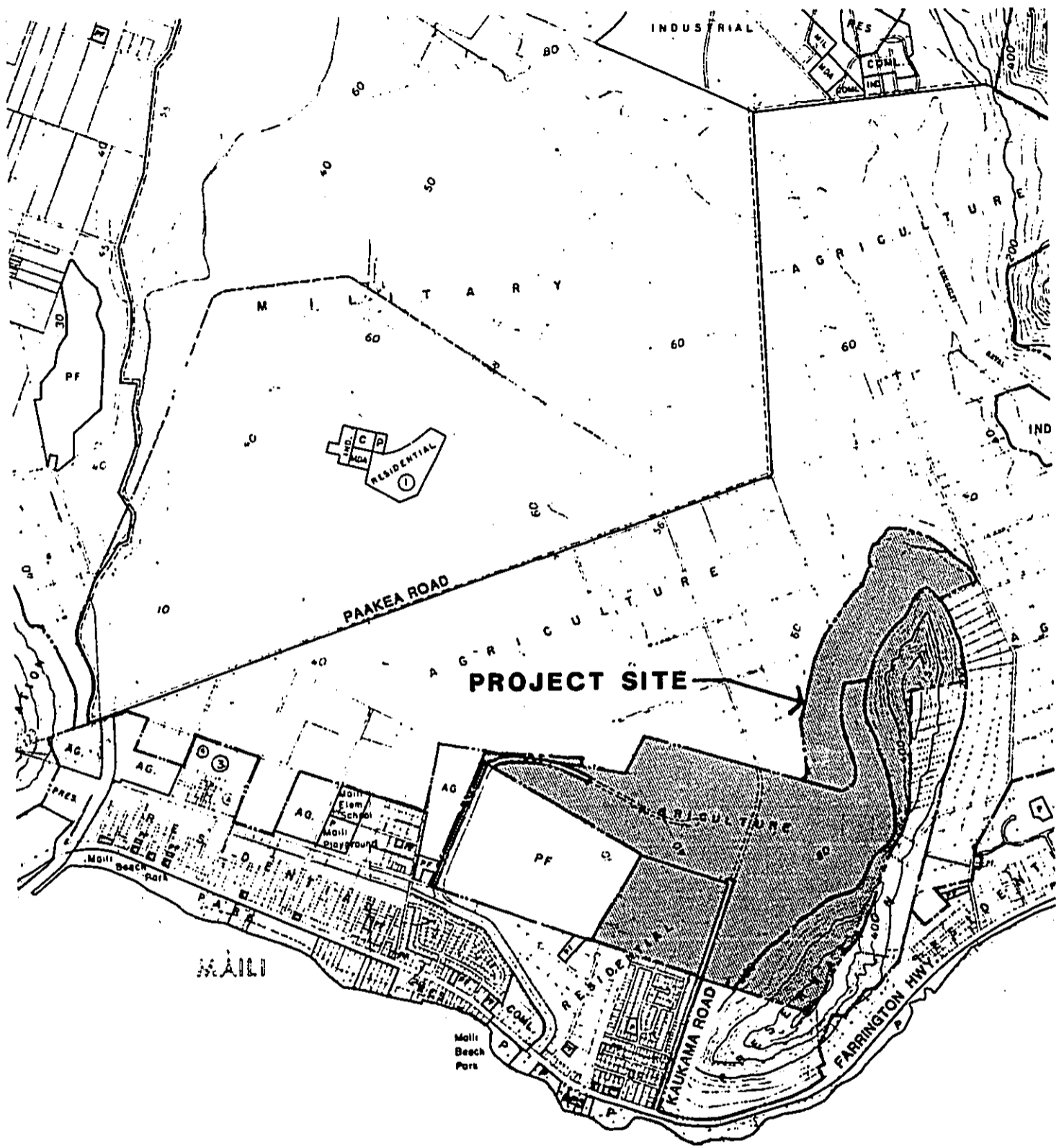
- U URBAN
- A AGRICULTURE
- C CONSERVATION

**STATE LAND USE CLASSIFICATION**

SOURCE: STATE LAND USE COMMISSION  
DEPARTMENT OF PLANNING & ECONOMIC DEVELOPMENT

**FIGURE II-5  
MAILI KAI PROPERTY**





**WAIANAE DEVELOPMENT  
PLAN LAND USE**

SOURCE: DEPARTMENT OF GENERAL PLANNING  
CITY & COUNTY OF HONOLULU

**FIGURE II-6  
MAILI KAI PROPERTY**





**LEGEND**

**PRESERVATION ZONES**

- P-1 RESTRICTED GENERAL
- P-2 GENERAL
- F-1 MILITARY AND FEDERAL

**RESIDENTIAL ZONES**

- R-20 RESIDENTIAL
- R-10 RESIDENTIAL
- R-7.5 RESIDENTIAL
- R-5 RESIDENTIAL
- R-3.5 RESIDENTIAL

**APARTMENT ZONES**

- A-1 APARTMENT
- A-2 APARTMENT
- A-3 APARTMENT

**APARTMENT MIXED USE ZONES**

- AMX-1 LOW DENSITY
- AMX-2 MEDIUM DENSITY
- AMX-3 HIGH DENSITY

**RESORT ZONE**

- RESORT

**BUSINESS ZONES**

- B-1 NEIGHBORHOOD BUSINESS
- B-2 COMMUNITY BUSINESS

**BUSINESS MIXED USE ZONES**

- BMX-3 COMMUNITY
- BMX-4 CENTRAL

**INDUSTRIAL ZONES**

- I-1 LIMITED
- I-2 GENERAL
- I-3 WATERFRONT

**INDUSTRIAL MIXED USE ZONE**

- MX-1 INDUSTRIAL MIXED USE

**AGRICULTURAL ZONES**

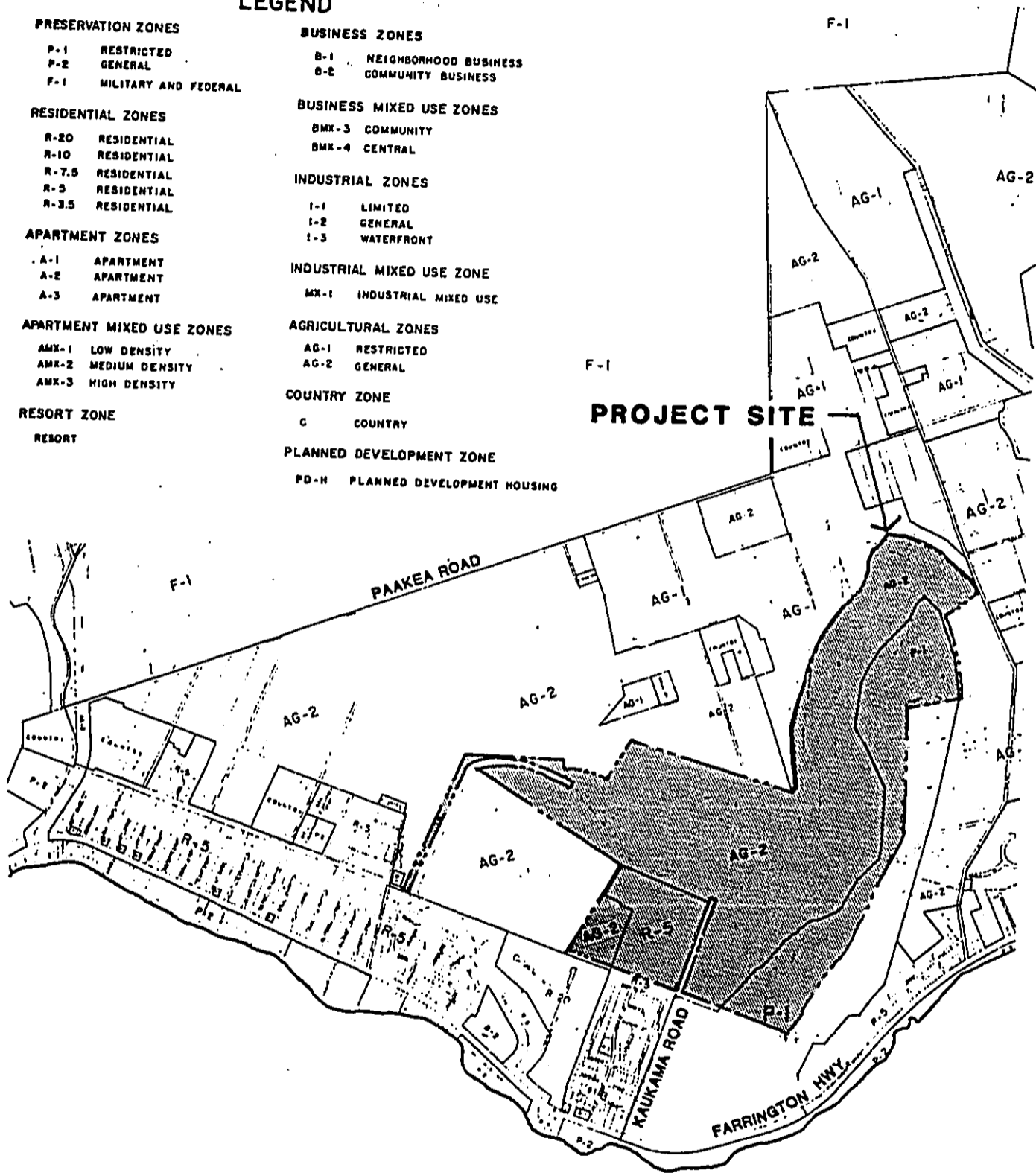
- AG-1 RESTRICTED
- AG-2 GENERAL

**COUNTRY ZONE**

- C COUNTRY

**PLANNED DEVELOPMENT ZONE**

- PD-H PLANNED DEVELOPMENT HOUSING



**COUNTY ZONING**

SOURCE: DEPARTMENT OF LAND UTILIZATION  
CITY & COUNTY OF HONOLULU

**FIGURE II-8  
MAILI KAI PROPERTY**



In the mid-1970's, the owner of the Maili Kai property, Kaiser Cement Corporation, initiated actions to develop the Maili Kai property, but did not complete actions due to market circumstances at the time. Various farming and agricultural activities have occurred on the property, with the last having been abandoned in the late 1950's. Lone Star and Hawaiian Cement Corporations do still have an approved quarry site northeast of the property, but this operation is also closed at present and there are no known plans to renew quarry operations. In essence, the Maili Kai property has remained vacant for the last several years, in part due to the lack of water and other infrastructural components. Planning for the presently proposed project was initiated in early 1987 and represents the first project for the property that has been studied in some detail for several years and appears to be timely given the need for housing in the area as well as the general need for housing on Oahu.

3. DEVELOPMENT CONCEPT

3.1 PROJECT OBJECTIVES

The objectives of the proposed project are to:

1. Provide a range of housing opportunities in the Waianae Coast area in general and specifically in the Maili area,
2. Provide a community setting in which minimal controls on neighborhood character and upkeep are encouraged,
3. Provide recreational facilities and amenities that can be enjoyed by the community at-large as well as the residents of Maili Kai.

### 3.2 DESCRIPTION OF THE PROPOSED PROJECT

The proposed project has been designed to provide a mix of housing opportunities in the Maili area such that gap group, low and moderate income groups and those who can afford market priced homes of comparable value can reside within a community in which the environment is minimally controlled and maintained for the betterment of all concerned. Approximately 1,315 units of the net 1,435 units proposed, would be developed for gap group and low and moderate income groups. These units would be single family, multifamily (townhouse) and low density apartment units (two-story garden type apartments). The remaining 120 units would be at market price consisting of larger single family lots along Puu O Hulu ridge below the Conservation/Preservation designated lands. The numbers of the various unit types and estimated sales prices are shown in Table II-3.

The proposed project concept plan shown on Figure II-9 is characterized by a variety of residential housing, complimented by a 9-hole golf course and a park. Potential zoning designations have been selected only as a means to clarify the quality of such a project and do not represent the definitive designations.

The proposed project requires the redesignation of approximately 168.5 acres of Agriculture land to Residential, Low Density Apartment and Parks and Recreation as shown on Figure II-10 and in Table II-4. As noted previously, the Waianae Development Plan land Use Map identifies four land uses on the Maili Kai property: Residential - all of which would remain under the proposed project; Agriculture - approximately 280 acres, of which 111.5 acres would remain in Agriculture under the proposed project; Preservation - all of which would be retained as Preservation; and Public Facility - all of which would be retained under the proposed project.

**TABLE II-3  
MAILI KAI HOUSING PROVISIONS**

**MAILI KAI PROJECT**

**Affordable Gap Group Units**

<u>Unit Type</u>	<u>No. of Units</u>	<u>Estimated Sales Price</u>
Single Family	411	\$95 - 120,000
Multi Family (Town House)	432	\$70 - 85,000
Low Density Apartment	472	\$55 - 65,000
<b>Total:</b>	<b>1,315</b>	

**Market Priced Units**

<u>Unit Type</u>	<u>No. of Units</u>	<u>Estimated Sales Price</u>
Single Family	120	\$130 - 160,000

**TOTAL UNITS: 1,435**

**AFFORDABLE SALES PRICES OF GAP GROUP HOMES (1)**

City and County of Honolulu

<u>Family Income Size</u>	<u>Range of Gap Group Families</u>	<u>Range of Available Monthly Mortgage Payments</u>	<u>Range of Affordable Home Sales Price</u>
1	\$19,100 - 28,644	\$409 - 664	\$51,827 - 84,050
2	\$21,850 - 32,736	\$483 - 733	\$61,111 - 97,866
3	\$24,555 - 36,828	\$555 - 882	\$70,227 - 111,682
4	\$27,300 - 40,920	\$628 - 991	\$79,512 - 125,498
5	\$29,000 - 43,375	\$673 - 1,057	\$85,252 - 133,787

Notes: (1) Source: Definition of "Affordable Housing", HHA June 15, 1987.

\*The hypothetically affordable homes sales price was derived by performing the following arithmetical calculations, and was based on certain assumptions including a 30-year mortgage, a 10% interest rate, and a 10% downpayment.

The annual income was divided by 12 to arrive at a monthly income. This monthly income was then multiplied by 32% representing the qualifying ratio. \$100 was then subtracted from the product for estimated reserves, with the remainder representing an amount available each month for principal and interest (P & I).

Working backwards, the mortgage principal amount was calculated based on the amount available each month for principal and interest; the sales price was then calculated by dividing the mortgage principal amount by 90% (to take into consideration a 10% downpayment).

**Example:**

Annual income .....	\$ 27,300 + 12
Monthly income .....	\$ 2,275
Qualifying ratio .....	x 32%
Amount available for housing payment .....	\$ 728
Less estimated reserves .....	(100)
Amount available for P & I .....	\$ 628
Mortgage principal amount .....	\$ 71,550 + 90
"Affordable" sales price .....	\$ 79,500



**TABLE II-4  
LAND USE SUMMARY**

<u>D.P. Land Use</u>	<u>Existing Acres</u>	<u>Proposed Acres</u>	<u>Total Existing* &amp; Proposed Acres</u>
Residential	46	124.5	170.5
LDA	0	32.5	32.5
Park/Recreation	0	11.5	11.5
Agriculture	280	111.5	111.5
Preservation	87	87	87
Public Facility	<u>2</u>	<u>2</u>	<u>2</u>
	415	369	415

\* Includes 46 acres of existing D. P. Land Use Residential designation.

**4. NEED FOR THE PROPOSED PROJECT: MARKET ASSESSMENT**

To assess the market demand for the proposed Maili Kai project, a market assessment of the project was performed (Appendix A). The following summarizes the results of that study and presents the market analyses for both the "affordable" and market priced residential units.

**4.1 MARKET ASSESSMENT - AFFORDABLE UNITS**

**4.1.1 Study Approach**

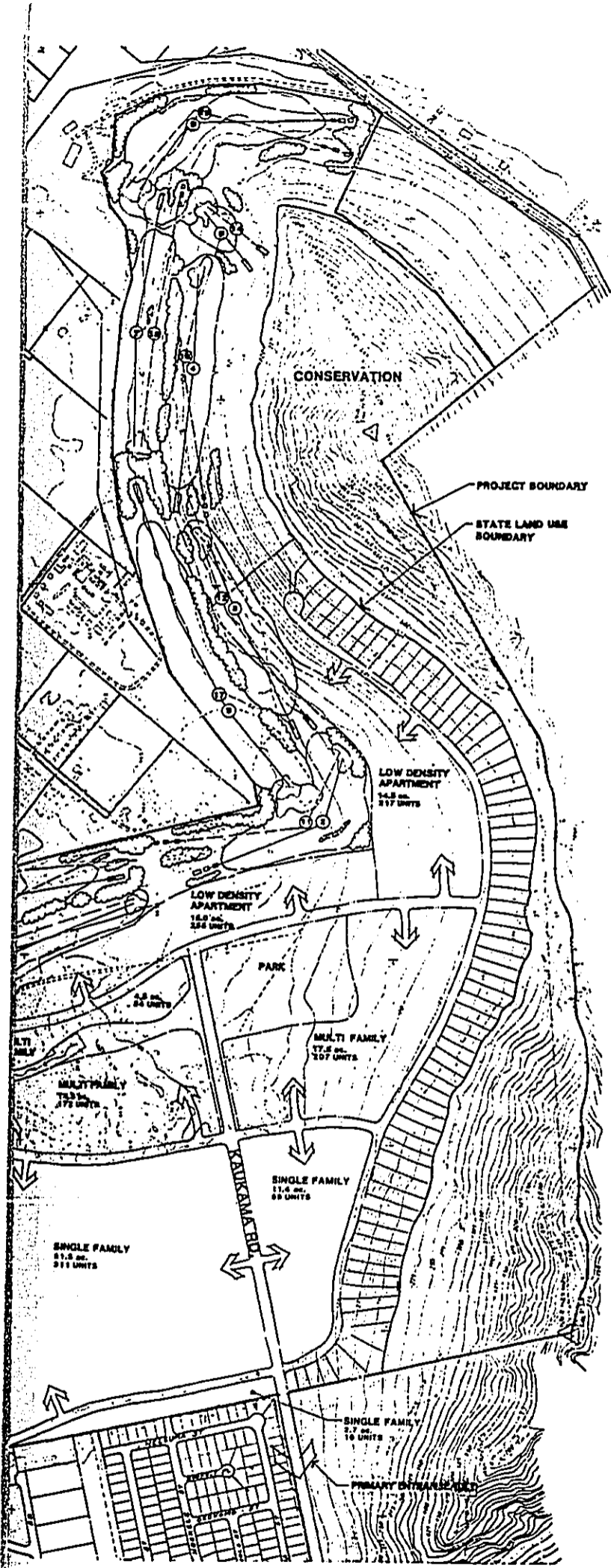
The study approach to complete the market assessments for affordable units is outlined as follows:

- o Overview of housing and demographic trends on Oahu, Waianae and Ewa.



**FIGURE II-9**  
**MAILI KAI PROPERTY**  
 MAILI, OAHU

**CONCEPTUAL MASTER PLAN**



**LAND USE**

CONSERVATION	± 87.0 ac.
AGRICULTURE (9 HOLE GOLF COURSE (MULTIPLE TEES))	± 101.0 ac.
<b>URBAN</b>	
PARK	± 11.5 ac.
RESIDENTIAL (R-10)	± 30.0 ac.
RESIDENTIAL (R-5)	± 68.0 ac.
MULTI FAMILY	± 36.0 ac.
LOW DENSITY APARTMENT	± 29.5 ac.
CIRCULATION	± 37.0 ac.
OPEN SPACE	± 15.0 ac.
<b>TOTAL:</b>	<b>± 227.0 ac. ± 415.0 ac.</b>

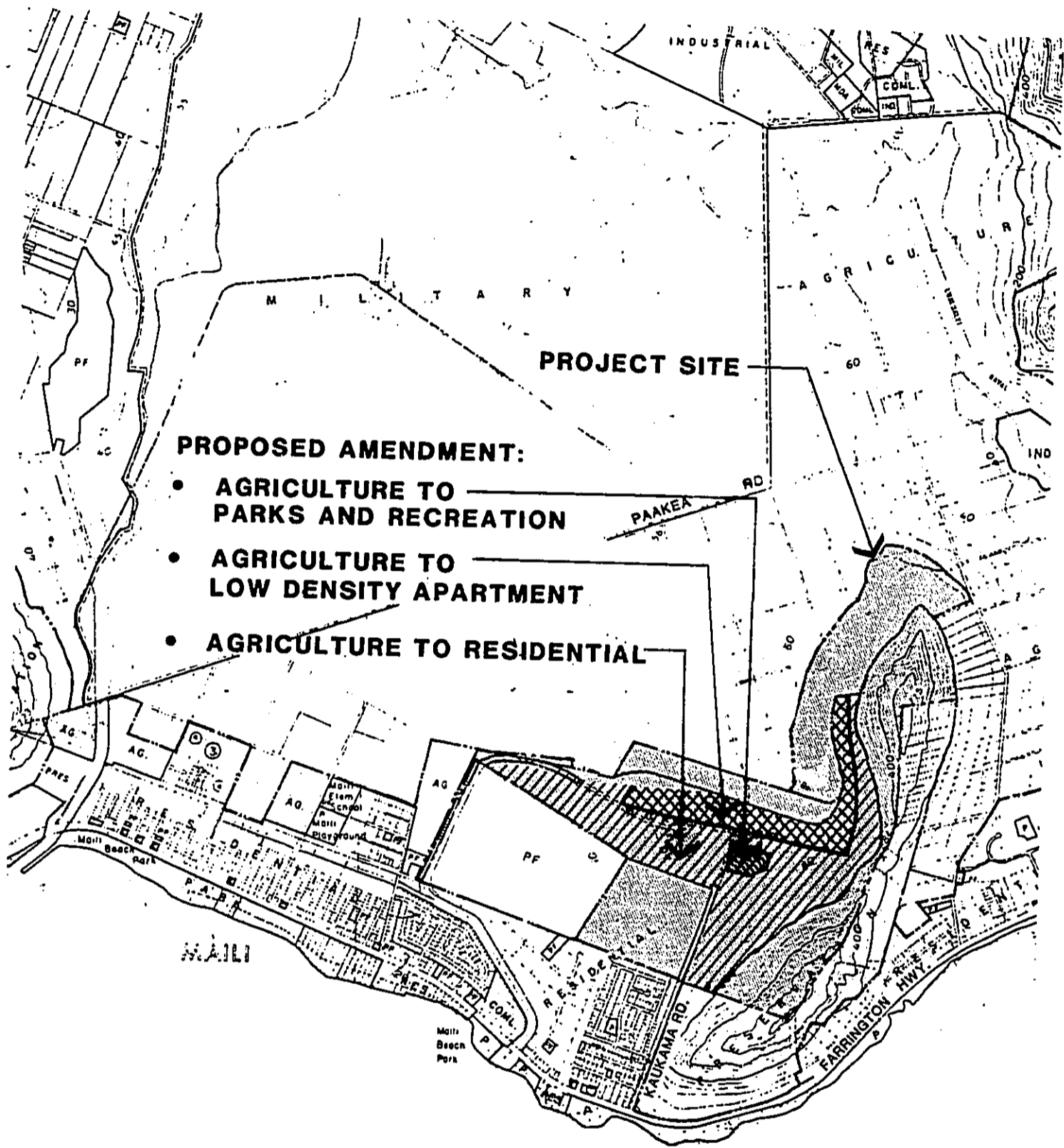
**DWELLING UNITS**

RESIDENTIAL	ACRES	UNITS
R-10 (10,000)	± 30.0	± 120
R-5 (5,000)	± 68.0	± 411
MULTI FAMILY	± 36.0	± 432
LOW DENSITY APARTMENT	± 29.5	± 472
<b>TOTAL:</b>	<b>± 163.5</b>	<b>± 1,435</b>



LINEAL SCALE (FEET)





**PROPOSED D.P. LAND USE AMENDMENT**

SOURCE: DEPARTMENT OF GENERAL PLANNING  
CITY & COUNTY OF HONOLULU

**FIGURE II-10  
MAILI KAI PROPERTY**



- o Review of recent publications covering affordable housing. The articles include:
  - Oahu's Affordable Housing Crisis, Department of Housing and Community Development (DHCD), City & County of Honolulu, dated March 16, 1987.
  - Three-Year Housing Assistance Plan for the City & County of Honolulu, October 1985-September 1988, DHCD, City & County of Honolulu, dated June 1985.
  - Hawaii State Plan: Affordable Housing Issue Paper, Department of Planning and Economic Development (DPED), State of Hawaii, dated December 1984.
  - Affordable Housing Issue Paper, DPED, Hawaii, dated December 1981 - Daly & Associates, Inc.
- o Interviews with representatives of DHCD and Housing Finance and Development Corporation (HFDC), formerly Hawaii Housing Authority, as a basis to evaluate household income levels and housing prices the gap group could afford.
- o Review of historical absorption rates, sales price range, buyer profile and unit characteristics of comparable projects oriented to the gap group.
- o Identification and evaluation of existing and proposed competitive residential developments on Oahu sponsored by HFDC, DHCD or private developers.
- o Assessment of the competitiveness of the proposed Maili Kai project in relation to the current and proposed residential projects on Oahu.

- o Estimate of the sales prices and absorption period for the proposed Maili Kai project based on the absorption rates experienced by recent comparable projects, projected market trends and the competitive position of the Maili Kai project.

#### 4.1.2 Regional Background

Trends in Hawaii, Oahu, Waianae and Ewa were reviewed in terms of population, personal income, employment and economic activity. Significant trends are outlined as follows:

- o Resident population of Hawaii is projected to reach 1.3 million by 1990 and 1.5 million by 2005.
- o Personal income in Hawaii has increased 8 to 12 percent annually since 1965 and compares to National levels.
- o Employment continues to grow in government, service and retail trades; Hawaii's current unemployment rate of 3.9 percent compares favorably to National averages.
- o Economy of the State is expected to remain strong.
- o Resident population of Oahu is expected to reach 954,500 by 2005.
- o Most dramatic growth in the past 10 to 15 years occurred in Central Oahu; however, in the next 10 to 20 years growth is expected to focus in the Ewa area.
- o 1985 population distribution on Oahu includes about 4.5 percent in Ewa (36,738 residents) and 4.3 percent in Waianae (34,903 residents).

#### 4.1.3 Definition of Gap Group

The gap group household is defined in relation to median household income. The DHCD defines gap group households as those with incomes between 80 and 120 percent of the median household income estimate provided by HUD for metropolitan areas of Hawaii (see Notes to Table II-3).

#### 4.1.4 Gap Group Market

The gap group housing market was reviewed in terms of household incomes, population, and supply and demand relationships on Oahu. Significant trends relating to the gap group market and housing inventory on an islandwide basis are outlined as follows:

- o The minimum and maximum income levels for typical household sizes under the current DHCD guidelines are as follows:

##### Gap Group Qualification

<u>Number persons in household</u>	<u>Household Income</u>	
	<u>Minimum</u>	<u>Maximum</u>
1	\$19,100	\$28,644
2	21,850	32,736
3	24,555	36,828
4	27,300	40,920
5	29,000	43,375

- o In 1980, estimated gap group households on Oahu totaled 39,366 households. A total of 27,292 of these households were renting their units.
- o Since 1980, sales prices of homes have risen faster than increases in household income. This has resulted in an increase in the number of gap group households.

- o Based on a review of the Daly & Associates, Inc. Affordable Housing Issue Paper, prepared in 1981, and recent trends in Oahu population, household incomes, and affordable housing inventory, over 30,000 households on Oahu are estimated to be in the gap group market.
- o Demand for affordable housing will increase because of increasing numbers of household formations which increase the competition and push prices further upward.
- o The problem of housing affordability shows no sign of dissipation in the near future; factors influencing both supply and demand are expected to continue pushing the cost of housing further out of reach of the average household.
- o Specific needs of the gap group desiring to become homeowners include: smaller, lower cost "starter homes," and/or reduced initial cost to enable them to qualify to purchase.
- o The gap group market is an islandwide market. Projects located in reasonable proximity to employment, schools and shopping would effectively compete for the gap group buyer.

#### 4.1.5 Gap Group Housing Inventory

Historic Inventory: The historical and current inventory of gap group housing on Oahu was reviewed. Significant trends and findings are outlined as follows:

- o The current range of purchase prices a gap group household could afford, based on household size, income, 10 percent down payment, 32 percent qualifying ratio, \$100 per month



reserves, and 30-year conventional financing at 10 percent interest, are summarized as follows:

Gap Group Unit Pricing

<u>Number persons in household</u>	<u>Estimated Range of Purchase Prices</u>	
	<u>Minimum</u>	<u>Maximum</u>
1	\$51,800	\$ 84,000
2	61,100	98,000
3	70,200	111,700
4	79,500	125,500
5	85,300	134,000

- o Relatively few gap group projects have been marketed over the recent past. Those which offered a single family detached unit in a reasonable location attracted more qualified buyers than units available for sale, and consequently, experienced short marketing periods.
- o Until recently, the private sector has not played a major role in providing single family units oriented to the gap group. A review of major projects over the past two years indicates a change in this trend:

Major Affordable Projects

	<u>1986</u>	<u>1987</u>
Private sector projects:		
Single family	0	413
Multifamily	582	434
Publicly assisted projects:		
Single family	493	15
Multifamily	<u>42</u>	<u>44</u>
Total	1,117	906

- o These major projects are estimated to represent about 75 percent of the affordable units marketed on Oahu which were oriented to the gap group purchaser. Therefore, total annual additions are estimated at between 1,200 and 1,500 units.
- o Most of these major projects typically attracted at least three times as many qualified buyers as there were units available for sale. Therefore, demand indicated by buyer interest is estimated to range from 3,600 to 4,500 units annually.
- o The number of gap group units developed by the public and private sector has not been sufficient to significantly reduce the overall demand for gap group housing units.
- o Based on the relatively limited numbers of affordable units which have been marketed in the recent past, the outlook for construction of affordable units is not encouraging. Rising material costs, coupled with the increasing cost and limited supply of suitable land, can be expected to continue pushing the costs of producing housing units higher.
- o The State has announced its policy of requiring 60 percent of new housing inventory as a condition of land use reclassification. As a result, significantly more than 10 percent of future housing development on land not currently zoned for residential use could be oriented to the gap group market.

#### 4.1.6 Planned and Projected Inventory

While gap group housing developments are generally stand-alone projects, many large residential developments orient a portion of the project inventory to the gap group. A review of major housing projects which are currently being developed or are proposed for development and contain competitive affordable units indicates the following:

- o The projects include 34,601 proposed residential units. About 38 percent (13,088 units) are proposed to be marketed as gap group units.
- o About 51 percent (6,691 units) of the gap group units are expected to be single family units, and 40 percent (5,245 units) are expected to be multifamily units. The unit types of the remaining units have not been specified.
- o About 510 of the 6,700 single family gap group units have already been marketed and are under construction.
- o Marketing is projected to commence on about 7,500 gap group units prior to 1991. However, many projects require land use/zoning approvals which may delay the projected timetables.
- o About 50 percent or 3,780 of the units scheduled to commence marketing prior to 1991 are single family units.
- o One-half of the proposed gap group units are multifamily; however, market patterns have shown that the single family dwellings are more desirable if they can be afforded.

- o Most residential projects recently marketed in Waianae have been publicly assisted projects developed by HHA. HCDC has only developed low cost rental projects in the area over the recent past.
- o Since HHA starts construction on a project only when there are three times as many income-qualified applicants as there will be units, and is charged with the distribution of affordable housing on a state-wide basis, their activity in Waianae is a conservative indication of demand for affordable housing units in the area.
- o Currently, the major competing gap group projects on Oahu would be Kahi Kani, a proposed 290±-unit single family project in Whitmore Village, and West Loch Estates, a proposed 750-unit single family project in Honouliuli, Ewa.

#### 4.1.7 Estimated Market Support for Affordable Housing

Affordable unit additions on Oahu are estimated to have ranged from 1,200 to 1,500 units over the recent past. With an estimated annual demand for 3,600 to 4,500 gap group units, there has been an unfulfilled demand for about 2,400 to 3,000 affordable units per year. An additional 13,000 units are proposed to be oriented to the gap group in Waianae, Ewa and Central Oahu over the foreseeable future. If all of the proposed projects market units according to current schedules, there would be about 1,000± units added annually over the foreseeable future. However, it is probable that many of these proposed developments will be significantly delayed or altered, and there would still be unfulfilled demand.

The marketing of recent projects oriented to the gap group market reflects this pent up demand. These projects have attracted large numbers of prospective gap group purchasers from wide geographic areas. Typically, as many as three to four times as many buyers as available units have been attracted to these affordable priced projects.

The location of the housing units has not been a significant factor unless the project was in a very remote location. Location is expected to remain a less significant factor within the gap group market, if the right housing product can be offered at an affordable price and the project is located in reasonable proximity to employment, schools and shopping. Gap group projects in Waianae have historically achieved less market support due to their remote location, high-density, plain designs, and adverse reputation as a high crime area.

#### 4.1.8 Market Assessment for Maili Kai Affordable Units

The projected demand for the 1,350 affordable housing units in Maili Kai varies by unit type. The islandwide market demand for gap group housing is expected to remain very strong over the foreseeable future. While most residential developments in the Central Oahu/Ewa area will have significant portions of their inventory oriented to the gap group market, a sufficient demand would exist to accommodate all anticipated supply.

Unit Sizes and Price: Because of the range of household sizes and income levels comprising the market, a range of unit sizes in terms of bedroom and bathroom count would be appropriate for Maili Kai. Recommended affordable unit sizes and price ranges are summarized as show in the table on the next page.

Absorption: Comparable single family developments affordable to the gap group market have experienced very rapid absorption rates. Multifamily projects oriented to the same market have not been absorbed as rapidly as single family units.

Recommended Mix of Affordable Units

<u>Unit type</u>	<u>Bedroom/ bath count</u>	<u>Net living area excluding carport (sf)</u>	<u>Estimated selling price range</u>
Single family	3/2	900-1,000	\$ 95,000-\$105,000
	3-4/2	1,000-1,200	\$105,000-\$120,000
Townhouse	2/1	750- 800	\$ 70,000-\$ 80,000
	2-3/1.5-2	800- 900	\$ 80,000-\$ 85,000
Low-density apartments	2/1	750- 800	\$ 55,000-\$ 65,000

The sales experiences of projects affordable to the gap group reflect the following absorption data:

- o Single family units generally have absorption rates which are two to three times faster than absorption rates for multifamily projects.
- o The average monthly absorption rate for the four major publicly assisted single family projects in 1986 was 91 units. These units were sold with a buy-back provision which effectively precludes the buyer from benefiting from any future increase in the unit value for 10 years.
- o Soda Creek is the only major privately developed single family affordable project in the past two years. While the unit sales have not closed, most of the 413 units were "sold" within a two-month period. It did not have a buy-back provision.

- o The average monthly absorption rate for the five most recent privately developed multifamily projects is 29 units. These units do not have buy-back provisions.
- o Absorption rates are influenced by financing. Most projects were conventionally financed through FHA/VA. However, the impact of other financing is evident for the Holani at Makaha single family project. The project had a total of 147 units and started marketing in 1986. The 100 units which were available with financing through Farmer's Home Loans (3+ percent interest) sold in two months. The 47 other units were marketed with conventional (FHA) financing, and there are still 20 units remaining to be sold. The 27 units were sold over an 18-month period.
- o Waianae district projects have been significantly influenced by financing. Those projects with very favorable financing such as Farmer's Home Loans sold rapidly. Projects with conventional financing sold at generally slower rates than similarly financed projects located elsewhere on Oahu.
- o Primary reasons cited by brokers and public agency representatives for the slower absorption rates in Waianae include remote locations, generally lower income levels for the community, and concern over reputation for higher crime rates for the area.

With the exception of projects in Makaha Valley, there has not been a master-planned residential development in Waianae which would be comparable to that proposed for the Maili Kai site. Most residential projects recently marketed in Waianae have been publicly assisted projects developed by HHA. The Maili Kai units will be more attractive than the typical HHA projects due to the

master-planned setting, security and project amenities, and absence of the buy-back provision on the majority of the units.

The recently announced Valley Homes project in Makaha Valley is a more comparable development. In the past five weeks the developer has shown his model unit to a variety of realtor groups and has already received over 30 purchase offers. At this rate, it is probable that the 119 single family unit condominium project will sell out in a few months. The positive response to this comparable project indicates significant demand exists for well designed units in a master-planned setting.

The Maili Kai affordable units could experienced a very rapid sell-out such as that indicated for Valley Homes; however, lower absorption rates are projected for Maili Kai due to its less familiar location and smaller scale of development. The absorption rates projected for the single family units are greater than that projected for the multifamily units based on the experiences of similar projects. The following absorption rates would be reasonable for the Maili Kai affordable units:

<u>Unit type</u>	<u>Planned units</u>	<u>Annual absorption rate</u>	<u>Projected absorption (years)</u>
R-5 single family units	411	100-150	3- 4
Multifamily townhouse units	432	30- 50	9-14
Low-density apartment units	472	30- 50	9-16

Projected absorption rates for affordable units at Maili Kai total 160 to 250 units per year. This represents a market share of between 4 percent and 6 percent of Oahu's projected annual demand for 4,000± units oriented to the gap group market.



#### 4.1.9 Design Considerations

A master-planned community is recommended to attract buyers to the Maili Kai project. A master-planned project would attract buyers because of the overall quality and design of the area would be known, buyers could exercise control over the quality of maintenance through an owner's association, and master planning provides a mean of developing a sense of community among the component projects. Individual projects within the various categories of land use should present a feeling of a separate community which buyers could identify with. All buyers are concerned about security - for their families and their investment. The master development plan and project designs should provide integrated security measures for each project in order to mitigate security concerns.

The overriding factors for affordable housing are price, type of unit, unit size and unit design. Location is not a significant factor provided the project is located in reasonable proximity to employment, schools and shopping. The future development of Ko Olina as a major employment center and planned development of Makakilo Shopping Center, both within 10-minute driving times of the Maili Kai site, would help to make Maili Kai competitive with other developments offering affordable units.

Options offered on single family units are generally very limited in comparable projects, and if offered, were very basic; for example, patio for expansion, garage upgrade, or appliance package. Community amenities are typically not important in the purchase decision. Buyers of affordable units do not want significant monthly obligations for maintenance of common areas/recreational facilities since they are very concerned about maximizing their purchasing dollar and meeting debt service obligations.

## 4.2 MARKET ASSESSMENT - VIEW UNITS

### 4.2.1 Study Approach

The study approach to complete the market assessments for the view lots included:

- o Review of current and projected demand for housing units on Oahu and especially in Waianae and Ewa.
- o Review of sales absorption rates, sales prices, buyer profiles and unit characteristics of comparable projects.
- o Inventory of competitive under-construction, planned and proposed inventory in all major residential developments in Waianae and Ewa.
- o Review of competitive strategies of major residential developments in Waianae and Ewa.
- o Estimate the unit sizes and average sales prices appropriate for Maili Kai.
- o Estimate of average annual absorption of the Maili Kai single family units.

### 4.2.2 Current Housing Demand

The historical and current demand for housing on Oahu was reviewed. Significant trends are outlined as follows:

- o Since 1981, between 2,500 and 4,000 new housing units have been added annually on Oahu.

- o At the same time, vacancies have remained relatively low, ranging from 3.1 percent to 4.7 percent.
- o About 41 percent of Hawaii's housing inventory is owner occupied.
- o Over the past 15 years, the strongest growth in new housing units has been concentrated in Central Oahu. From 1980 to 1985 occupied housing units in Central Oahu increased from 26,300 to 31,300 and represented 10 percent of Oahu's increase in occupied inventory.
- o At the same time occupied housing units in Waianae increased from 7,660 to 8,300 units and Ewa increased from 8,800 to 9,200 units. In 1985, Waianae and Ewa represented 3.4 percent and 3.7 percent of Oahu's occupied inventory respectively.
- o Since 1980, over 23,000 new housing units have been added on Oahu. About 9,400 are single family units.
- o Annual new sales in major projects in Waianae and Ewa and Central Oahu have averaged as follows:

	<u>No. of Units</u>
Mililani	300-400
Makakilo	100-200
Gentry-Waipio	300-400
Village Park	250-300

- o Overall, estimated annual average of 800 to 1,200 units have sold in Ewa and Central Oahu. There have not been any major private residential developments in Waianae in the recent past.

- o From 1981 to 1985, average sales prices for residential properties on Oahu have remained relatively stable. Since 1986, prices have increased significantly.
- o In comparison, average single family sales prices in both Waianae and Ewa have increased about 3 percent annually since 1984.
- o Average sales prices for single family residential properties ranged as follows:

	<u>Oahu</u>	<u>Waianae</u>	<u>Ewa</u>
1981	\$191,597	NA	NA
1982	184,227	NA	
1983	188,742	NA	
1984	187,270	\$ 97,826	\$138,600
1985	188,900	108,811	139,100
1986	210,600	104,600	144,925
Sept. 1987	261,900	106,800	151,850

#### 4.2.3 Projected Housing Demand

Demand for housing on Oahu is expected to continue to remain strong as population, employment and household incomes continue to increase. Significant trends in projected housing demand are outlined as follows:

- o Department of General Planning (DGP) projects Oahu's population to increase to 954,000 persons by 2005. The increase in population by 2005 would represent an additional demand for at least 48,200 housing units, assuming an average household size of 2.9 persons on Oahu.

- o On Oahu, the primary new demand for housing would be in Ewa because of new employment opportunities created by:
  - Ko Olina Resort
  - Expansion of Campbell Industrial Park
  - Barbers Point Harbor
  - Ewa Town Center
  
- o The Maili Kai project is located within a 10-minute drive of these employment centers and would be more convenient than some of the proposed developments in the Ewa District.
  
- o According to the DGP, the population of Ewa is expected to double to 83,100 by 2005, while Waianae's population is projected to increase by about 2,600 persons to 39,300. However, DPED's estimates of the population in Ewa may be conservative because:
  - Oahu's overall demand for new households could represent at least 48,200 new units.
  
  - Ewa and Central Oahu would be expected to represent a significant portion of the new demand because of:
    1. New job opportunities in both Ewa and Central Oahu.
    2. Availability of competitively priced residential properties.
  
- o As a result, historical annual absorption levels of 800 to 1,200 units would be expected to double to 1,500 to 2,500 units over the next 20 years. Ewa would attract about two-thirds of the future units based upon projected population growth, say 1,000 to 1,700 units per year.

- o Overall housing demand in Ewa and Central Oahu is estimated to be about 42,000 units by 2005. However, considering an average vacancy rate of about 5 percent, the actual new housing units required would be about 44,200 units by 2005.
- o Portions of the Waianae district which are located within reasonable travel time of employment opportunities in Ewa will compete with residential projects in Ewa for the new households attracted to the Ewa district.

#### 4.2.4 Existing and Projected Housing Inventory

Major residential developments in Waianae, Ewa and Central Oahu were evaluated in terms of development status. Waianae has no proposed major residential developments which are or would be comparable to the Maili Kai view units other than Mauna Olu subdivision. Mauna Olu subdivision was marketed as vacant houselots and has no unsold inventory. The existing and projected housing inventory for Ewa and Central Oahu is summarized as follows:

- o Current unsold inventory in major projects:

<u>Project</u>	<u>Unsold inventory</u>	
	<u>Single Family</u>	<u>Multifamily</u>
Mililani	402	330
Village Park	231	---
Makakilo	<u>96</u>	<u>24</u>
Total	729	354

- o Typical sales prices of the unsold inventory:

<u>Project</u>	<u>Sales Price Range</u>	
	<u>Single Family</u>	<u>Multifamily</u>
Mililani	\$122,000-214,000	\$78,000-160,000
Village Park	135,900-145,200	-----
Makakilo	140,900-223,000	78,000-134,000

- o Over 51,000 additional units are proposed as follows:

<u>Project</u>	<u>Potential New Units</u>
<u>Waianae</u>	
Valley Homes	119
<u>Ewa</u>	
West Loch Estates	1,500
Makakilo	3,000
Kapolei Village	4,000
Puuloa Estates	300-330
Ewa Marina	4,850
West Beach	9,200 (1)
Ewa by Gentry	7,000-8,000
Ewa Town Center	NA
<u>Central Oahu</u>	
Mililani Mauka	6,640
Waikele	2,700
Village Park	3,480
Waiawa Ridge	8,000
<b>Total</b>	<b>50,789-51,819</b>

(1) Luxury multifamily residential units.

- o State land use and county zoning approvals are required to develop the proposed projects. Current approvals permit development as follows:

	<u>Potential New Units</u>
Development approvals obtained	7,834
State Land Use approved	3,265-3,925
State and County approvals required	39,690-40,690

- o However, approvals are expected for a significant number of new units. Excluding Ewa Marina, Ewa Town Center and West Beach, 14,680 planned and about 22,000 proposed units are scheduled for Waianae, Ewa and Central Oahu.
- o The annual additions could range from about 800 to 3,300 units based on the current schedule. However, new units would be delayed when supply exceeds demand, and 3,300 units are unlikely to be built if the demand were not sufficient to support sales.
- o The proposed price ranges of competitive projects are as follows:

<u>Project</u>	<u>Units</u>	<u>Sales Price Range</u>
West Loch	600	\$130,000-180,000
Mililani Mauka	5,630	118,000-280,000
Waikele	8,000	130,000-200,000
Village Park (expansion)	3,480	120,000-195,000
Makakilo	3,000	119,000-190,000
Waiawa Ridge	8,000	130,000-140,000
Ewa by Gentry	7,000-8,000	135,000 (average)
Kapolei Village	4,000	130,000-150,000
West Beach	9,200	NA



#### 4.2.5 Estimated Market Support For Housing Development

The projected housing requirements were compared to the projected available inventory. Currently, housing supply exceeds demand; however, within one or two years, the existing and planned inventory would be insufficient, and an additional 900 to 1,000 units would be required. However, assuming Waiawa, Mililani Mauka and Ewa by Gentry receive necessary land use and zoning approvals, and development proceeded as proposed, the total available inventory would exceed demand from 1990 through about 2000.

As a result, major projects would be expected to delay or decrease the proposed phasing to minimize the surplus inventory. By 2001, housing requirements would be expected to exceed available inventory. Major residential projects would be expected to accelerate development. About 5,000 units in Ewa Marina and Puuloa Estates would be expected to be developed between 2001 and 2005. In addition, several thousand residential units could also be developed in Ewa Town Center.

#### 4.2.6 Market Assessment for Maili Kai View Units

The market outlook for view units in Maili Kai support development of the 120+ units over the next two to three years because of their larger lot sizes, convenient location, views and master planned community setting. The projected housing requirement in the Waianae/Ewa area benefitting from planned developments is expected to remain relatively strong. The most competitive future inventory would be:

- o West Loch Estates
- o Ewa by Gentry
- o Village Park

Although Makakilo would be in a position to offer competitively priced units, their inventory is most likely to be priced higher than Maili Kai. Mililani, Waikele and Waiawa Ridge are also expected to be priced higher and would not be directly competitive.

Unit Sizes and Prices: Average sales prices for Maili Kai single family, view units in the \$140,000 to \$150,000 range would be reasonable based on the current and projected sales prices of competitive developments after adjustment for location and project amenities.

Unit prices would vary based on unit size and design and lot topography, views and size. The selling prices would range from about \$130,000+ for small (1,200 sq ft) three-bedroom, two-bath units to about \$160,000 for large (1,800 sq ft) four+-bedroom, two+-bath units on the larger 10,000 sq ft view lots.

Absorption: A review of recent absorption rates experienced in comparable residential developments reflect annual sales volumes or 100 to almost 400 units annually. The absorption rates experienced in Mililani, Village Park and Makakilo over the recent past ranged from 100 to 400 units per year, Mauna Olu Estates in Makaha Valley sold 86 one- to two-acre view lots at prices ranging from about \$100,000 to \$200,000 over a five-week period in 1987. The strong market demand for these upscale residential lots indicates a market exists for upscale residential projects in Waianae.

Considering the projected housing requirements and available inventory in Ewa, and the convenient location of Maili Kai, the 120 view units would be expected to sell in about two to three years. The actual sales performance would depend on the design, timing, pricing and financing offered for comparable units at West Loch Estates, Ewa by Gentry and Village Park.

Maili Kai's estimated market share could range from three percent to seven percent of the projected new housing requirement for Ewa, and could range from 40 to 90 units annually, depending on the type of units, pricing and marketing efforts, and competitive inventory available.

#### 4.2.7 Design Considerations

Purchasers of view units are primarily interested in the view, unit design and project amenities.

The potential buyer of the Maili Kai view units will have many alternative projects to choose from in this price range. However, Maili Kai will offer larger lot sizes and superior views. The unit design should include a functional floor plan, ample floor area and attractive exterior appearance.

Developers listed the following items in response to a survey covering the elements of a good floor plan:

- o Space should be well utilized;
- o Kitchen should be well designed and laid out;
- o Master bedroom should be roomy;
- o Ample cabinet space;
- o Efficient traffic patterns within the home;
- o Interior layout should be attractive; and
- o Living areas oriented to the view.

#### 4.2.8 Project/Development Amenities

The project amenities offered in the development are promoted as part of the sales presentation. The view units represent a relatively upscale project for the neighborhood and should have a separate identity of their own even within the master planned Maili Kai development. Security features such as gated entry and

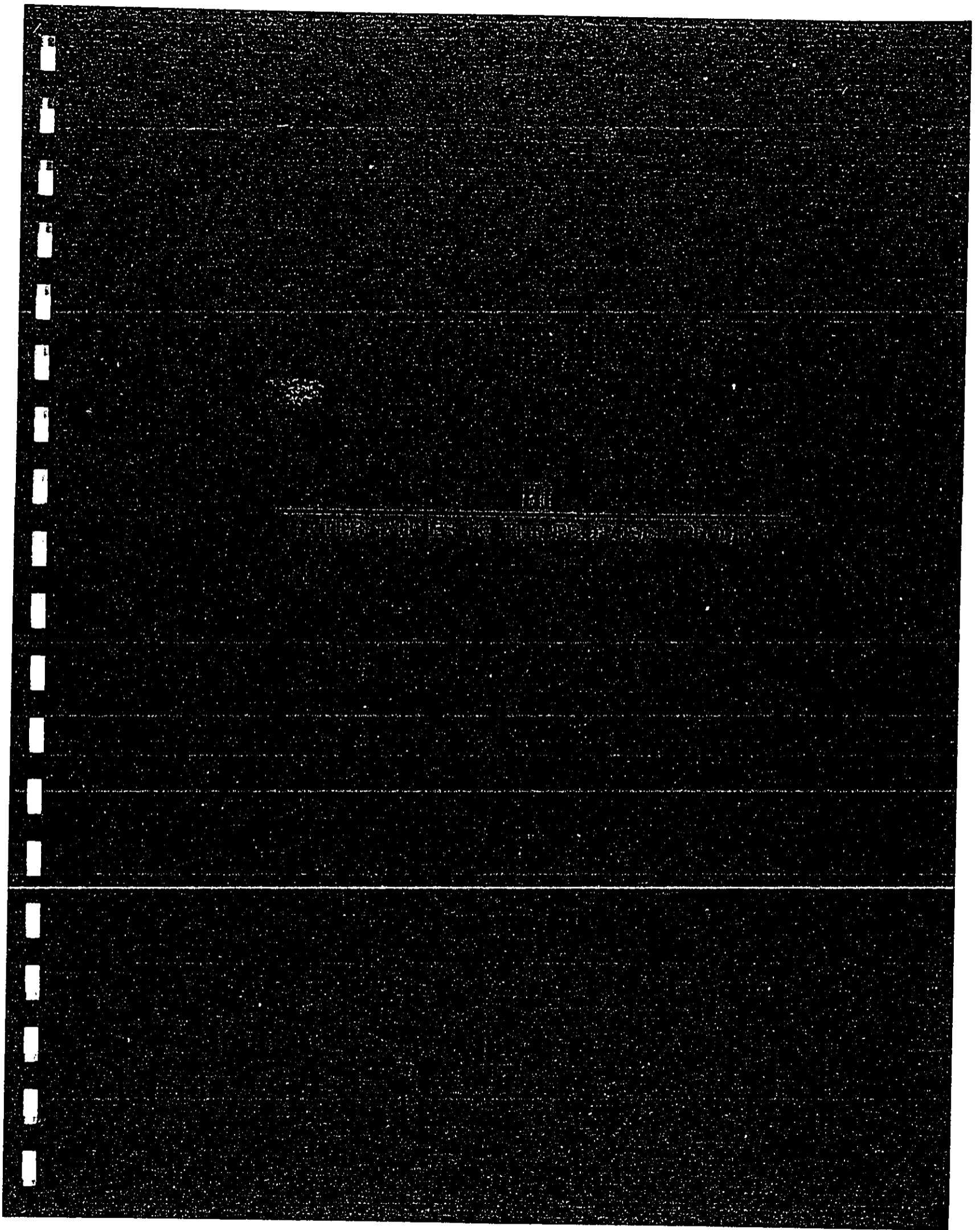
security guards which would be appropriate for this upscale project. Amenities such as open space and recreational facilities are important and increase desirability of the project, but are not the major factor in the purchase decision.

5. PROJECT SCHEDULE

The implementation of the proposed project depends upon five regulatory approvals: The Waianae Development Plan Land Use Map amendment; Waianae Development Plan Public Facilities Map; Change of Zoning; Conditional Use Permit; and Subdivision approval. Approval for such regulatory requests is projected to take approximately two and one-half years, based upon maximum processing times and acceptance at each step. Actual construction of utility improvements could begin in early 1990, followed by phased residential construction. Total project development (build-out) would be completed by 1995, given timely receipt of the regulatory approvals noted.

6. ESTIMATED PROJECT COSTS

Total development costs, including utility construction, housing unit construction, roadway and recreational facility construction, have been estimated to be approximately \$105,000,000 to \$110,000,000 in 1987 dollars.



## CHAPTER III

### ALTERNATIVES TO THE PROPOSED PROJECT

#### 1. INTRODUCTION

The proposed project has been designed to provide a mix of housing opportunities in the Maili area such that gap group, low and moderate income groups and those who can afford market priced homes of comparable value can reside within a community in which the environment is minimally controlled and maintained for the betterment of all concerned. As noted previously, the proposed project requires a Waianae Development Plan amendment because a portion of the project site is presently designated Agriculture rather than the required Residential designation.

In compliance with the provisions of Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules, Section 11-200-17(f), the "known feasible" alternatives to the proposed project are discussed in this chapter. Those alternatives which could "feasibly" attain the objectives of the project are described and evaluated. A rigorous exploration and evaluation of the environmental impacts of all reasonable alternative actions, particularly those that might enhance environmental quality or avoid or reduce some or all of the adverse environmental impacts, cost and risks are included in order not to prematurely foreclose options which might enhance environmental quality or have less detrimental effects. In each case, the analyses have been sufficiently detailed to allow the comparative evaluation of the environmental benefits, costs and risks of the proposed action and each reasonable alternative.

In conformance with the applicable rules, the alternatives have been evaluated relative to their capability to meet the proposed project objectives as previously stated in Chapter II, Section 3.1 and as described below.

The objectives of the proposed project are to:

1. Provide a range of housing opportunities in the Waianae Coast area in general and specifically in the Maili area,
2. Provide a community setting in which minimal controls on neighborhood character and upkeep are encouraged,
3. Provide recreational facilities and amenities that can be enjoyed by the community at-large as well as the residents of Maili Kai.

2. ALTERNATIVES ANALYZED

The alternatives to the proposed project that have been analyzed and evaluated include several combinations of the various types of housing units and recreational facility (golf course) arrangements. Housing unit numbers have ranged from a low of 72 to a high of 1,435 as included in the proposed project. Similarly, one 9-hole golf course to two 18-hole golf courses have been analyzed. The following briefly describes the alternative investigated and Table III-1 summarizes the alternatives.

**TABLE III-1  
DEVELOPMENT ALTERNATIVES CONSIDERED**

Proposed Zoning (Net Acres)	<u>Alternatives</u>				
	<u>One</u>	<u>Six</u>	<u>Seven</u>	<u>Nine</u>	<u>Ten</u>
R-20	---	28	---	---	---
R-10	38	94	30	29	30
R-5	129	---	40	---	68
R-3.5	---	---	58	---	---
MF	---	---	34	---	36
A-1	---	---	---	---	29.5
P-2 (Park)	8	3	10	---	11.5
Golf Course	---	1-18 Hole	1-9 Hole	2-18 Hole	1-9 Hole
<b>Total Units</b>	<b>1,020</b>	<b>305</b>	<b>1,290</b>	<b>72</b>	<b>1,435</b>
<b>Total Development Costs (\$M)</b>	<b>\$90-\$95</b>	<b>\$40-\$45</b>	<b>\$95-\$100</b>	<b>\$22-\$27</b>	<b>\$104-\$109</b>

**Notes:**

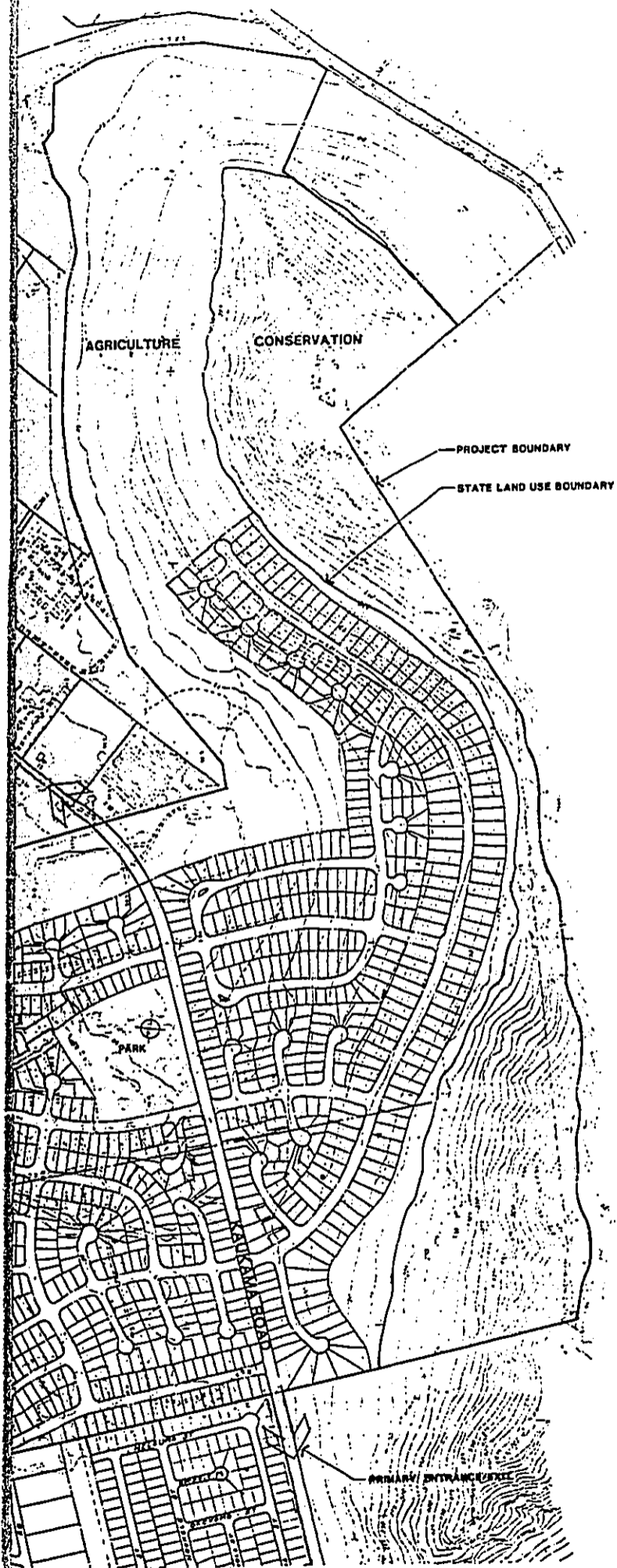
1. Proposed zoning refers to land use ordinance designations with the exception of "MF" which corresponds to cluster zoning.
2. Total development costs are based on estimated 1987 prices assuming average construction cost of \$55.00 per square foot.



- o Alternative One - This alternative includes 38 acres that would be developed as R-10 residential units, 129 acres as R-5 units and 8 acres for park use. No golf course would be included. There would be a total of about 1,020 residential units and development costs would be about \$90 to \$95 million (Figure III-1).
- o Alternative Six - This alternative includes 28 acres devoted to R-20 residential units, 94 acres of R-10 units, 3 acres for park use and one 18-hole golf course. There would be approximately 305 residential units under this alternative. Development costs are estimated to be about \$40 to \$45 million (Figure III-2).
- o Alternative Seven - This alternative includes 30 acres for R-10 residential units, 40 acres for R-5 units, 58 acres for R-3.5 units, 34 acres for multifamily units, a 10 acre park and one 9-hole golf course. A total of about 1,290 residential units would be developed at an estimated cost of about \$95 to \$100 million (Figure III-3).
- o Alternative Nine - This alternative includes 29 acres devoted to R-10 residential units and two 18-hole golf courses. Total development would be approximately 72 residential units and total development costs would be about \$22 to \$27 million (Figure III-4).
- o Alternative Ten - This is the preferred alternative and includes 30 acres devoted to R-10 residential units, 68 acres of R-5 units, 36 acres of multifamily units, 29 acres of A-1 units, an 11.5 acre park and one 9-hole golf course. A total of 1,435 residential units would be developed at an estimated cost of \$105 to \$110 million (Figure II-9).



**FIGURE III-1**  
**MAILI KAI PROPERTY**  
 MAILI, OAHU



**ALTERNATIVE ONE**

**LAND USE**

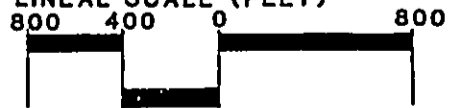
	CONSERVATION	± 87 ac.
	AGRICULTURE	± 98 ac.
	URBAN	± 230 ac.
	PARK	± 8.5 ac.
	RESIDENTIAL (R-10)	± 38 ac.
	RESIDENTIAL (R-5)	± 129 ac.
	CIRCULATION	± 41.5 ac.
	OPEN SPACE	± 13 ac.
<b>TOTAL:</b>		<b>± 230 ac.</b>
		<b>± 415 ac.</b>

**DWELLING UNITS**

	SINGLE FAMILY RESIDENTIAL	DENSITY	UNITS	
	R-10 (10,000)	± 38 ac.	3.8 U/A	± 145
	R-5 (5,000)	± 129 ac.	6.7 U/A	± 875
<b>TOTAL:</b>		<b>± 167 ac.</b>	<b>6.1 U/A</b>	<b>± 1,020</b>



LINEAL SCALE (FEET)





**FIGURE III-2**  
**MAILI KAI PROPERTY**  
 MAILI, OAHU

**ALTERNATIVE SIX**

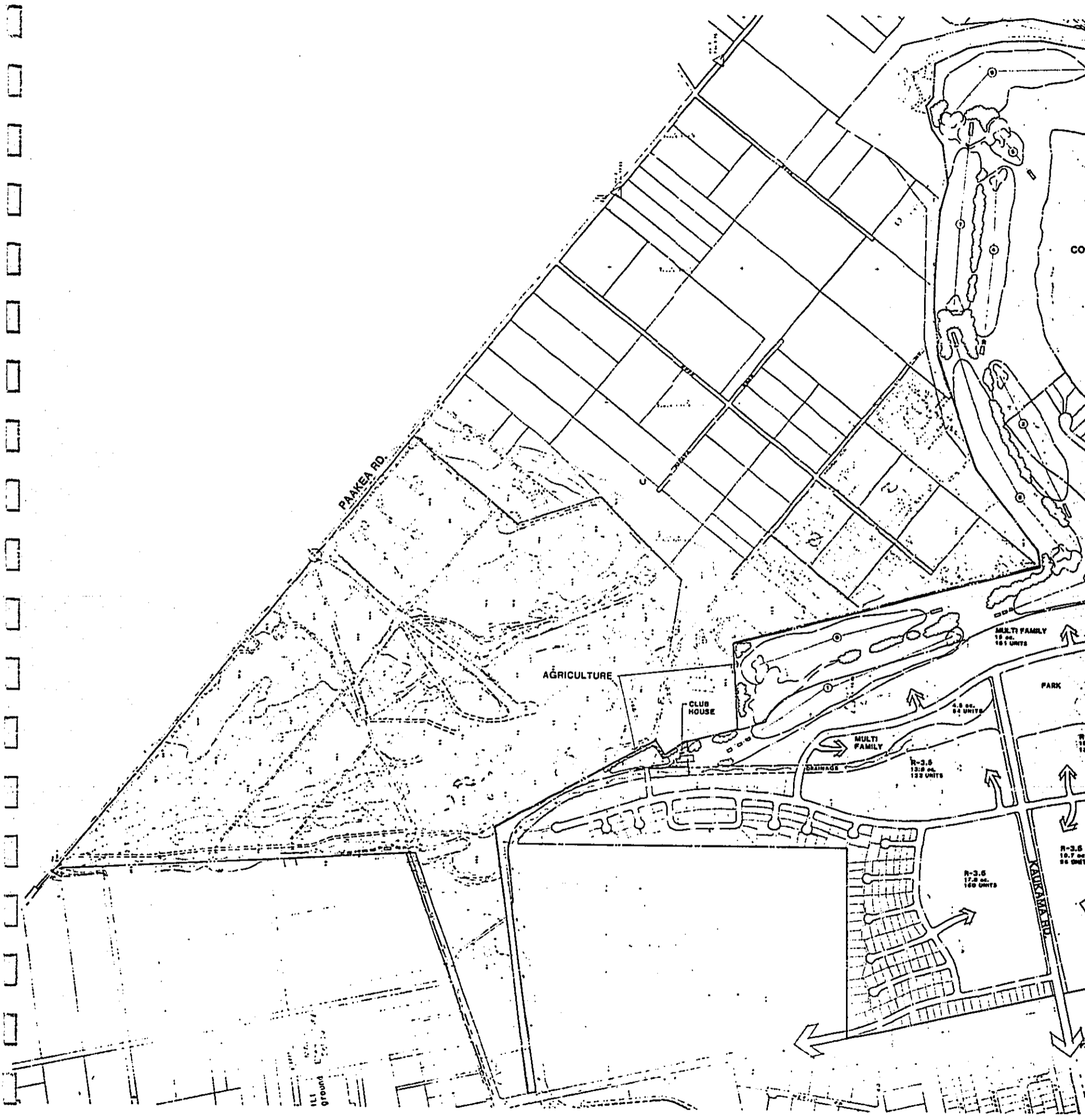
**LAND USE**

	CONSERVATION	±87 ac.
	AGRICULTURE (9 HOLE GOLF COURSE) (YARDS: 3,400 PAR:36)	±101 ac.
	URBAN	±227 ac.
	PARK	±3 ac.
	RESIDENTIAL (R-20)	±28 ac.
	RESIDENTIAL (R-10)	±94 ac.
	CIRCULATION	±22 ac.
	OPEN SPACE	±80 ac.
<b>TOTAL:</b>		<b>±415 ac.</b>

**DWELLING UNITS**

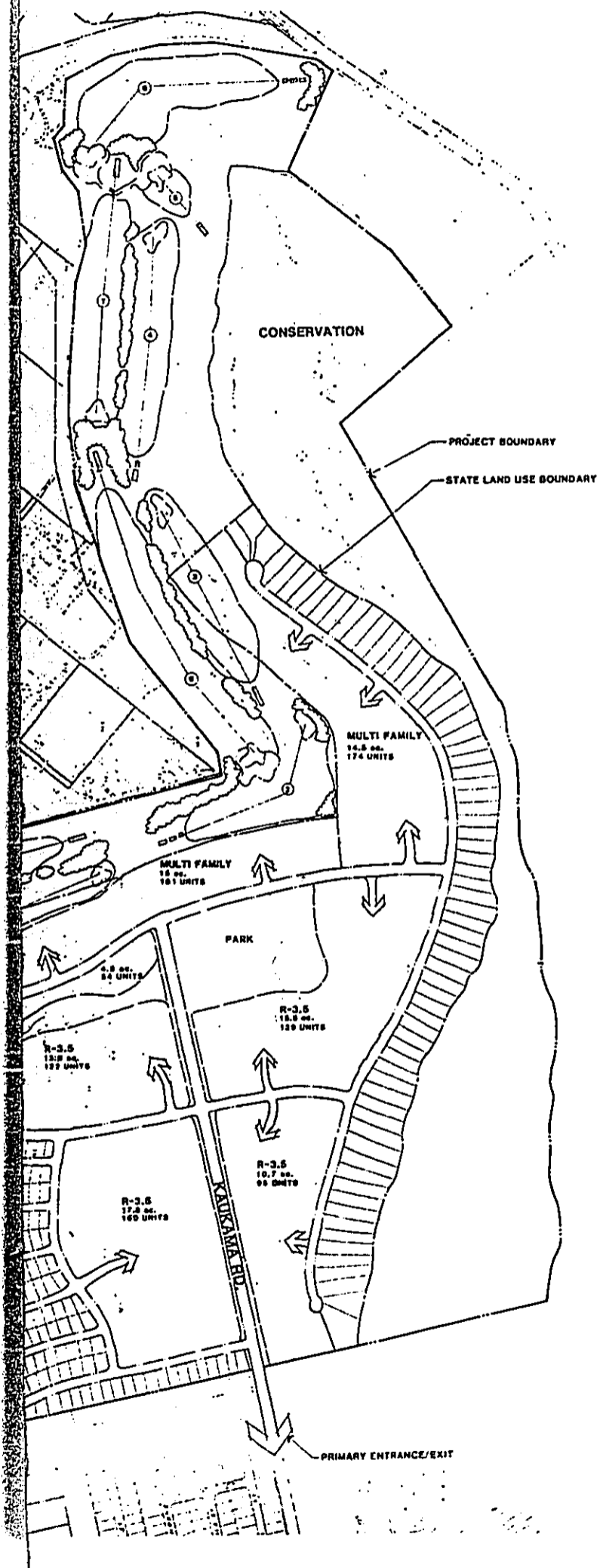
	SINGLE FAMILY RESIDENTIAL	DENSITY	UNITS	
	R-20 (20,000)	±28 ac.	1.6 U/A	±47
	R-10 (10,000)	±94 ac.	2.7 U/A	±258
<b>TOTAL:</b>		<b>±122 ac.</b>	<b>2.5 U/A</b>	<b>±305</b>





**FIGURE III-3**  
**MAILI KAI PROPERTY**  
 MAILI, OAHU

**ALTERNATIVE SEVEN**

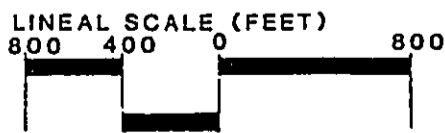


**LAND USE**

CONSERVATION	± 87.0 ac.
AGRICULTURE (9 HOLE GOLF COURSE) (YARDS: 3,500 PAR 36)	± 101.0 ac.
<b>URBAN</b>	<b>± 227.0 ac.</b>
PARK	± 10.0 ac.
RESIDENTIAL (R-10)	± 30.0 ac.
RESIDENTIAL (R-5)	± 40.0 ac.
RESIDENTIAL (R-3.5)	± 58.0 ac.
MULTIFAMILY (12U/A)	± 34.0 ac.
CIRCULATION	± 47.0 ac.
OPEN SPACE	± 16.0 ac.
<b>TOTAL:</b>	<b>± 227.0 ac.</b>
	<b>± 415.0 ac.</b>

**DWELLING UNITS**

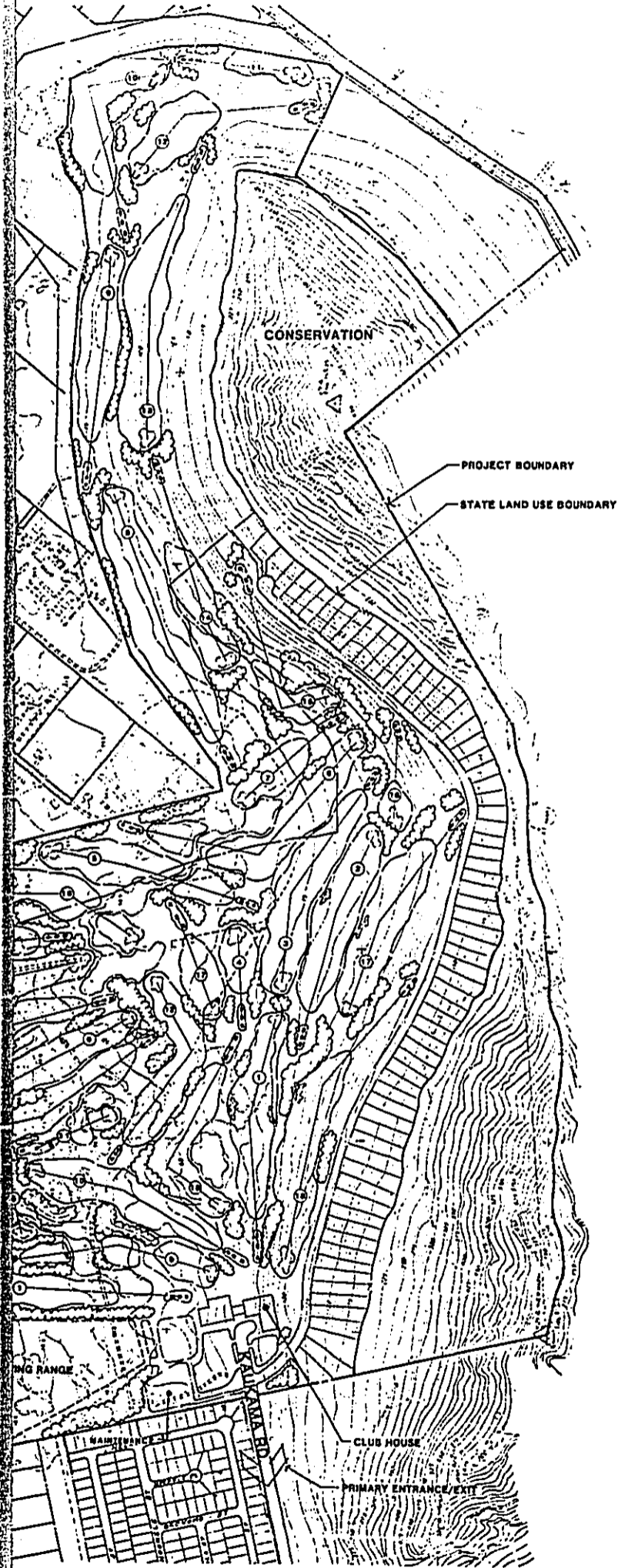
RESIDENTIAL	ACRES	DENSITY	UNITS
R-10 (10,000)	± 30.0	4 U/A	± 120
R-5 (5,000)	± 40.0	6 U/A	± 240
R-3.5 (3,500)	± 58.0	9 U/A	± 522
MULTIFAMILY	± 34.0	12 U/A	± 408
<b>TOTAL:</b>	<b>± 162.0</b>	<b>8 U/A</b>	<b>11,290</b>







**FIGURE III-4**  
**MAILI KAI PROPERTY**  
 MAILI, OAHU



**ALTERNATIVE NINE**

**LAND USE**

□	CONSERVATION	± 87.0 ac.
□	AGRICULTURE (GOLF COURSE)	± 101.0 ac.
URBAN		
□	RESIDENTIAL (R-10)	± 29.0 ac.
□	CIRCULATION	± 5.0 ac.
□	OPEN SPACE (GOLF COURSE)	± 193.0 ac.
TOTAL:		± 415.0 ac.

**DWELLING UNITS**

RESIDENTIAL	ACRES	DENSITY	UNITS
□ R-10 (10,000)	± 29.0 ac.	2.5 U/A	± 72

**GOLF COURSE**

(2) 18 HOLE COURSES:  
 COURSE AVERAGE- YARDS 6,433 PAR 72



For the above alternatives, the proposed zoning noted refers to Land Use Ordinance designations with the exception of the multifamily, which corresponds to cluster zoning. The total development costs are based on estimated 1987 prices assuming average construction costs of \$55 per square foot.

In addition to the above, the alternative of "no-action" was also evaluated. Under this alternative the land would remain in its present condition and continue to serve as a convenient illegal dumping ground and off-road motorcycle and vehicle playground.

In assessing each of the alternatives to the proposed project, as well as the proposed project itself, care was given to evaluate present land use designations, known concerns of nearby residents, the owner's financial position and forecast future growth trends for the Maili and Waianae areas. Per the applicable regulatory requirements, the project objectives became the primary guidelines as to whether an alternative met the goals of the developer.

### 3. COMPARATIVE EVALUATION

In general, none of the alternatives evaluated provide the degree of satisfaction of meeting the project objectives as the preferred alternative. Although some of the alternatives would result in fewer residential units and greater recreational facilities, it does not appear that the projected housing needs of the area would be satisfied nor does it appear that the units would be absorbed as rapidly as a greater number of units at lower costs to buyers.

Similarly, reducing the types of units that would be made available would not satisfy the apparent market demand for different types of units, thereby negating one of the project objectives. The alternative of "no-action" similarly would not

result in meeting the project objectives and would continue the present underutilization of the project property. The preferred alternative satisfies the project objectives and provides the best opportunity to assist in the satisfaction of Oahu's forecast housing needs over the next 10 years.

THE UNIVERSITY OF CHICAGO  
DEPARTMENT OF CHEMISTRY  
530 SOUTH EAST ASIAN AVENUE  
CHICAGO, ILLINOIS 60607

CHAPTER IV

DESCRIPTION OF THE AFFECTED ENVIRONMENT,  
PROBABLE ENVIRONMENTAL CONSEQUENCES AND  
PROPOSED MITIGATION MEASURES

Descriptions of the affected environment (existing conditions), probable environmental consequences (impacts) of the proposed project on existing conditions and mitigation measures designed to minimize and/or eliminate potential adverse impacts are given in the following paragraphs. For ease of review and evaluation, information and analyses of the impacts of the proposed project on the physical, natural; historical and archaeological resources; socioeconomic environment; infrastructure; and public services and facilities, in that order, are provided. The information and analyses given are based on (1) field and/or office studies conducted specifically for this EIS; (2) comparisons and evaluations by specialty consultants (see Chapter I) of the proposed project relative to similar planned or existing housing projects; and (3) the input, advice, guidance and information provided by public agencies, private groups, organizations and residents of the project area during the development and review of the EIS Preparation Notice (EISPN) during the consultation period for this EIS.

1. PHYSICAL ENVIRONMENT

1.1 PHYSIOGRAPHY AND GEOLOGY

1.1.1 Existing Conditions

The Waianae district consists of a coastal plain and the Waianae mountain range with intruding valleys. Urban development has primarily occurred on the coastal plain, with agricultural activities extending into inland areas. Most of the land area is comprised of the Waianae mountain range, with its rugged topography of near-vertical cliffs and amphitheater-headed valleys. The proposed project site is bounded on the south by the Puu O Hulu Kai and Puu O Hulu Uka ridgelines which extend approximately one and one-half miles in an easterly direction. From these ridgelines the property slopes gently downward to the north to an elevation of about + 25 feet Mean Sea Level (MSL).

General slope analysis of the site indicates that approximately 290 acres of the 415 acre site, or about 70 percent, are of slopes less than 20 percent. The remaining 125 acres (30 percent) are of slopes greater than 20 percent.

Geologically, the project site is underlain by consolidated calcareous marine deposits, chiefly emerged coral reef, and unconsolidated noncalcareous deposits that are primarily younger alluvium that has washed down from the inland Waianae mountains.

1.1.2 Probable Impacts

Impacts on the physiography and geology of the project site could be caused by alterations to the topography of the site to accommodate the housing units and infrastructural components (roadways, utilities and drainage structures). The planned

alterations, however, are relatively insignificant compared to the overall physiographic and geologic character of the site and region. As such, significant impacts resulting from the proposed project are not expected.

### 1.1.3 Mitigation Measures

Due to the expected lack of significant impacts on the physiography and geology of the project site or region, mitigation measures to minimize potential adverse impacts are not warranted. As noted in subsection 1.4 below, appropriate engineering, design and construction measures would be taken to minimize potential volcanic and seismic impacts on the proposed residential units and facilities.

## 1.2 SOILS AND AGRICULTURAL POTENTIAL

### 1.2.1 Existing Conditions

The soils of the project site have been examined primarily for their overall agricultural productivity and designated importance to the State of Hawaii. The Detailed Land Classification, Island of Oahu, by the Land Study Bureau, University of Hawaii, 1971-72, classifies land according to its overall productivity. Lands are rated from A, being the most productive, to E, being the least productive. The project property is classified as 100 percent E62, E64, E71, E72, E102, E114 and E115. The numbers following the letter classification indicate general soil families and soil characteristics. The higher the number, the greater the constraints are for agricultural suitability. Productivity for the project property soils appears to be limited. The E rated soils are derived from talus and comprise rocky material with little or no soil mantle. E rated soils are considered virtually impossible to work because of excessive rocks and/or steep

slopes. The general soil characteristics of the project property are shown on Figures IV-1 and IV-2 and described in Table IV-1.

TABLE IV-1  
MAILI KAI PROPERTY SOILS DESCRIPTIONS

Upper Slopes:

rRK - Rock land, 40 to 70 percent slopes, exposed basalt and andesite outcrops extending length of Puu O Hulu Ridge. Rolling stone danger is great. Approximately 15 percent of site classified as rock land. Capability classification VIIs, non-irrigated.

Lower Slopes:

LPE - Lualualei extremely stony clay, 3 to 35 percent slopes, Unified Soil Classification - CH. Medium to rapid runoff, moderate to severe erosion hazard. It is impractical to cultivate this soil unless the stones are removed. Capability classification VIIs, non-irrigated.

LuA - Lualualei clay, 0 to 2 percent slopes, Unified Soil Classification - CH. Permeability slow, runoff slow and erosion potential slight. Capability classification IIIs if irrigated, VIIs if non-irrigated.

LuB - Lualualei clay, 2 to 6 percent slopes, Unified Soil Classification - CH. Runoff is slow and erosion hazard slight. Capability classification IIIe if irrigated and VIIs if non-irrigated.



TABLE IV-1 (CONTINUED)

LvA - Lualualei stony clay, 0 to 2 percent slopes, Unified Soil Classification - CH. Similar to Lualualei clay, 0 to 2 percent slopes, except that there are enough stones to hinder machine cultivation. Capability classification IIIs if irrigated, VIs if non-irrigated.

Note: LPE, LuA, LuB and LvA soils collectively comprise approximately 50 percent of the project site.

MnC - Mamala stony silty clay loam, 0 to 12 percent slopes, Unified Soil Classification - CL-ML. Very slow to medium runoff, slight to moderate erosion hazard, low shrink-swell potential, coral at depths of less than 20 inches inhibit permeability. Stones hinder but do not prevent cultivation. Capability classification IIIs if irrigated, VIs if non-irrigated. Approximately 30 percent of the site is classified as Mamala stony silty clay loam.

MtB - Mokuleia clay, Unified Soil Classification - CL. Nearly level land, very slow runoff, slight erosion hazard, low shrink-swell potential, permeability slow in surface layer, rapid below 20 inches. Workability is difficult because of the sticky, plastic clay. Capability classification IIIs if irrigated, VIs if non-irrigated. Approximately 5 percent of the project site is this soil classification.

Soils investigations (Walter Lum & Assoc., 1974) conducted on the project property show that on the lower flat portions coral and coral sand is found to about 15-foot depths. A thin surface cover of "CH" clays is found toward the southern end of the site and at the toe of the talus slope (Puu O Hulu Kai ridgeline). On

the higher, sloping areas along the foothills of the ridges talus material, "CH" soils with cobbles and boulders to about 5 to 20 feet or more depths underlain by clayey silt, silty sand and decomposed rock to about 20 to 30 feet are found. Slickensided clays were noted in several of the open pits and borings made during the soils investigations. Based on the soils investigations conducted to date and because a large portion of the site along the bases of Puu O Hulu Kai and Puu O Hulu Uka ridges has fairly deep deposits of clayey soils, additional soils investigations may be required for final design and layout of the proposed project.

Agriculturally, the State Department of Agriculture, in Agricultural Lands of Importance to the State of Hawaii, Waianae Map (1977), designates the property in two categories: (1) Prime Agricultural Land and (2) Other Important Agricultural Land as shown on Figure IV-3. Prime Agricultural Land, encompassing approximately 10 percent of the site, is defined as "Land best suited for the production of food, feed, forage and fiber crops. The land has the soil quality, growing season and moisture supply needed to produce sustained high yields of crops economically when treated and managed, including water management, according to modern farming methods." Other Important Agricultural Land, encompassing about 25 percent of the site, is defined as "Land other than Prime or Unique Agricultural Land that is of state-wide or local importance for the production of food, feed, fiber and forage crops. The lands in this classification are important to agriculture in Hawaii yet they exhibit properties, such as seasonal wetness, erodibility, limited rooting zone, slope, flooding or droughtiness, that exclude them from Prime or Unique Agricultural Land classifications." Present agricultural activities in the vicinity of the project site include livestock (cattle and swine) and poultry farming. The project site could presumably be suitable for nursery type operations, given the proper use of shade and cover materials and the use of imported



**LEGEND**

**E** VERY POOR SUITABILITY

**DETAILED LAND CLASSIFICATIONS**

SOURCE: DETAILED LAND CLASSIFICATION, 1971-73

**FIGURE IV-1  
MAILI KAI PROPERTY**



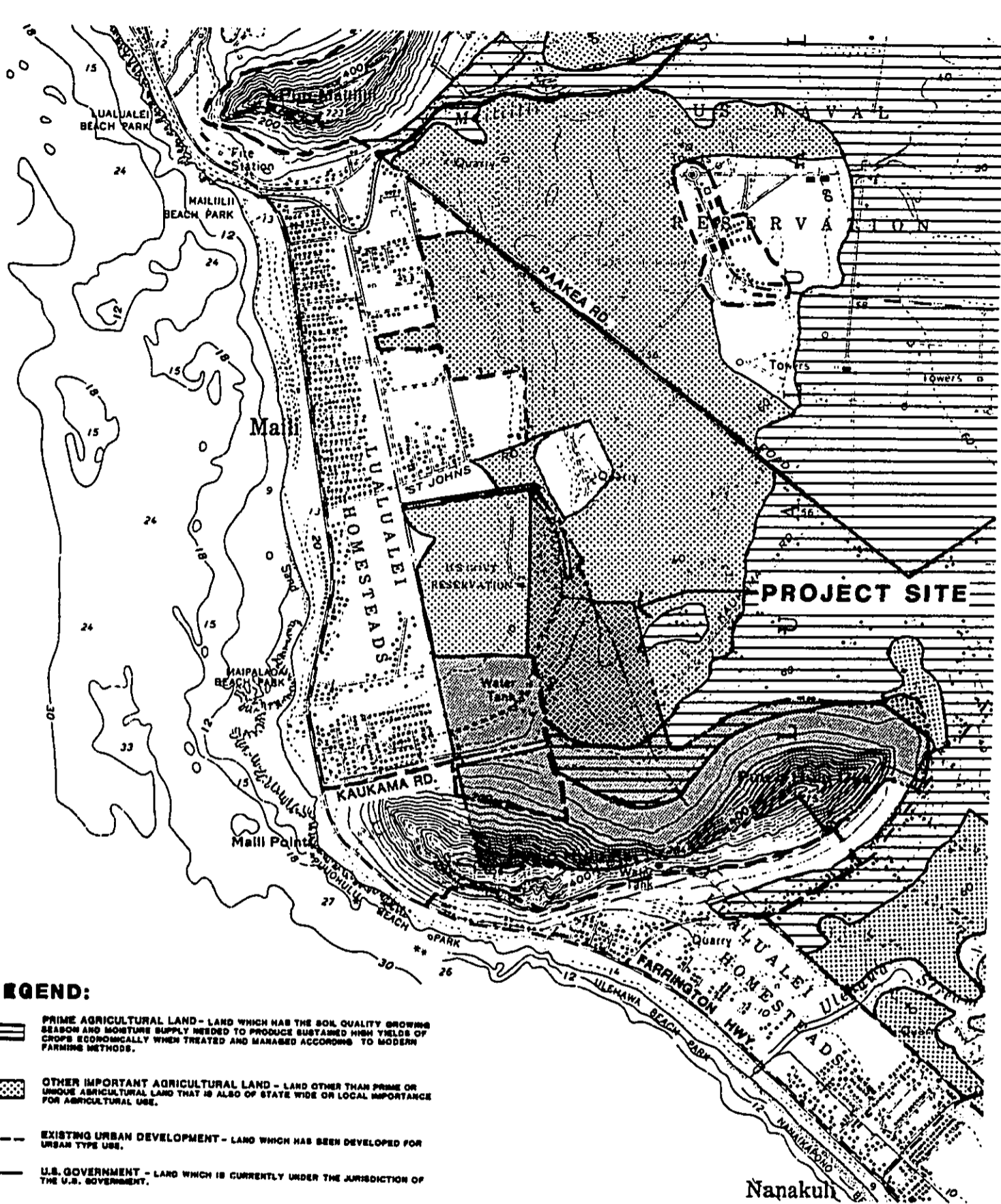


**SOIL SURVEY  
CLASSIFICATIONS**

SOURCE: U.S.G.S. AERIAL PHOTOGRAPH, 1977.  
SOIL SURVEY OF ISLANDS OF KAUAI, OAHU, MAUI,  
MOLOKAI AND LANAI, STATE OF HAWAII, 1972.

**FIGURE IV-2  
MAILI KAI PROPERTY**





**AGRICULTURAL LANDS OF IMPORTANCE TO THE STATE OF HAWAII**

SOURCE: DEPARTMENT OF AGRICULTURE, STATE OF HAWAII

planting medium. Table IV-2 indicates the ALISH classification acreages of Maili Kai relative to Oahu and the State.

TABLE IV-2  
INVENTORY OF AGRICULTURAL LANDS  
BY ALISH CLASSIFICATION<sup>1</sup>

<u>ALISH Classification</u>	<u>Maili Kai</u>	<u>Oahu</u>	<u>State</u>
Prime	42	55,500	304,300
Unique	0	9,000	31,300
Other	103	29,000	642,500

1. Based on 1986 data. Acreages of some classifications may have changed in recent years.

The subject lands constitute a small percentage of the island-wide (Oahu) inventory of Prime or Other Important Agricultural Land. There are approximately 120,000 acres in total farm acreage on Oahu, of which about 26,000 are in sugar cane and 12,000 in pineapple production. The subject lands with a Prime rating account for approximately 0.07 percent of the island-wide total and those with a rating as Other Important Agricultural Lands represent approximately 0.34 percent of the island-wide total. As implied by these percentages, agricultural lands of similar or better quality are not scarce on the island.

As indicated in the discussion above regarding the soil types (see Table IV-1), in general most of the project site soils have a capability classification of IIIs, VIs or VIIs. The capability grouping shows, in a general way, the suitability of soils for most kinds of crops. The capability classes are designated by Roman numerals as the broadest classification. The numerals indicate progressively greater limitations and narrower choices for practical use. Class III soils have severe limitations that reduce the choice of plants, require special conservation

practices or both. Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland or wildlife habitat. Class VII soils have very severe limitations that make them unsuited for cultivation and that restrict their use to pasture or range, woodland or wildlife habitat. Class VIII soils have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife habitat, water supply or to aesthetic purposes.

In addition to the general capability classification, soil capabilities are further defined by subclasses. Capability subclasses are soil groups within one class. They are designated by adding a small letter (e, w, s, or c) to the class numeral. The letter "e" shows that the main limitation is risk of erosion unless close-growing plant cover is maintained. The letter "s" shows that the soil is limited mainly because it is shallow, droughty or stony.

#### 1.2.2 Probable Impacts

Impacts to the soils or agricultural potential of the project site could be caused by removal and/or other disturbance of significant quantities of the existing soil materials and removal of the site from future agricultural activity potential. As noted previously, additional soils investigations may be conducted prior to the final design and layout of the proposed project. It is possible that these investigations would result in the recommendation to remove and/or mix large quantities of the existing soils with better quality imported soils to attain more stable soil conditions. Other possible measures to reduce or eliminate damage to homes by sliding are described below in Section 1.2.3. Should this occur, it is likely that the existing soils would be retained on-site and utilized for golf course or park landscaping purposes. It appears unlikely that soils would

require transport off-site, however, should this be required, the soils would be disposed of in approved disposal sites.

The use of the site for residential purposes would severely restrain potential future agricultural activities. There are no known proposed uses of the site for agricultural or other possible related activities at this time. Further, the proposed project will not require the relocation or displacement of existing agricultural operations.

Although the proposed project is not expected to significantly affect the soils of the project site, the soils, because of their characteristics, could affect the project. As noted previously, some project areas are subject to plastic and slickensided clays that could cause unstable structural conditions. To minimize the risks associated with these materials, appropriate mitigation measures, as described below, would be taken as appropriate.

#### 1.2.3 Mitigation Measures

Given the poor quality of the soils for agricultural activities and possibly as building materials, it does not appear that the proposed project would have an adverse impact on the soils of the site. As such, mitigation measures to minimize potential adverse impacts do not appear warranted.

The removal of the site from potential agricultural activities could cause adverse impacts via the reduction in the number of acres of land on Oahu that would be available for agricultural activities. At this time there are no known plans to utilize the project site for agricultural activities. Similarly, it does not appear likely that agricultural activities would be pursued on the site due to expected high land costs and relatively high water costs, resulting in uneconomical agricultural activities. Additional information relative to the agricultural potential of



the site in relationship to state and county land use plans and policies is presented in Chapter V of this EIS and in Appendix H.

To minimize risks of slippage, mitigation measures, such as construction of boulder abutment walls, removal of poor soils and replacement with good material, construction of concrete ditches on the hillsides above new improvements and extension of structure supports to more stable material, would be taken as appropriate.

### 1.3 HYDROLOGY AND DRAINAGE

#### 1.3.1 Existing Conditions

The Waianae Coast is relatively dry, receiving less than 20 inches of rainfall per year along the coastline and up to about 30 inches per year in the lower valleys. As such, there are no perennial streams in the coastal plain area of the district. Some streams, such as the Nanakuli, Lualualei, Waianae, Makaha and Makua, have small perennial flows only in the high elevations (greater than 600 feet MSL). All streams in the low-lying areas are intermittent.

Rainfall at the higher elevations is predominantly orographic, which does not result in appreciable surface runoff because of its low intensity. Periods of heavy runoff are generally associated with frontal type (Kona) storms (see Section 1.4 below). Storm runoff averages approximately 15 MGD in the Waianae basin (Takasaki, 1971).

Groundwater recharge from rainfall occurs primarily in the mountain area and is stored in the volcanic structure of the region. Excess overland runoff from the mountain region, except during the few heavy storms that the district experiences,

eventually percolates into the coastal coralline rocks and becomes part of the groundwater resource.

To provide water for the planned growth in the Waianae area, and to reduce the importation of water from the Pearl Harbor aquifer, the Board of Water Supply (BWS) is in the process of developing new water sources (wells) in upper Makaha Valley. It is estimated that these wells will provide about 4.0 million gallons of water per day (MGD) of additional water. Construction of these improvements is phased such that four wells are expected to be on-line in 1990. Long-range BWS plans also include the possible development of an additional 2.0 MGD of groundwater resources in Waianae Valley.

In general, surface drainage of the project site is from south to north due to the slope of the property from Puu O Hulu Kai ridgeline to the northern boundary, an elevation change of about 825 feet. No natural drainage features, such as gulches or intermittent streams are found on the property. With the exception of about 25 acres, the project site presently drains to the Maili Stream Channel by way of an existing channel extension and a 6-foot by 4-foot box drain. The Maili Stream Channel is an existing concrete rectangular channel that crosses Farrington Highway and discharges storm runoff into the ocean. About 25 acres along the southeast corner of the project site presently flows to existing Hakimo Road and Ulehawa Stream in the adjoining Lualualei Valley. Of the remaining 390 acres, about 110 acres of the project site located north and south of Kaukama Road drain into the existing 6-foot by 4-foot box culvert in Maipalooa Road. Based on the City and County of Honolulu's modified curve on Plate 6 for the Ewa area, the peak discharge from the 110 acres is about 520 cubic feet per second (cfs). The existing 18- to 78- inch diameter pipe drainage system in Kaukama Road is designed for a total runoff from the 75 acres of the slope area on the south side of about 300 cfs. The storm runoff from the

major portion of the site of about 280 acres flows to the existing Maili Channel Extension. Based on the City's modified curve for Plate 6, the peak discharge from this area is about 1,100 cfs.

### 1.3.2 Probable Impacts

Impacts to the hydrological characteristics of the project site and/or area are not expected to result from the proposed project. Similarly, although changes to the existing surface drainage patterns will be made, major impacts to the surface drainage patterns are not expected to occur. On-site planned improvements include storm drains that would collect surface water runoff and discharge into the primary drainage channel. The proposed improvements include construction of street drain systems, in accordance with City standards, with discharge to the 6-foot by 4-foot box drain or the Maili Channel Extension, whichever is appropriate for the specific location. The Maili Stream Channel will be extended further into the project by an open swale in the planned golf course. In addition, ditches will be built along the back boundary of the hillside lots to intercept storm runoff and convey the water to the pipe system in the streets. Additionally, to reduce flow rates of surface waters, retention basins may be designed into the golf course.

For temporary erosion control, appropriately sized ponding basins will be constructed on-site for desilting storm runoff prior to discharge into the existing 6-foot by 4-foot box drain and Maili Stream Channel. None of the planned improvements to the existing drainage system would be performed below the Mean High Water Level (MHWL) of tidal waters.

A drainage master plan will be prepared and submitted for City concurrence prior to grant of tentative subdivision approval.

### 1.3.3 Mitigation Measures

Significant adverse impacts to the hydrological and drainage characteristics of the project site are not expected to result from the proposed project. Similarly, the hydrological and drainage characteristics of the site are not expected to significantly affect the proposed project. As such, mitigation measures to minimize potential adverse impacts do not appear warranted at this time. All new drainage structures and storm drains would be designed to applicable engineering design codes and regulations.

## 1.4 NATURAL AND MAN-INDUCED HAZARDS

### 1.4.1 Existing Conditions

Potential natural hazards to which the project property is subjected include floods, tsunamis and volcanic eruptions. Man-induced potential hazards include the storage of munitions at the U.S. Navy Lualualei Naval Magazine and radiation from radio transmitter towers located within the military reservation.

The project site, as designated on the Flood Insurance Rate Map (FIRM) (Community Panel Number 150001 0100 A, dated Sept. 3, 1980), is in Zone D, which is defined as "Areas of undetermined, but possible flood hazards". The project is located outside the tsunami zone for the area which terminates about two blocks mauka of Farrington Highway.

Volcanic hazards in the area are considered minimal due to the extinct status of former volcanoes (Mt. Kala in particular). Seismic hazards in the Waianae area are no greater than other locations on Oahu and are accounted for in design standards and the building codes.

Potential man-induced hazards near the site could include accidental detonation of ammunition stored at the U.S. Navy Lualualei Naval magazine and/or potential electromagnetic radiation hazards from the Navy radio transmitters located in the Lualualei Valley. The proposed project site is outside the nearest Explosive Safety Quantity Distance (ESQD). Based on information provided in the U.S. Department of Navy, Pacific Division Naval Facilities Engineering Command (NEEACT PAC) (See Chapter XII, Dept. of Navy letter dated 18 March 1988), there are no areas outside the boundaries of the transmitter facility where exposure to electromagnetic radiation (EMR) is a hazard. Further, magnetic field levels and microwave transmission field strength levels are all below current Permissible Exposure Limits (PEL) as established by the U.S. Environmental Protection Agency.

#### 1.4.2 Probable Impacts

Due to the location of the site and underlying geologic structure, the proposed project is not expected to either effect or be effected by flood hazards. Similarly, the proposed project is not expected to either effect or be effected by tsunamis, seismic hazards or nearby U.S. Navy operations.

#### 1.4.3 Mitigation Measures

Due to the lack of expected adverse impacts by floods, tsunamis, seismic activity or U.S. Navy operations, mitigation measures, other than adherence to engineering design and building standards to minimize potential adverse impacts do not appear warranted.

## 1.5 CLIMATE AND METEOROLOGY

### 1.5.1 Existing Conditions

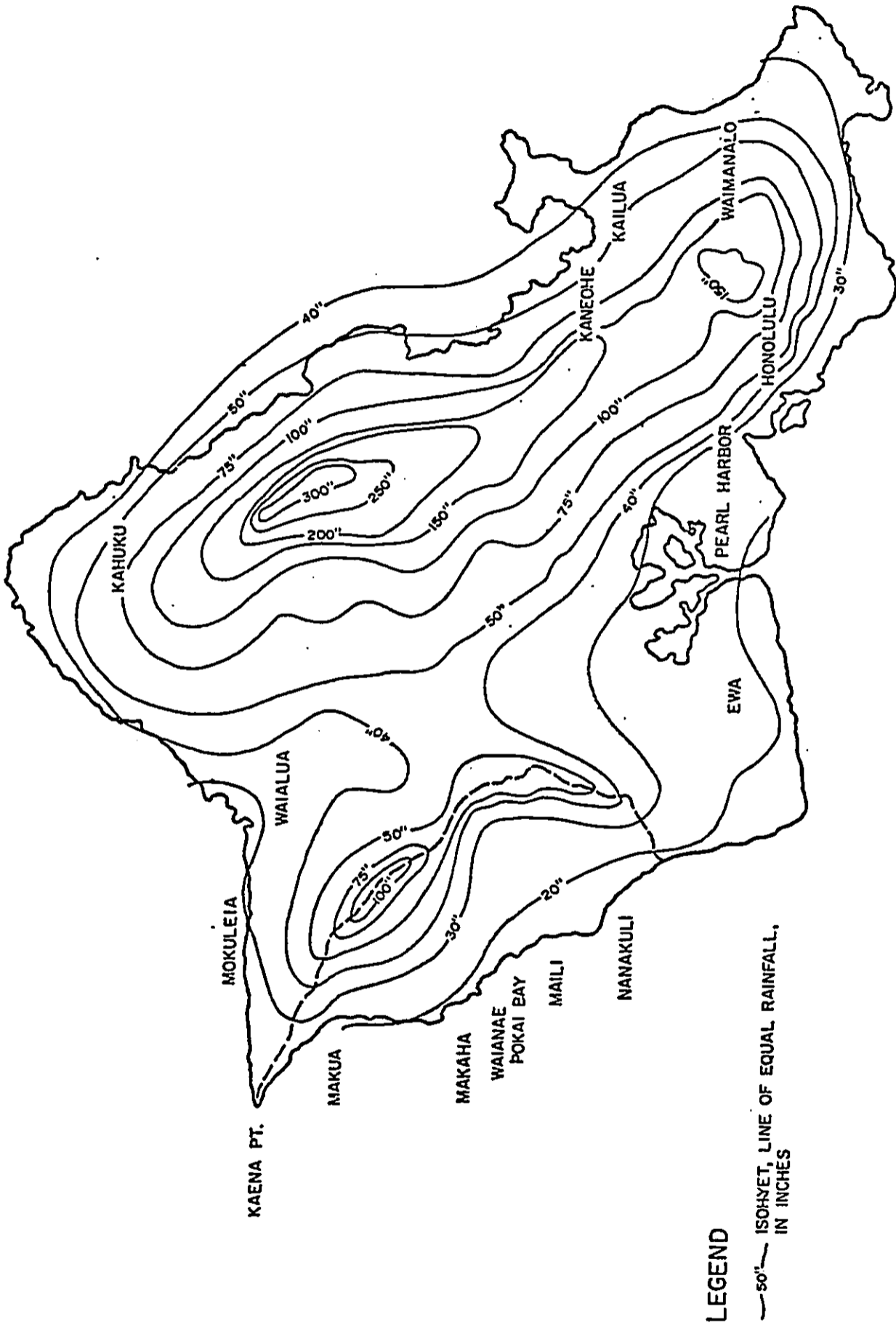
In general, the Waianae District is characterized as semiarid. Mean annual rainfall along the coast averages 20 inches per year, 30 inches per year in the lower valleys and about 80 to 100 inches per year at the higher elevations of the Waianae range. Much of the rainfall occurs during a few severe storms, such as "Kona" storms that approach Oahu from the south or west, usually between the months of December and March. Figure IV-4 shows the mean annual rainfall for Oahu and the Waianae area.

The only available wind data applicable to the proposed project site is that from Barbers Point NAS, which is located about five miles south of the district boundary and 10 miles from the project site. The wind rose for Barbers Point NAS is shown on Figure IV-5 and morning (7:00 am) wind speed and direction data are given in Table IV-3. Figures IV-6 and IV-7 indicate Barbers point morning wind speed and direction frequency respectively. As shown in Table IV-3 and Figures IV-5 and IV-7, under typical conditions, tradewinds from the northeast and east northeast prevail along the western coastline of Oahu. As indicated in Appendix B (Page B-4), in addition to the predominant northeasterly tradewinds, there is a significant occurrence of onshore winds primarily associated with a midday sea breeze regime. Calm and southerly wind conditions occur approximately 30 percent of the time in general on Oahu, but are experienced about 12 percent of the time at Barbers Point.

Temperatures in the project area average between 72 and 80 degrees F along the low land areas, decreasing at higher elevations. Temperatures for monitoring stations located in Waianae and Lualualei are shown in Table IV-4.

TABLE IV-3  
0700 HST WIND ROSE  
BARBERS POINT NAVAL AIR STATION  
1984

Direction	Speed (kts)						Total
	1-3	4-6	7-10	11-16	17-21	>21	
N	0.00275	0.00000	0.00275	0.00000	0.00000	0.00000	0.00550
NNE	0.01374	0.02473	0.02198	0.00275	0.00000	0.00000	0.06320
NE	0.06868	0.19231	0.04945	0.00549	0.00000	0.00000	0.31593
ENE	0.17033	0.22527	0.10440	0.02198	0.00000	0.00000	0.52198
E	0.00824	0.02473	0.01923	0.00000	0.00000	0.00000	0.05220
ESE	0.00275	0.00275	0.00000	0.00549	0.00000	0.00000	0.01099
SE	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
SSE	0.00000	0.00000	0.00000	0.00275	0.00000	0.00000	0.00275
S	0.00000	0.00000	0.00275	0.00000	0.00000	0.00000	0.00275
SSW	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
SW	0.00000	0.00000	0.00549	0.00000	0.00000	0.00000	0.00549
WSW	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
W	0.00000	0.00000	0.00275	0.00000	0.00000	0.00000	0.00275
WNW	0.00000	0.00000	0.00000	0.00275	0.00275	0.00000	0.00550
NW	0.00000	0.00000	0.00000	0.00275	0.00000	0.00000	0.00275
NNW	0.00000	0.00000	0.00000	0.00275	0.00000	0.00000	0.00275
<b>Total:</b>	<b>0.26649</b>	<b>0.46979</b>	<b>0.20880</b>	<b>0.04671</b>	<b>0.00275</b>	<b>0.00000</b>	<b>0.99454</b>
<b>Calms:</b>	<b>0.00549</b>						<b>Total: 1.00003</b>



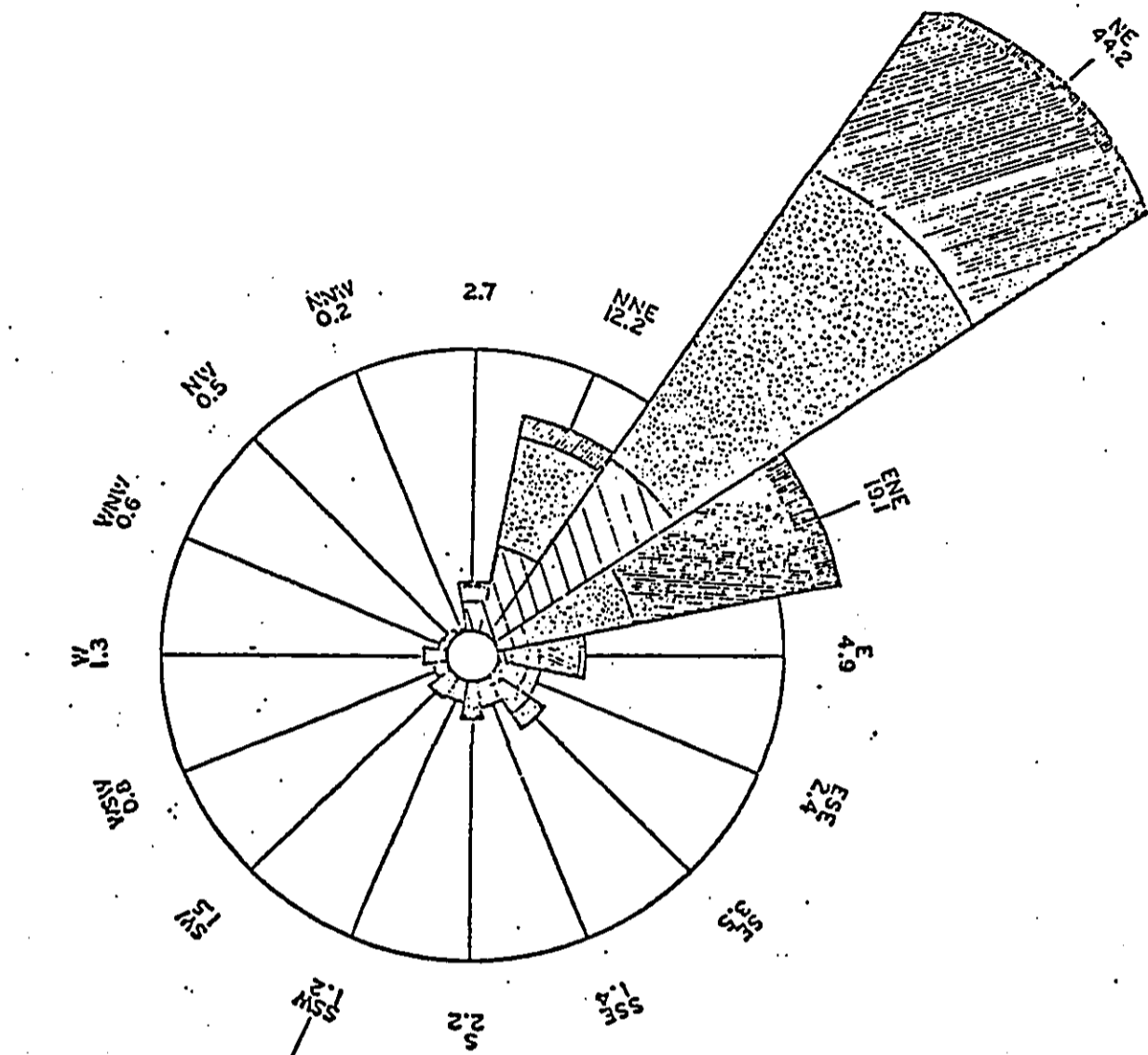
**FIGURE IV-4**  
**MAILI KAI PROPERTY**



**OAHU MEAN ANNUAL RAINFALL**

SOURCE: ATLAS OF HAWAII, 1983.

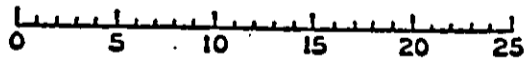




**LEGEND**

- CALM = ALL WIND 0 TO 3 KNOTS INCL.
- [Horizontal lines] = WIND VELOCITIES 3 TO 7 KNOTS
- [Diagonal lines /] = WIND VELOCITIES 8 TO 12 KNOTS
- [Diagonal lines \] = WIND VELOCITIES 13 TO 20 KNOTS
- [Dotted pattern] = WIND VELOCITIES OVER 20 KNOTS

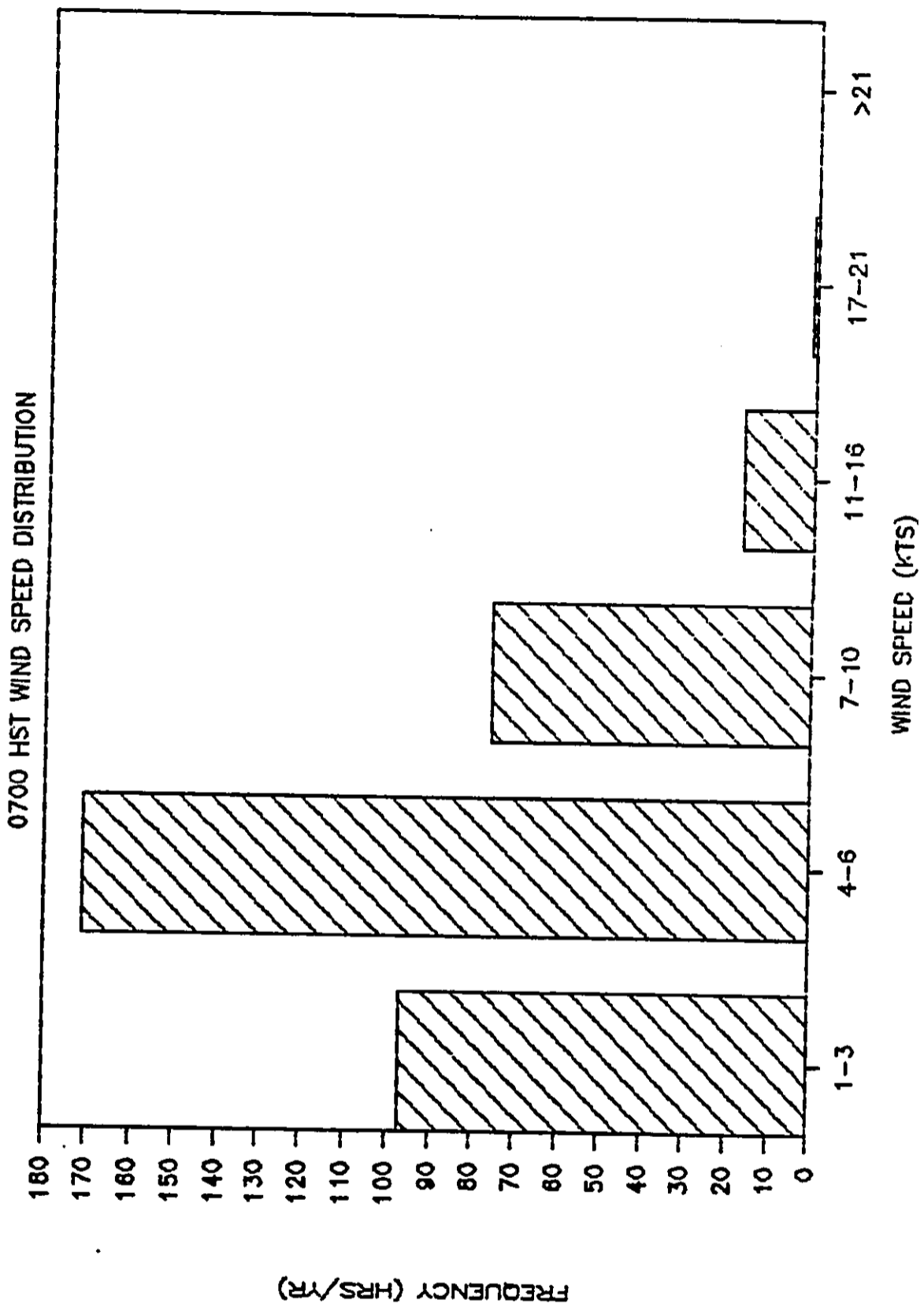
PERCENT OF TIME SCALE



**WIND ROSE  
N.A.S. BARBERS POINT**

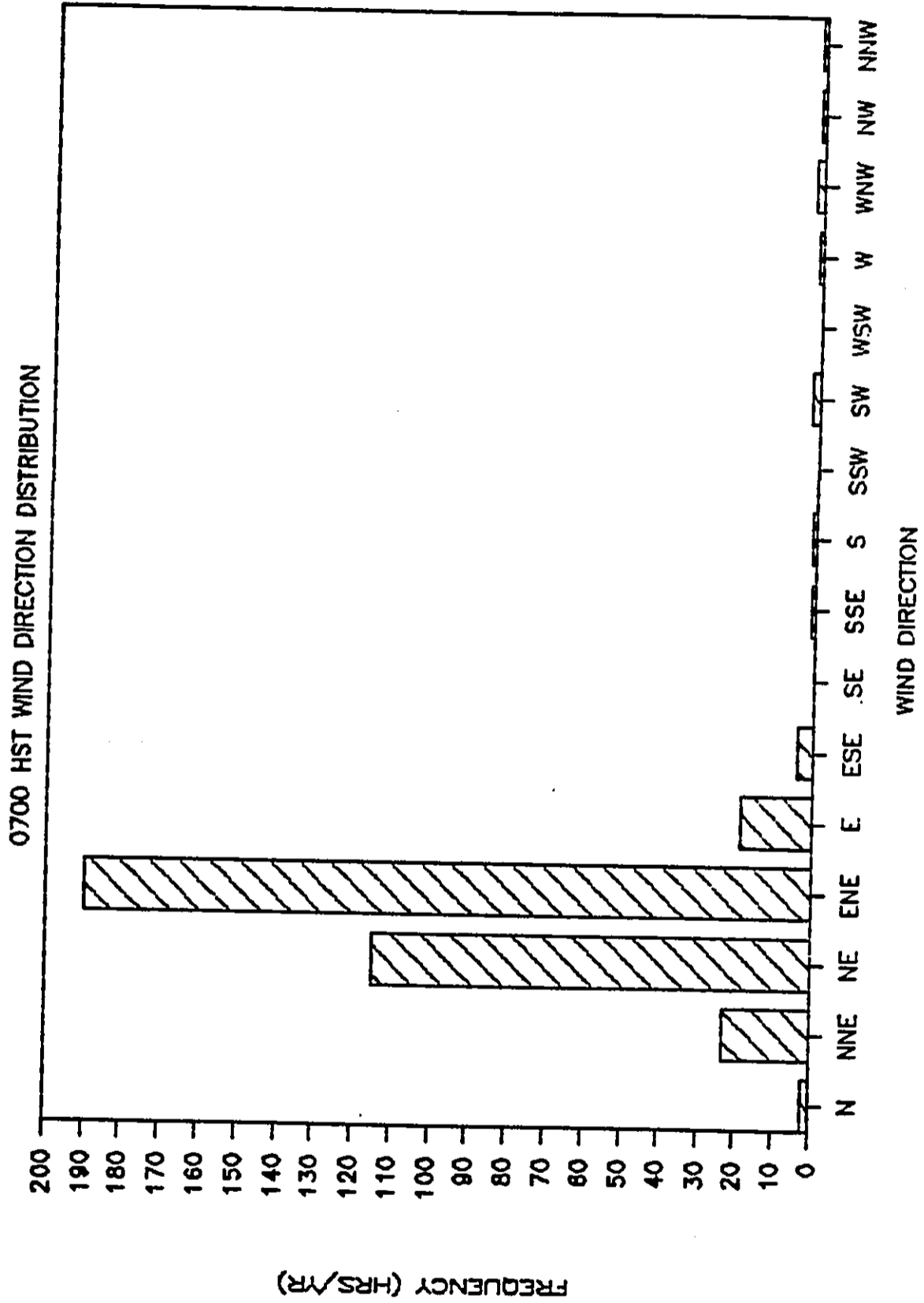


**FIGURE IV-5  
MAILI KAI PROPERTY  
MAILI, OAHU**



**FIGURE IV-6**  
**MAILI KAI PROPERTY**  
 MAILI, OAHU

**BARBERS POINT N.A.S.**  
**MORNING WIND SPEED DISTRIBUTION**



**BARBERS POINT N.A.S.  
MORNING WIND DIRECTION DISTRIBUTION**

**FIGURE IV-7  
MAILI KAI PROPERTY  
MAILI, OAHU**

TABLE IV-4  
 AVERAGE AND EXTREME RECORDED TEMPERATURES  
 FOR THE WAIANAE DISTRICT

<u>Station</u>	<u>Ground Elevation (ft)</u>	<u>Average Temperature (°F)</u>		<u>Extreme Temperature of Record (°F)</u>	
		<u>Lowest Mo.</u>	<u>Highest Mo.</u>	<u>Lowest</u>	<u>Highest</u>
Waianae*	20	72.1	79.7	45	96
Lualualei**	113	69.9	81.3	--	--

\* Based on 79 years of record.  
 \*\* Based on 1 year record (1972).

1.5.2 Probable Impacts

The proposed project is not expected to have any impact on the climate or meteorology of the project area or region. Planned structures would not be tall enough to significantly affect existing wind patterns; new landscape or residential vegetation is not expected to be great enough to significantly affect temperature or rainfall patterns; and existing and new surface water drainage collection and disposal structures are not expected to significantly affect groundwater recharge or runoff patterns.

1.5.3 Mitigation Measures

Due to the lack of expected adverse environmental impacts on the existing climatological and meteorological characteristics of the project area or region, mitigation measures to minimize potential adverse impacts do not appear warranted.

# CORRECTION

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

0700 HST WIND DIRECTION DISTRIBUTION

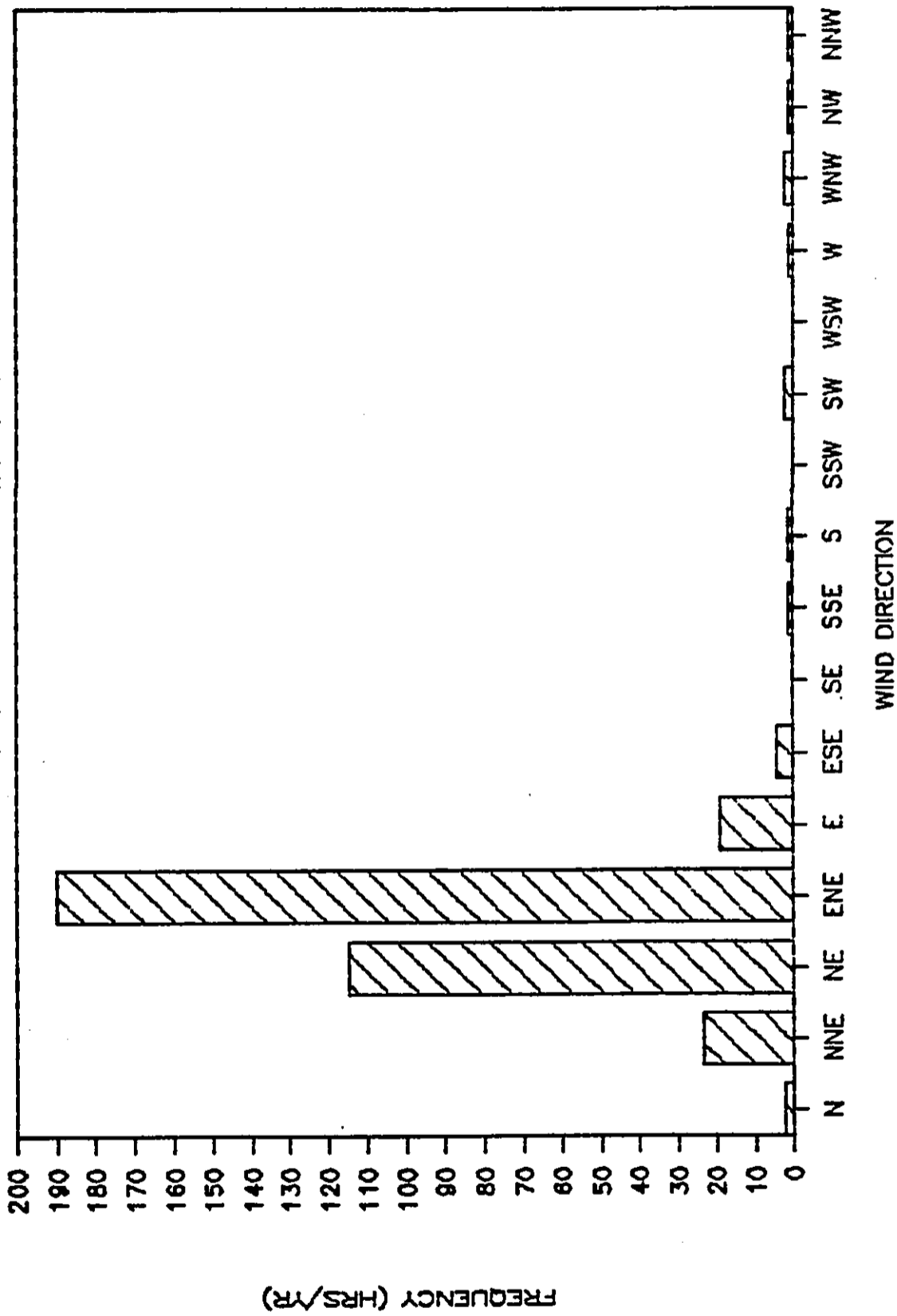


FIGURE IV-7  
MAILI KAI PROPERTY  
MAILI, OAHU

BARBERS POINT N.A.S.  
MORNING WIND DIRECTION DISTRIBUTION

TABLE IV-4  
 AVERAGE AND EXTREME RECORDED TEMPERATURES  
 FOR THE WAIANAE DISTRICT

Station	Ground Elevation (ft)	Average Temperature (°F)		Extreme Temperature of Record (°F)	
		Lowest Mo.	Highest Mo.	Lowest	Highest
Waianae*	20	72.1	79.7	45	96
Lualualei**	113	69.9	81.3	--	--

\* Based on 79 years of record.  
 \*\* Based on 1 year record (1972).

#### 1.5.2 Probable Impacts

The proposed project is not expected to have any impact on the climate or meteorology of the project area or region. Planned structures would not be tall enough to significantly affect existing wind patterns; new landscape or residential vegetation is not expected to be great enough to significantly affect temperature or rainfall patterns; and existing and new surface water drainage collection and disposal structures are not expected to significantly affect groundwater recharge or runoff patterns.

#### 1.5.3 Mitigation Measures

Due to the lack of expected adverse environmental impacts on the existing climatological and meteorological characteristics of the project area or region, mitigation measures to minimize potential adverse impacts do not appear warranted.

## 1.6 AIR QUALITY

### 1.6.1 Existing Conditions

The proposed project is classified as an "indirect source" of air pollution as defined in the federal Clean Air Act of 1977 because its primary association with air pollution is due to its inherent generation of mobile source, i.e., motor vehicle activity. The proposed project will also have off-site air quality effects due to increased demand for electrical energy, which must be met through the combustion of some type of fuel; disposal of the refuse generated by the residents of Maili Kai; and there will be short-term impacts during construction due to clearing and grading and construction activities. Air quality within the project site and surrounding area is also affected by agricultural activities near the project site. These affects are primarily odors, which are more noticeable during rainy or calm wind conditions. However, given the predominance of northeasterly tradewinds and almost daily, midday sea breezes, odors from nearby piggeries and chicken farms are almost a constant occurrence at the site as they are in other residential areas downwind or makai of the agricultural activities.

The nearest State Department of Health air monitoring station to the project area is located at the Campbell Industrial Park, about 8 miles southeast of the project site. The state has monitored air quality at the park since 1971, and summary of the data is presented in Table IV-5. As shown, total suspended particulates (TSP), sulfur dioxide (SO<sub>2</sub>) and nitrogen dioxide (NO<sub>2</sub>) were measured on a 24-hour basis.

As shown in Table IV-5, both the National Ambient Air Quality Standards (NAAQS) and the Hawaii Ambient Air Quality Standards (HAAQS) are being met at the monitoring station. However, because the monitoring station is relatively close to potentially



TABLE IV-5  
AIR MONITORING DATA  
CAMPBELL INDUSTRIAL PARK  
1971-1985

YEAR	RANGE	TSP		RANGE	SO <sub>2</sub>		RANGE	NO <sub>2</sub>	
		MEAN	>AQS		MEAN	>AQS		MEAN	>AQS
1971	18-471	125	54	<5-16	<5	0	<20-49	29	0
1972	24-155	55	4	<5-7	<5	0	<20-49	21	0
1973	14-129	50	1	<5-5	<5	0	<20-33	<20	0
1974	23-132	47	1	<5-10	<5	0	<20-40	25	0
1975	13-137	52	1	<5-11	<5	0	<5-25	11	0
1976	12-101	40	1	<5-7	<5	0	<5-29	14	0
1977	25-134	54	1	<5-18	<5	0	-----	--	-
1978	22-127	48	1	<5-40	<5	0	-----	--	-
1979	23-223	76	10	<5-27	<5	0	-----	--	-
1980	29-158	53	2	<5-10	<5	0	-----	--	-
1981	26-188	51	2	<5-40	<5	0	-----	--	-
1982	15-63	41	0	<5-12	<5	0	-----	--	-
1983	28-193	--	2	<5-95	--	1	-----	--	-
1984	17-112	50	1	<5-<5	<5	0	-----	--	-
1985	24-138	57	3	<5-25	<5	0	-----	--	-

- NOTES:
1. TSP = total suspended particulates
  2. SO<sub>2</sub> = sulfur dioxide
  3. NO<sub>2</sub> = nitrogen dioxide
  4. >AQS = number of violations of state air quality standard
  5. All concentrations are in micrograms per cubic meter of air.
  6. Sampling station was moved from Barbers Point Lighthouse to the Chevron Refinery site due to salt spray from the ocean on 17 March 1972.
  7. The samplers were elevated to a rooftop on 7 August 1979.
  8. Source: State Department of Health

elevated air pollutant sources, the data may not be representative of the highest ambient pollution levels resulting from various pollutant sources at the park. Air quality computer modeling (see Appendix B) done in conjunction with the City's resource recovery facility (H-POWER) permitting indicated maximum SO<sub>2</sub> concentrations occurring some 1.0 to 1.5 kilometers north of the park in the flat terrain as well as on the hillsides north of the park. Similarly, because the monitoring site is approximately eight miles southeast of the proposed project site, it is likely that the air quality data shown in Table IV-5 are not exactly representative of the Maili area. It is possible that air quality at the project site is "better" than that shown for the Campbell Industrial Park, due to the lack of stationary sources such as those at the industrial park.

#### 1.6.2 Probable Impacts

Impacts to the project area and regional air quality could be caused by increased vehicular activity; electrical generation off-site; solid waste disposal off-site; and construction activities. Although the proposed project will not affect air quality impacts due to odors caused by nearby agricultural activities, these odors will impact on the proposed project.

Based on the traffic and air quality analyses (see Appendices B and F) performed for this EIS, it appears that primary mobile source generated air pollutant of interest, carbon monoxide (CO), 1-hour, 8-hour and downstream concentrations would be within both federal and state air quality standards, although downstream concentrations would be close to the State's 1-hour standard. In-vehicle CO levels, i.e., for those Maili Kai residents commuting to work-places in the more developed parts of Oahu, e.g., downtown Honolulu, would probably be higher than those indicated for outside ambient conditions.

Potential stationary source air quality impacts (electrical generation and solid waste disposal) emissions due to the Maili Kai project are shown in Table IV-6. The project's contribution to the county emissions inventory (Table IV-7) appear to be less than 0.2 percent. Short-term construction impacts are not expected to adversely affect surrounding areas due to dust control measures (frequent watering) that will be employed during the construction period. It is expected that due to the new landscaping and residential plantings that will be part of the proposed project, existing fugitive dust emissions in the project area would decrease. It is probable that residents of Maili Kai will experience odors from nearby agricultural operations. These effects will be most pronounced during calm and during rainy periods although northeasterly trades indicate an almost constant occurrence of agriculturally generated odors affecting the site.

#### 1.6.3 Mitigation Measures

Mitigation measures to minimize potential adverse air quality impacts, due to increased traffic and/or construction activities, would include frequent watering of unpaved roads and construction areas and planting of ground cover and vegetation as soon as possible after construction. Based on the air quality analysis performed for this EIS, it does not appear that additional mitigation measures for traffic or construction activities are required. There are no practical methods of controlling agriculture generated odors. As such, the residents of Maili Kai will most likely be subjected to these odors constantly.

Given the state's right-to-farm law (HRS Chapter 165), it is likely that project residential unit sales documents will include language precluding resident's rights to attempt to restrict or otherwise interfere or hinder with existing or future

**TABLE IV-6**  
**ESTIMATES OF ANNUAL EMISSIONS DUE TO**  
**ELECTRICAL GENERATION AND SOLID WASTE DISPOSAL**  
**MAILI KAI PROJECT**

Pollutant	Emissions (T/Yr)	
	Electrical Generation	Solid Waste Disposal
Sulfur dioxide	28.8	1.8
Nitrogen oxides	38.1	8.8
Particulate Matter	2.9	0.7
Carbon monoxide	1.8	7.7
Hydrocarbons	0.4	0.5

TABLE IV-7  
1980 EMISSIONS INVENTORY  
CITY AND COUNTY OF HONOLULU

SOURCE CATEGORY	EMISSIONS (Tons/Year)				
	PM	SOx	NOx	CO	HC
Steam Electric Power Plants	2092	36,736	12,455	1,065	184
Gas Utilities	14	0	199	0	0
Fuel Combustion in Agricultural Industry	1088	579	358	0	31
Refinery Industry	622	7,096	2,149	266	2,584
Petroleum Storage	0	0	0	0	1,261
Metallurgical Industries	28	96	40	0	0
Mineral Products Industry	6,884	1,883	597	0	31
Municipal Incineration	42	145	2,029	0	184
Motor Vehicles	1,413	1,014	17,270	239,198	22,853
Construction, Farm and Industrial Vehicles	184	193	2,507	3,729	338
Aircraft	382	145	1,751	5,594	1,476
Vessels	42	386	438	533	123
Agricultural Field Burning	1,399	0	0	15,982	1,692
<b>TOTAL:</b>	<b>14,191</b>	<b>48,274</b>	<b>39,792</b>	<b>266,367</b>	<b>30,758</b>

SOURCE: State Department of Health

agricultural activities that meet the provisions of the right-to-farm law. This language would serve to inform potential buyers that agricultural activities meeting the provisions of the right-to-farm law take precedence over project resident's rights and that there is the probability that agricultural odors will pervade the project site. There are no practical or economical means to control agricultural odors and, as such, notification of potential residential unit buyers via the sales document clauses noted above appear to be the most practical and effective measures that can be taken to mitigate potential adverse impacts to agricultural activities and the odors generated by those activities.

## 1.7 NOISE QUALITY

### 1.7.1 Existing Conditions

The existing noise quality of the proposed project site is dominated by natural factors including wind moving through the vegetation on the site and distant surf sounds. Although farming and, at times, quarrying operations can be "heard" on-site, the natural noise sources tend to relegate man-made noise to background or "white noise" levels. Additionally, traffic noise generated on Farrington Highway and nearby streets is experienced on-site. Based on noise level measurements taken at other similar locations on Oahu, it is presumed that existing noise levels in the project area are approximately 40 to 55 dBa.

### 1.7.2 Probable Impacts

Potential impacts on the noise quality of the site and area are primarily limited to those generated by the increased volume of traffic that the proposed project is expected to generate and, in the short-term, construction activity noise. Other potential sources of noise could be golf course operation and maintenance

activities near by agricultural activities and quarrying operations if the near by quarry is reopened. Increased human noise generation is also expected to occur in localized areas at different times.

Traffic generated noise levels both on- and off-site (along Farrington Highway) are expected to be in the range of 50 to 60 Leq (energy equivalent sound level for a given time period) (dB) at 50 feet. That is, traffic generated sound levels are expected to be typical of a busy highway condition. Traffic generated sound levels within the new residential area are expected to be lower, due to lower speed levels and landscaping along the roadways and around the residences. Increased noise activity due to construction would be limited to daytime hours and persist only during the construction period. All construction related equipment and activities would be required to comply with the provisions of Title 11, Administrative Rules, Chapter 43, Community Noise Control for Oahu. Similarly, air conditioning equipment used on any of the residential units would also be required to comply with the provisions of Chapter 43. Golf course operation and maintenance activities are expected to be performed during daylight hours and equipment used would meet appropriate federal and state noise control regulations. Agricultural activities outside the project boundaries may impact the residents of Maili Kai. However, structures within the development would be designed and built to minimize potential adverse effects of those noises. There are no known plans to reopen the quarry located to the north of the proposed project site. Should the quarry be reopened, operations would have to comply with Chapter 43 noise control regulations. Increased human activity noise levels in the area could be expected to occur in and around the public park area primarily, although increased human activity throughout the project site can be expected. Structures would be designed and built to maximize

containment of noise generated within the homes as well as minimize intrusion of outdoor noise sources.

### 1.7.3 Mitigation Measures

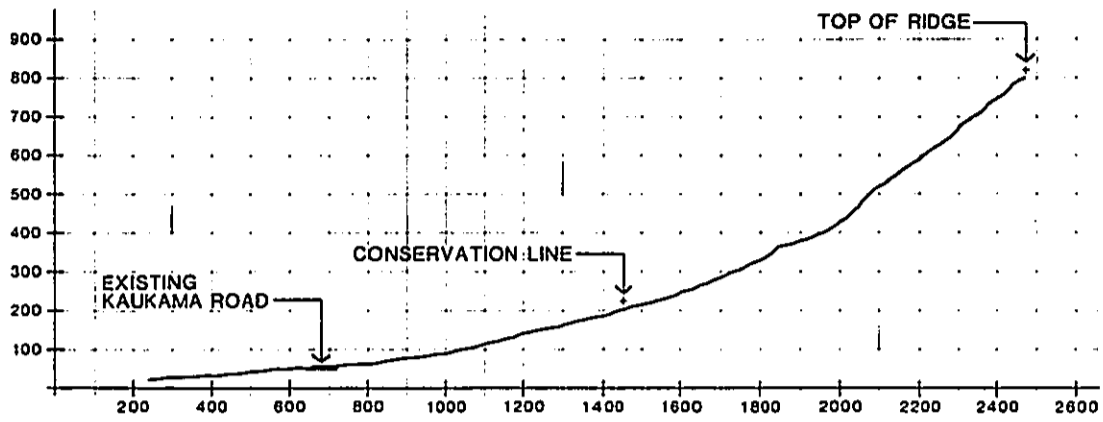
Mitigation measures to minimize potential adverse noise impacts resulting from increased traffic generation, other than those normally associated with any project, i.e., maintenance of vehicular muffler systems, do not appear warranted. Construction generated increased noise levels would be limited to daytime hours and do not appear to warrant additional noise mitigation measures. Similarly, it is expected that increased human activities and resultant increased noise levels in localized areas would be limited to daytime hours and not require additional mitigation measures other than adherence to standard engineering design and construction measures that would maximize containment of noise generated within structures and minimize intrusion of outdoor noise sources.

## 1.8 VISUAL ATTRIBUTES

### 1.8.1 Existing Conditions

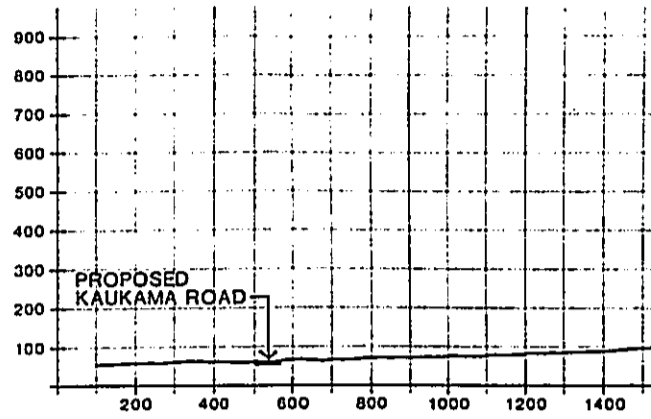
The existing visual character of the proposed project site is one of open space, scrub vegetation, barrenness and rubbish dumped in various locations. View planes from the site include a variety of land elevations ranging from relatively flat to extremely steep slopes (Figure IV-8). The slopes leading toward Puu O Hulu Kai and Puu O Hulu Uka ridgelines provide commanding views to the north overlooking the entire site and the ocean beyond. To the north and east from the level flatlands on the property, views of the Waianae Mountain Range predominate and to the south, views from the flat lands are dominated by the rugged Puu O Hulu Kai and Puu O Hulu Uka ridgelines (Figure IV-9).



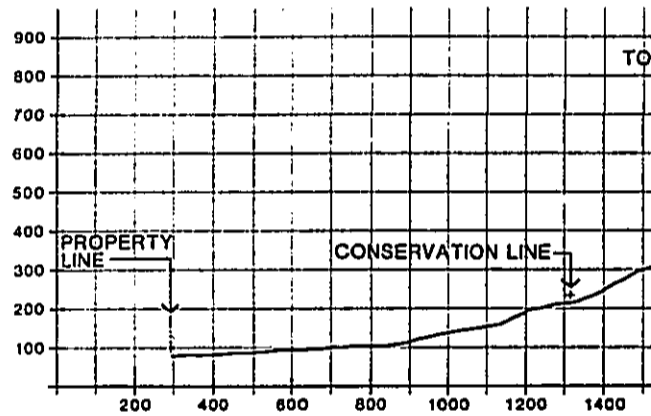
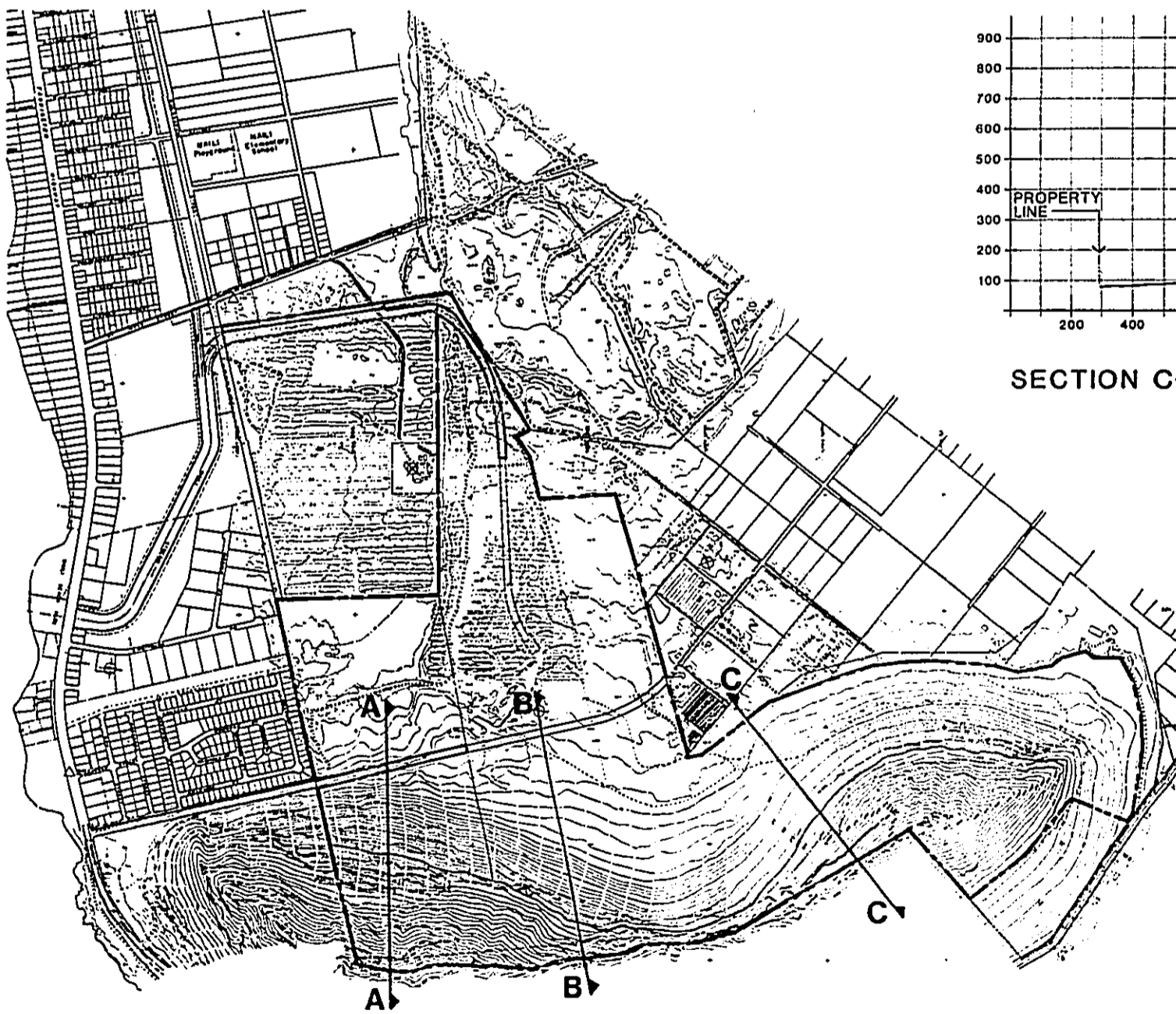


SECTION A-A

SCALE: 1" = 500'

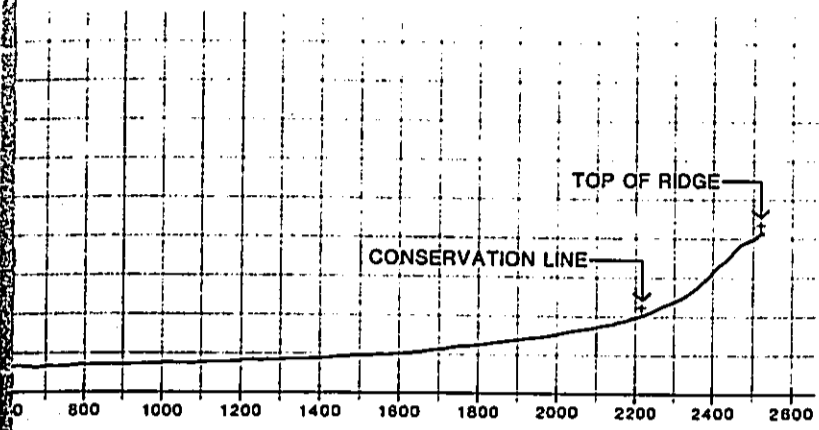


SECTION B-B

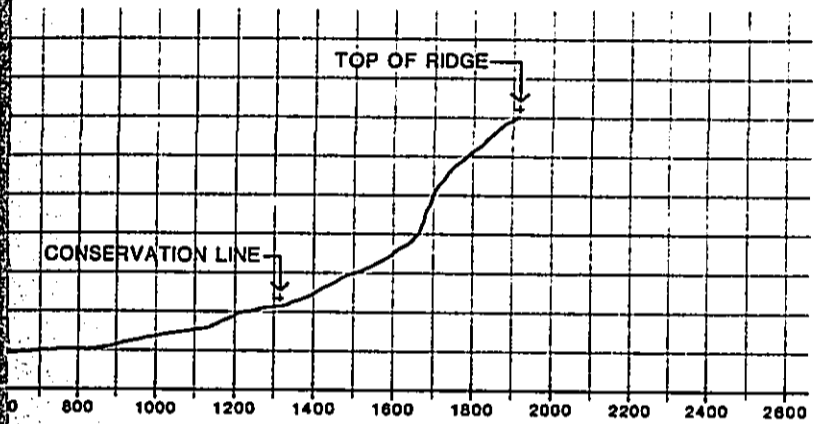


SECTION C-C

**FIGURE IV-8**  
**MAILI KAI PROPERTY**  
**MAILI, OAHU**



SCALE: 1" 500'



SCALE: 1" 500'

**SITE SECTIONS**





**FIGURE IV-9**  
**MAILI KAI PROPERTY**  
**MAILI, OAHU**

**VIEWS**



### 1.8.2 Probable Impacts

Probable impacts to the visual character of the proposed project include changing the views into the site such that the present scrub vegetation and rubbish would be removed and replaced with park, golf course and residential landscaping and structures. Views out of the site would essentially remain the same in that the Waianae Mountain Range and Puu O Hulu Kai and Puu O Hulu Uka ridgelines would still be visible and views of the ocean from the majority of the site would be retained. It is expected that the visual character of the site, from outside the site, would be improved through the addition of the landscaping noted above. Further, the single family and multifamily housing units would be designed to complement the background vistas.

### 1.8.3 Mitigation Measures

The primary mitigation measures to be employed to minimize adverse impacts to the visual attributes of the site include landscaping of the park, golf course and residential areas; architectural treatment of the buildings to complement background vistas; and maintenance of views of the Waianae Mountain Range and the ridgelines on the southerly boundary of the project site. It is expected that the visual character of the site will be improved by the proposed project. As such, additional mitigation measures to minimize potential adverse impacts do not appear warranted.

## 2. NATURAL ENVIRONMENT

### 2.1 FLORA

#### 2.1.1 Existing Conditions

A botanical survey of the proposed project site was conducted in December 1987 to inventory and identify the species of vascular plants found on the site (Appendix C). The survey was focused primarily on the level areas and on the slopes below about 200 feet elevation as development would take place in these areas. The species recorded are indicative of the season (rainy versus wet) and environmental conditions under which the survey was made. Surveys taken at different times of the year, under varying environmental conditions would yield slight variations in the species list, especially the weedy annual taxa.

The vegetation of the area is largely weedy with evidence of repeated burnings in many areas. Where fires are frequent or recent, the vegetation consists of grassland; where fires are less frequent, a koa-haole (Leucaena leucocephala) scrub replaces the grass. Less disturbed areas support a forest of kiawe (Prosopis pallida). Only 103 species of vascular plants were found on the site, relatively few compared to similar Oahu habitats. Of the 103 species, 89 were exotic (introduced); two are believed to be Polynesian introductions; eight are considered indigenous to the Hawaiian islands; and four are endemic, i.e., native to the Hawaiian islands. No threatened or endangered plant species designated by federal and/or state agencies occur on the project site.

The level areas of the site show repeated disturbance from excavation and/or burning whereas the slope areas are less disturbed. After disturbance, annual weeds are the first to colonize the bare soil. However, these were not much in evidence

on the site at the time of the survey. Those that were present were about 1 - 2-weeks old, apparently germinating after a heavy rain storm just prior to the survey. Many weedy species that could be expected to be found on the site were not found. Most of the site had progressed to vegetation of later successional stages; grassland, scrub and forest. In the climatic conditions that exist over the site and general region, kiawe forest is the final stable vegetation type.

Three vegetation types were recognized on the site: (1) Grassland; (2) Kiawe Forest; and (3) Koa-haole Scrub. Complete descriptions of these vegetation types and a list of all of the species inventoried during the survey are given in Appendix C.

#### 2.1.2 Probable Impacts

The proposed project is not expected to have a significant impact on the vegetation of the area because it is composed largely of exotic species, the majority of them weedy. The native species, i.e., indigenous and endemic, are found in similar environmental conditions throughout the state. Some of the more "ornamental" native species that have colorful flowers and interesting foliage, such as the Hawaiian cotton (Gossypium sandvicense), 'ilima (Sida fallax), pa'u-o-Hi'i'aka (Jacquemontia sandwicensis) and 'ili'e'e (Plumbago zeylanica), could be used for landscaping in areas such as the park and open spaces.

#### 2.1.3 Mitigation Measures

Due to the lack of expected adverse impacts on the vegetation of the project site, mitigation measures to minimize potential adverse impacts do not appear warranted. To the extent possible, native species would be used for landscaping purposes in the open spaces and park and possibly in individual residential landscaping plans.

## 2.2 FAUNA

### 2.2.1 Existing Conditions

An avifauna and feral mammal survey of the proposed project site was conducted in early January 1988 to (1) document which bird and mammal species occur on the property or may likely occur given the types of habitat available; (2) provide baseline data on the relative density of each species and determine the extent to which each species is dependent upon the resources on the property; (3) compare the findings of the survey with published and unpublished data; and (4) assess possible changes that might occur as a result of the proposed project (see Appendix D).

No resident endemic (native) birds were recorded during the survey conducted and, given the present nature of the property, the only likely endemic bird that might occur would be the Short-eared Owl (Asio flammeus sandwichensis). Also, it is possible that temporary heavy flooding by heavy rains would create ponding of water that might attract Black-necked Stilt (Himantopus mexicanus knudseni) which often take advantage of these opportunities to forage. The only migratory indigenous (native) birds recorded during the survey were two Pacific Golden Plover (Pluvialis dominica fulva). Temporary flooding of the site might attract Ruddy Turnstones (Arenaria interpres) and Sanderlings (Caldris alba), however, the lack of permanent wetlands on the site indicates that these species, if they did frequent the site, would be transient visitors. No resident indigenous birds were recorded on the site during the survey.

The majority of the birds sighted during the survey were exotic or introduces species. A total of 15 species were recorded (see Table 1, Appendix D for relative abundance and typical habitat preferences) on the site. The most abundant species was the Zebra Dove (Geopelia striata) with sixteen individuals counted.



Relatively low numbers of Red-crested cardinal (Paroaria coronata) as well the absence of Japanese Bush Warbler (Cettia diphone) and White-rumped Shama (Copsychus malabaricus) were unexpected results of the survey. The presence of both Gray Francolin (Francolinus pondicerianus) and Erckel's Francolin (Francolinus erckelii) was unexpected as both species are relatively uncommon on Oahu. It is presumed that the Common (Ring-necked) Pheasant (Phasianus colchicus) occurs on the property but none were sighted.

The only feral mammal observed during the survey was the Small Indian Mongoose (Herpestes auropunctatus), but scats and tracks of both dogs and cats were also found. No rats or mice were recorded, but it is highly unlikely that they do not exist on the property. Similarly, although the endemic and endangered Hawaiian Hoary Bat (Lasiurus cinereus semotus) has been recorded from central Oahu, none were observed on the property.

#### 2.2.2 Probable Impacts

The present Maili Kai property environment provides a fairly diverse range of habitats that are utilized by the typical array of exotic birds that could be expected to be found in this part of Oahu. The steep rocky brush covered slopes of Puu O Hulu Kai and Puu O Hulu Uka provide a refuge for two exotic francolin species, and the grass and seed bearing trees (Koa Haole) provide abundant resources for doves, sparrows, finches and cardinals. A change of land use type will most likely alter the present habitat by creating even more diversity of living spaces than presently available. The planting of fruit trees and creation of open spaces will provide new habitats and most likely cause an increase in the numbers of plover and Common Myna (Acridotheres tristis). It is also likely that the loss of high grass and brush will also cause mongoose, rat and mice populations to

decrease. However, as noted below, activities off-site could serve to maintain present mongoose, rat and mice populations.

It is possible that the residents of Maili Kai would face problems caused by flies, mosquitos and rodents originating at nearby poultry and swine farms. The following briefly describes existing or potential conditions that may be experienced.

Flies. The common housefly and blowfly are the prevalent species in the area. They occur year-round and breed in tremendous numbers on the animal farms. The housefly breeds mostly in chicken manure, especially in wet manure. To compound the problem, these flies are highly resistant to pesticides and are difficult to control.

A specific example is the situation involving the Maili Elementary School which is located adjacent to a poultry farm. There have been a number of occasions when uncontrollable fly breeding has occurred on the farm. The resulting flies have invaded the school enmasse, resulting in public outcry from staff, students and parents alike.

Mosquitoes. Numerous mosquito breeding sources abound in the area, including animal sewage lagoons, Lualualei reservoir, and artificial temporary pools. All of these sources are well within the flight range of the adult mosquitoes. Like the houseflies, the mosquitoes are also highly resistant to chemicals. The State Department of Health (DOH) relies mostly on a larviciding oil for control. While the oil is effective, the residual effect is minimal. Frequent treatments are necessary and DOH is not able to maintain this constant service.

Rodents and Mongooses. These animals also abound in the area because of ample foodstuff. The rodents are especially

difficult to control because of competing food. As their numbers increase, they are likely to disperse into the surrounding areas. Additionally, test results indicate that significant numbers of the rodents in the area are infected with murine typhus and leptospirosis.

These vectors are generally controlled to "tolerable" levels by the State Department of Health, but there will be constant interruptions to the lives of the residents of the development. The Department of Health has noted (see Chapters XI and XII) that there will be times when their efforts will not satisfactorily control various vectors and residents will have to compromise their comfort for choosing to live there.

It is also possible that the avifauna inhabiting and frequenting the proposal project site, and particularly the proposed golf course, could be affected by the biocides that would be used on the golf course or landscape areas.

Based on the experience of other projects in Hawaii and knowledge of the use of biocides and fertilizers on golf courses in Hawaii, it does not appear that there would be any adverse effects to the wildlife inhabiting or frequenting the proposed project site due to the application of biocides or fertilizers to the golf course or other landscaped areas. This is due in part to the relatively low dosages of biocides that are applied to golf courses; the application of biocides in accordance with manufacturer's recommendations; and the relatively rapid degradation of biocides by natural actions of the soil-sod interrelationships. Although specific details regarding which biocides or fertilizers would be used on the golf course are not available at this level of planning, it is presumed that the biocides would be in Toxicity Categories III and IV, indicating unrestricted use and fairly rapid degradation. There are national concerns, as well as state-wide concerns regarding the uses of various chemicals on

golf courses and landscape areas. However, the literature searches and analyses that have been conducted for other projects (for example see Chapter IV, Section 2.5.1.2 and Appendix G, Punalu'u Resort Final EIS, April 1988), indicate that there does not appear to be any significant impact on the terrestrial or aquatic biota inhabiting or frequenting golf courses, provided that the chemicals are applied in accordance with manufacturer's recommendations.

### 2.2.3 Mitigation Measures

In general, the lack of potential adverse impacts that would result from the proposed project, as well as the absence of significant numbers of resident endemic, migratory, resident or indigenous birds, and the relatively small numbers of introduced birds or mammals indicates that mitigation measures to minimize adverse effects are not warranted. As noted in Chapter II, Section 3.2, the proposed project will not directly affect those areas presently classified as Conservation/Preservation, the "best" habitat and refuge areas for birds. Similarly, the planting of a wide range of trees, which most likely will be the case as new residents establish landscaping around single family residences and as landscaping is planted around multifamily units, will increase the biological diversity of the site for birds.

Vector control, to the extent possible will be provided by the State Department of Health. It is recognized that these efforts may not be totally satisfactory at all times. As an added measure, it may be possible in the future to construct a jointly funded (federal, state, county and private) animal waste digester that could process area-wide generated wastes, produced methane gas to fire an electrical generator that could be fitted with heat pumps thereby increasing power generation efficiency. The power generated could be used to operate both the digester and

groundwater pumps that could supply agricultural quality water to the area. However, it is recognized that this concept would require special funding and the close cooperation of federal, state, county and private agencies and groups and for any one of several possible reasons may not be a realistic, plausible mitigation measure.

Other mitigation measures that might be employed to reduce or eliminate adverse environmental impacts resulting from agricultural operations could include (1) stringently enforcing existing or new regulations requiring agricultural operations to control vectors that might affect other activities and (2) increase DOH funding and staffing to allow implementation of better vector control measures.

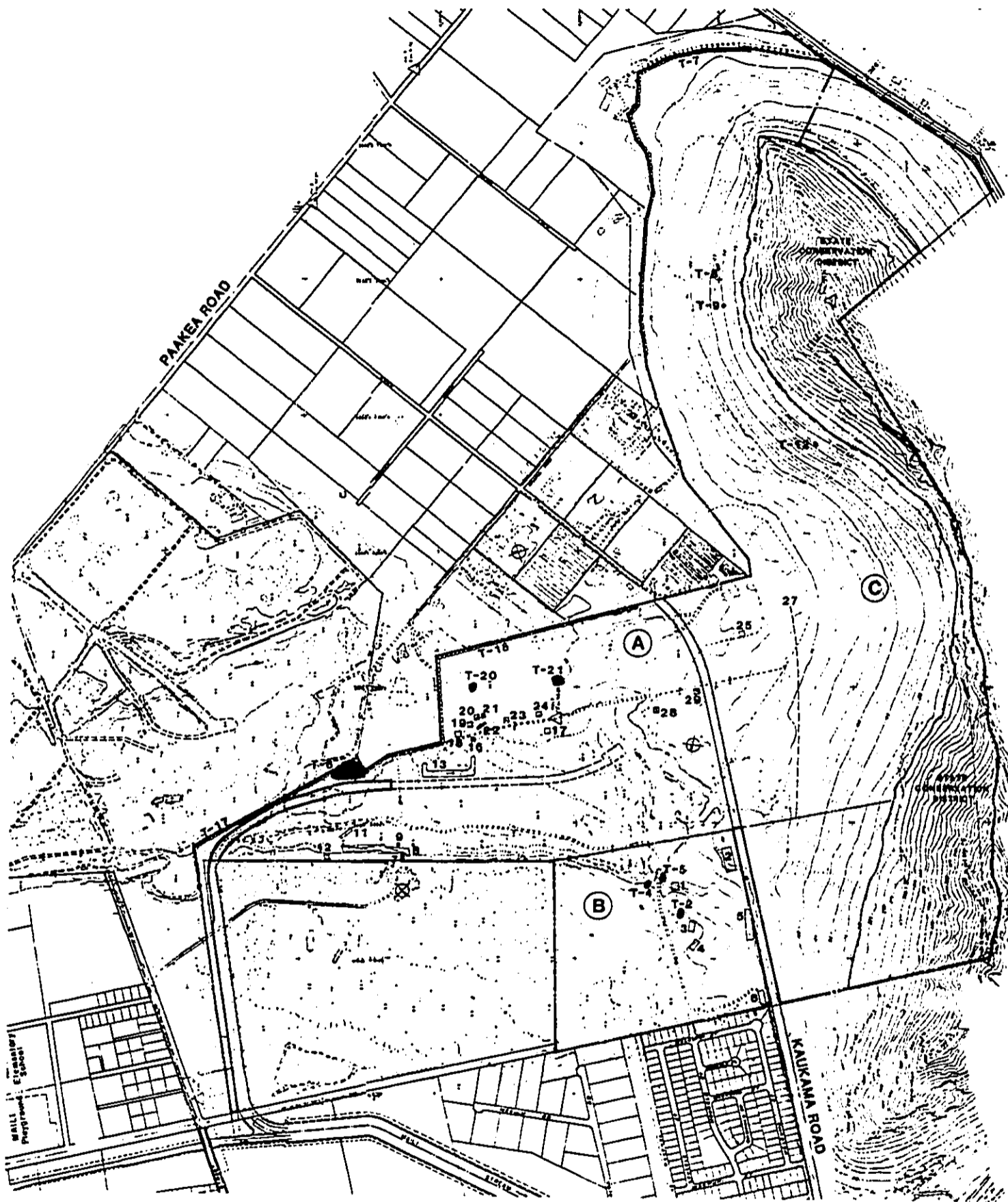
### 3. HISTORICAL AND ARCHAEOLOGICAL RESOURCES

#### 3.1 EXISTING CONDITIONS

Archaeological resources within the project area were studied, the findings of the reconnaissance survey are documented in Appendix E. The basic purpose of the survey was to identify and evaluate all sites of possible archaeological significance present within the project area. Field survey consisted of 100 percent coverage ground survey by means of medium- to high-intensity pedestrian sweeps. The survey identified 26 sites, including 12 newly identified sites and 14 of 25 previously recorded sites. Eleven previously recorded sites were not relocated, and were determined to have been destroyed. Identified sites are summarized in Table IV-8 according to site number, formal type, tentative functional interpretation, nature and degree of significance (PHRI cultural resource management value modes) and comments. Site locations are shown on Figure IV-10. Formal site types present within the project area include multiple component complexes, stone walls, rock mounds, walled

enclosures, rough platforms, a modified sinkhole and a bridge/trench. Function site types present include various agricultural (sheds and corrals, land-clearing mounds) and industrial (charcoal manufacturing kiln) sites, boundary walls and markers, a well, a reservoir, temporary habitation shelters and a bridge. A complete description of all sites is included in Appendix E.

As noted by previous archaeological survey work, and reconfirmed by the recent PHRI survey, large-scale ranching and cultivation, land-clearing, and quarrying operations--from 1851 to the present--have extensively altered the Maili Kai property. Land-clearing and quarrying in particular have been destructive to the natural and cultural environments. One major result of the destruction is that 24 of the 26 sites in the project area date to the 20th century; two on the 24 sites date to the early to late 20th century, while the other 22 sites date from 1930 to the present. Only two small sites, rock features lacking associated artifacts, may predate the 20th century.



**LEGEND:**

- Peril Temporary Site Numbers (T- )
- Previously Recorded - Relocated (Ch-Oa- )
- Previously Recorded - Not Relocated (Ch-Oa- )
- Survey Area

**HISTORIC SITE LOCATIONS**

**FIGURE IV-10  
MAILI KAI PROPERTY**



TABLE IV-8  
SUMMARY OF IDENTIFIED SITES  
MAILI KAI PROPERTY PROJECT AREA

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	*Significance Evaluation			Comments
			R	I	C	
T-2	Complex (5) <sup>#</sup>	Agricultural	L	L	L	Modern structures; 1950s agricultural area (two sheds, corral, two trash piles)
T-4	Complex (3)	Industrial (charcoal kiln)	L	L	L	Approx. 1930-60s charcoal kiln; two associated sheds
T-5	Sinkwell with Wall	Well	L	L	L	May have 20th century and pre-20th century components
T-6	Complex (5)	Water Storage	L	L	L	May date to c. WWII or earlier; two reservoirs, two foundation slabs (pumphouse?), wall
T-7	Wall	Boundary	L	L	L	Shown on 1928 USGS quad map
T-8	Rock Mounds (2)	Unknown	L	L	L	Poss. aboriginal
T-9	Enclosure and Wall	Unknown	L	L	L	Poss. aboriginal
T-12	C-shape Enclosure	Unknown	L	L	L	Poss. military (date to WWII)
T-17	Wall	Boundary	L	L	L	On 1928 USGS quad map
T-18	Wall	Boundary	L	L	L	On 1928 USGS quad map
T-20	C-shape and Enclosure	Habitation(?) (temporary)	L	L	L	Probably related to rock-gathering operation; c. WWII

\*Significance Evaluation--Nature: R = scientific research, I = interpretive, C = cultural; (FHRI Value Modes)  
Degree: H = high, M = moderate, L = low.

<sup>#</sup>Number of component features within complex.



TABLE IV-8 (CONTINUED)

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	Significance Evaluation			Comments
			R	I	C	
T-21	Rock Mound Platform	Unknown	L	L	L	May be related to rock-gathering or land clearing operation; c. WWII
Ch-Oa-7	Rock Mound and Wall	Boundary	L	L	L	Predates 1910(?) (Cordy 1976)
Ch-Oa-8	Wall	Boundary	L	L	L	Predates 1910(?) (Cordy 1976)
Ch-Oa-9	Wall	Unknown	L	L	L	1890-1970(?) (Cordy 1976)
Ch-Oa-12	Mounds (2)	Boundary(?)	L	L	L	1890-1970(?) (Cordy 1976); poss. boundary markers or land-clearing piles
Ch-Oa-13	Enclosure (with internal walls)	Ranching(?)	L	L	L	1890-1970(?) (Cordy 1976); poss. corral
Ch-Oa-16	C-shape Enclosure	Unknown	L	L	L	1890-1970(?) (Cordy 1976)
Ch-Oa-19	Rock Mound	Unknown	L	L	L	1890-1970(?) (Cordy 1976); poss. land-clearing pile
Ch-Oa-20	Rock Mounds (2)	Unknown	L	L	L	1890-1970(?) (Cordy 1976); poss. land-clearing pile
Ch-Oa-21	Rock Mound/ Platform	Unknown	L	L	L	1890-1970(?) (Cordy 1976); poss. land-clearing pile; center of mound may have been scavenged for rocks

TABLE IV-8 (CONTINUED)

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	Significance Evaluation			Comments
			R	I	C	
Ch-0a-22	Bridge and Trench	Bridge	L	L	L	1890-1970(?) (Cordy 1976); bridge destroyed; trench mostly filled-in
Ch-0a-23	Rock Mound/ Platform	Unknown	L	L	L	1890-1970(?) (Cordy 1976); poss. land-clearing pile
Ch-0a-24	Rock Mound/ Platform	Unknown	L	L	L	1890-1970(?) (Cordy 1976); poss. land-clearing pile
Ch-0a-28	Rock Platform	Unknown	L	L	L	1890-1970(?) (Cordy 1976); poss. land-clearing pile
Ch-0a-29	Rock Mound/ Platform	Unknown	L	L	L	1890-1970(?) (Cordy 1976); poss. land-clearing pile

### 3.2 PROBABLE IMPACTS

An overall evaluation of the reconnaissance survey findings concluded that there were no archaeological remains that should be classified as "must be preserved" (see Appendix E). Due to their marginal nature, lack of time depth, and disturbed condition, the sites in the project area have been assessed as having minimal scientific research information potential, and no interpretive potential or cultural significance. Additional data collection in the form of limited subsurface testing, primarily to determine if pre-20th century components might possibly be present, has been recommended as appropriate for five sites. This data recovery work would be accomplished prior to any construction activity. Further, a written plan for mitigation work would be developed and submitted to the Department of Land and Natural Resources-Historic Sites Section (DLNR-HSS) for review and approval prior to commencement of any work. All mitigation work would be coordinated with DLNR-HSS. Contingent upon the results of this data recovery work, it is considered most likely that such additional limited data collection would constitute appropriate and adequate recovery of archaeological data present, that no further archaeological work would be necessary, and that none of the sites would have to be preserved; therefore, there would be no adverse impact upon any significant cultural resources by development activities within the project area.

General significance assessments and recommended general treatments for all sites identified during the reconnaissance survey are summarized in Table IV-9. The State Department of Land and Natural Resources-Historic Sites Section (DLNR-HSS) has reviewed and concurred with these assessments and mitigation measures (see Chapter XII, DLNR-HSS letter of March 21, 1988). The significance categories used in the evaluation process are based on the National Register criteria contained in the Code of

Federal Regulations (36 CFR Part 60). DLNR-HSS uses these criteria to evaluate eligibility for both the Hawaii State and National Register of Historic Places. Sites determined to be potentially significant for information content (Category A, Table IV-9) fall under Criterion D, which defines significant resources as ones which "...have yielded, or may be likely to yield, information important in prehistory or history." Sites potentially significant as representative examples of site types (Category B, Table IV-9) are evaluated under Criterion C, which defines significant resources as those which "...embody the distinctive characteristics of a type, period, or method of construction..., or that represent a significant and distinguishable entity whose components may lack individual distinction."

Sites with potential cultural significance (Category C, Table IV-9) are evaluated under guidelines prepared in 1985 by the Advisory Council on Historic Preservation (ACHP) entitled "Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review." The guidelines define cultural value as "...the contribution made by an historic property to an ongoing society or cultural system. A traditional cultural value is a cultural value that has historical depth." The guidelines further specify that "(a) property need not have been in consistent use since antiquity by a cultural system in order to have traditional cultural value."

**TABLE IV-9**  
**SUMMARY OF GENERAL SIGNIFICANCE ASSESSMENTS**  
**AND RECOMMENDED GENERAL TREATMENTS**  
**MAILI KAI PROPERTY PROJECT AREA**

Site Number	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NEW	PID	PAI
T-5	+	-	-	-	+	-	-	-
T-9	+	-	-	-	+	-	-	-
T-21	+	-	-	-	+	-	-	-
Ch-Oa-16	+	-	-	-	+	-	-	-
Ch-Oa-23	+	-	-	-	+	-	-	-
<b>Subtotal:</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>
T-2	-	+	-	-	-	+	-	-
T-4	-	+	-	-	-	+	-	-
T-6	-	+	-	-	-	+	-	-
T-7	-	+	-	-	-	+	-	-
T-8	-	+	-	-	-	+	-	-
T-12	-	+	-	-	-	+	-	-
T-17	-	+	-	-	-	+	-	-
T-18	-	+	-	-	-	+	-	-
T-20	-	+	-	-	-	+	-	-

**General Significance Categories:**

- A=Important for information content, further data collection necessary (PHRI=research value);
- X=Important for information content, no further data collection necessary (PHRI=research value, DLNR-HSS=not significant);
- B=Excellent example of site type at local, region, island, State, or National level (PHRI=interpretive value); and
- C=Culturally significant (PHRI=cultural value).

**Recommended General Treatments:**

- FDC=Further data collection necessary (intensive survey and testing, and possibly subsequent data recovery/mitigation excavations);
- NEW=No further work of any kind necessary, sufficient data collected, archaeological clearance recommended, no preservation potential;
- PID=Preservation with some level of interpretive development recommended (including appropriate related data recovery work); and
- PAI=Preservation "as is," with no further work (and possible inclusion into landscaping), or appropriate data recovery/disinterments.

TABLE IV-9 (CONTINUED)

Site Number	Significance Category				Recommended Treatment			
	A	X	B	C	FDC	NEW	PID	PAI
Ch-Oa-7	-	+	-	-	-	+	-	-
Ch-Oa-8	-	+	-	-	-	+	-	-
Ch-Oa-9	-	+	-	-	-	+	-	-
Ch-Oa-12	-	+	-	-	-	+	-	-
Ch-Oa-13	-	+	-	-	-	+	-	-
Ch-Oa-19	-	+	-	-	-	+	-	-
Ch-Oa-20	-	+	-	-	-	+	-	-
Ch-Oa-21	-	+	-	-	-	+	-	-
Ch-Oa-22	-	+	-	-	-	+	-	-
Ch-Oa-24	-	+	-	-	-	+	-	-
Ch-Oa-28	-	+	-	-	-	+	-	-
Ch-Oa-29	-	+	-	-	-	+	-	-
Subtotal:	0	21	0	0	0	21	0	0
Total:	5	21	0	0	5	21	0	0

### 3.3 MITIGATION MEASURES

Based on the findings of the reconnaissance survey field work, the archaeological remains identified within the Maili Kai property appear to be, for the most part, of minimal significance in terms of potential information content. None of the sites appear to be significant in terms of potential interpretive or cultural values. Most of the 26 sites recorded during the reconnaissance survey represent repetitive data sets. In addition to their disturbed condition and marginal significance, the repetitive nature of the sites identified in the property suggests that (a) further data collection from a few representative sites (as outlined in Appendix E, page E-15) would constitute sufficient mitigation, (b) no further archaeological

work would be necessary for most of the sites, and (c) none of the sites need to be preserved.

A qualified archaeologist will selectively monitor initial grubbing activity and/or vegetation clearing within the project area. The general significance evaluations and recommended general treatments presented here and in Appendix E are based on the findings of the surface reconnaissance survey field work only, which involved no subsurface testing. These evaluations and recommendations are given with the general qualification that during any development activity involving the extensive modification of the land surface, there is always the possibility--however remote--that previously unknown or unexpected subsurface cultural features, deposits or burials might be encountered. In such a situation, immediate archaeological consultation should be sought.

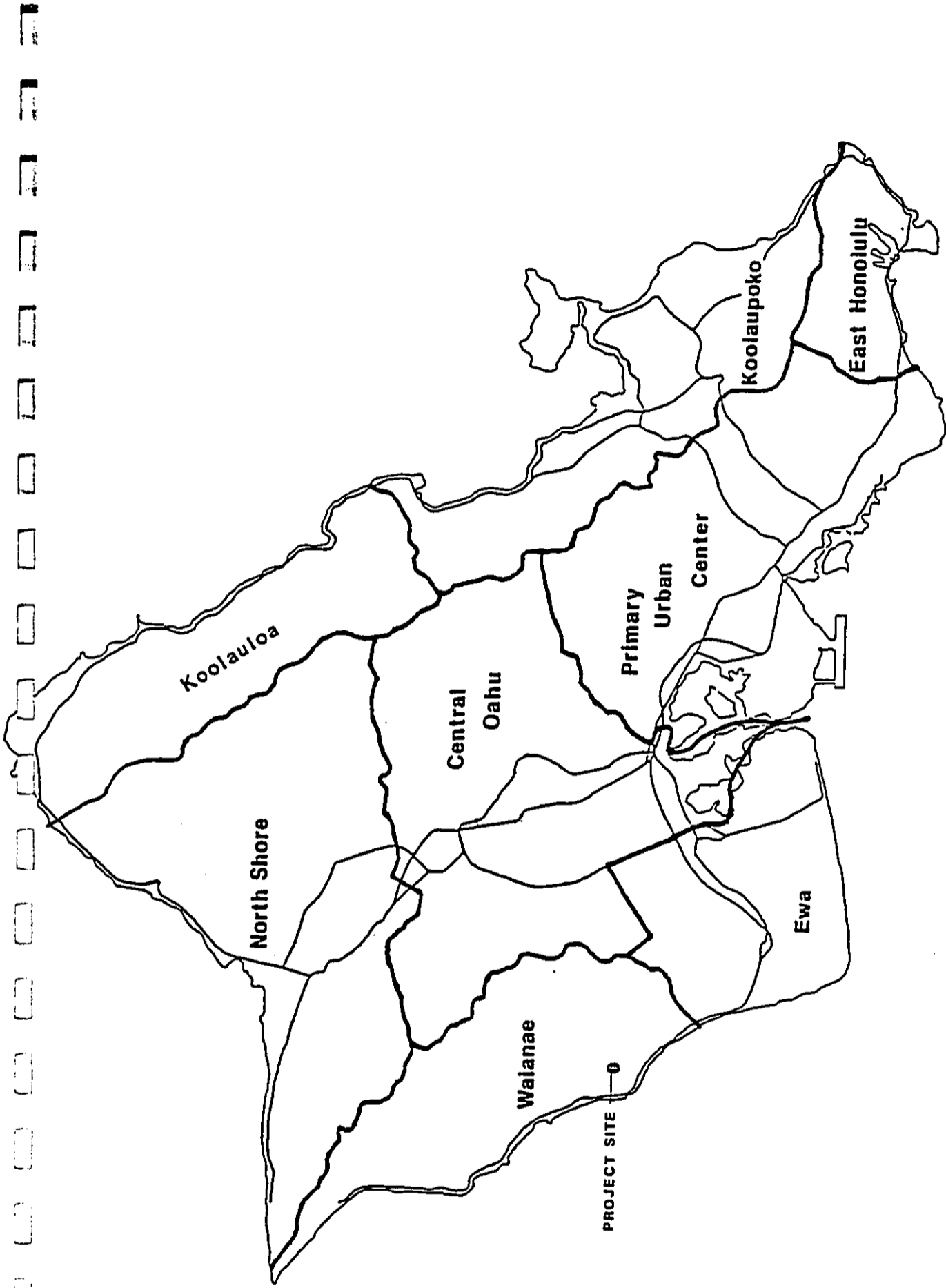
#### 4. SOCIOECONOMIC ENVIRONMENT

##### 4.1 EXISTING CONDITIONS

##### 4.1.1 Definition of Study Area

The project site is located in U.S. Census Tract 96.03, within the community of Maili on Oahu's Waianae Coast. "Waianae" as a geographical term may refer to any of three administrative units with essentially identical boundaries -- the State of Hawaii's Waianae Judicial District, the U.S. Census Bureau's Waianae Division, or the City and County of Honolulu's Waianae Development Plan (DP) Area.

Figure IV-11 shows the Waianae DP Area in relation to the island's other seven DP areas, while Figure IV-12 shows the project site in relation to the four census tracts and the four Census Designated Places (CDP's) within the overall Waianae area.



**FIGURE IV-11  
MAILI KAI PROPERTY**

**NORTH** 

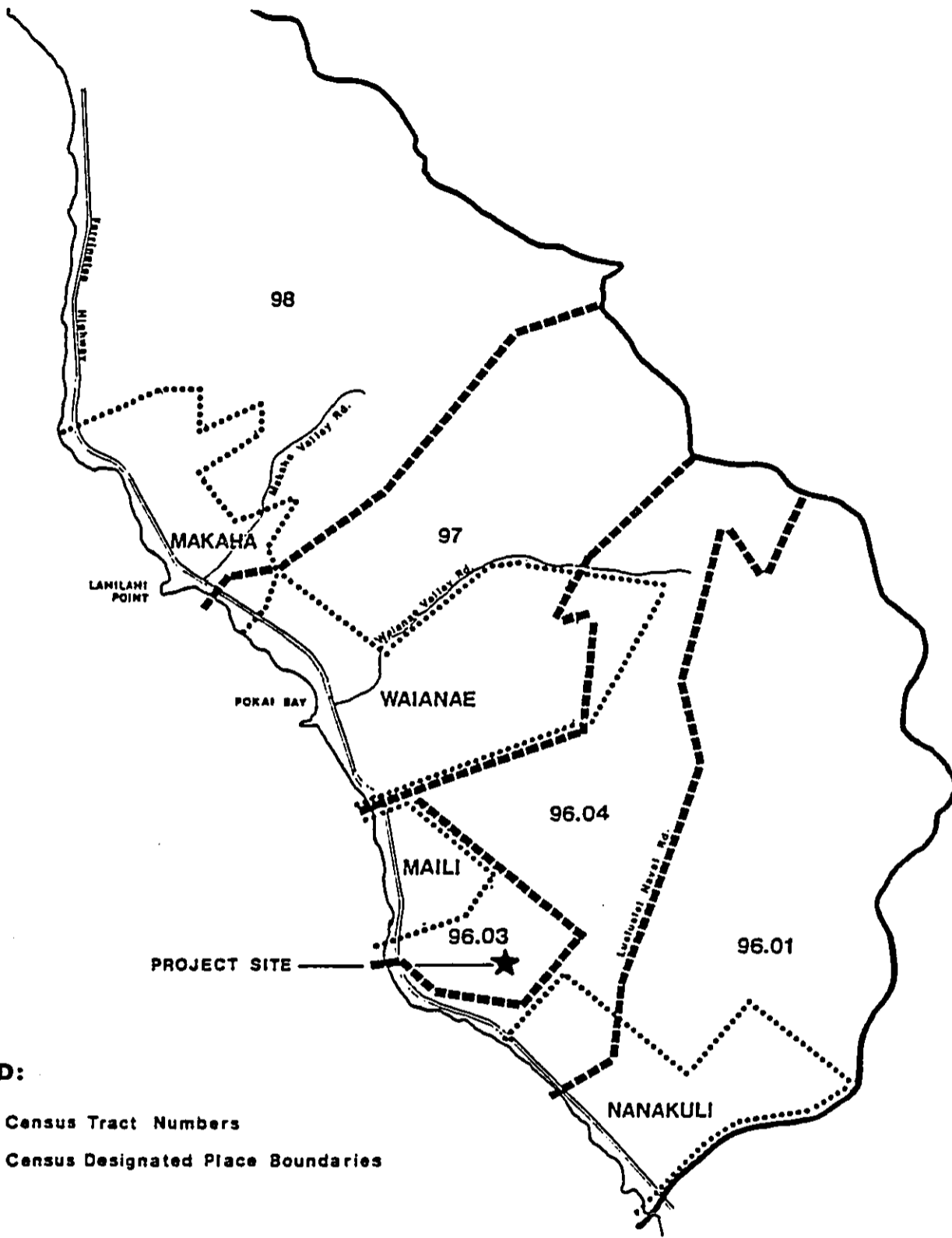
**LINEAL SCALE (MILES)**

4.5	2.25	0	4.5
-----	------	---	-----

**DBR HAWAII**

**DEVELOPMENT PLAN AREAS**





**LEGEND:**

- 96.01 Census Tract Numbers
- ..... Census Designated Place Boundaries

**WAIANAЕ STUDY AREA**

**FIGURE IV-12  
MAILI KAI PROPERTY**

NORTH MAILI, OAHU

LINEAL SCALE (MILES)

1.5 0.75 0 0.75 1.5

For this impact statement, both the Maili CDP and the overall Waianae DP area will be considered the primary study area. However, the Ewa DP area will also be included as a secondary study area. This is because the western part of Ewa, closest to the Waianae boundary, is currently regarded as the most likely site of substantial population and employment growth for West Oahu as a whole over the next several decades. Thus, for purposes of cumulative impact assessment, changes in Waianae must be considered in light of expected changes in Ewa as well.

#### 4.1.2 Historic and Geographic Factors Affecting the Community

Waianae: Geographically, Waianae is isolated from the rest of Oahu by mountains and the highway system. It is bounded on the east by the Waianae Mountains, over which there is no access to Central Oahu (except by a military road normally closed to the public). The only overland access to the Waianae area is by the Farrington Highway, which terminates a few miles before Kaena Point, Waianae's northern boundary, such that the Waianae area has an "end-of-the-road" geographical relationship to Ewa and Honolulu.

The Waianae area is further distinguished geographically by a series of ridges extending from the mountains to the sea and dividing the coast into a number of pockets or valleys. Each valley has developed a separate identity, with recognized urban communities primarily located off the highway along the coast. Traveling roughly south to north, these communities include Nanakuli (1980 population of 8,185), Maili (population 5,025, at the base of Lualualei Valley), Waianae Town (7,941), and Makaha (6,552). The last valley, Makua, is essentially undeveloped except for cattle ranching and military target practice operations.

Historically, Waianae in the mid-nineteenth century was a dry and dusty area occupied by only a few cattle ranchers and their workers. However, in 1879, Judge Herman A. Widemann began the Waianae Sugar Company, rapidly transforming the almost uninhabited district into "the largest settlement on the island outside of Honolulu" by 1884 (Krauss, 1972, p. 42). For more than half a century, sugar dominated Waianae's social and economic life.

However, the Waianae Sugar Company was one of Hawaii's first post-war sugar casualties and ceased operations in 1946. Capital Investment Company then acquired 9,150 acres of the former Waianae Valley sugar lands and sold them as houselots or small farms -- beginning a second wave of population growth in Waianae, but one which lacked a nearby job base. Subsequently, Capital Investment did create some tourism jobs starting in the 1960's through its development of a small resort complex in Makaha Valley.

Over the years, another major developer has been the State Department of Hawaiian Home Lands (DHHL). Much of the land in Nanakuli and several large parcels in Waianae and Lualualei are owned by DHHL. As of June 30, 1986, a total of 1,327 residential and 65 agricultural homestead lots on the Waianae Coast had been awarded to native Hawaiians (Hawaii State Department of Hawaiian Home Lands, 1986). The DHHL developments have been largely responsible for the heavy concentration of native Hawaiians in Waianae's overall population.

In recent years, the Waianae area's population has grown much more rapidly than its economic activities. There are several military installations, the largest of which is the U.S. Navy's Naval Magazine at Lualualei, above Maili. The proliferation of small truck farms and animal operations which have continued for the past 40 years add much to the area's rural flavor but little

to its employment base. Consequently, Waianae today remains among the more economically depressed areas on Oahu.

Maili: The name for Maili comes from the word "ili ili", meaning small pebbles (Krauss, p. 11). In early Hawaiian times, Maili was the area located between the hills of Puu o Hulu and Puu Mailiili, a double-domed hill of many small pebbles. As the Waianae community prospered due to the development of sugar, the Lualualei area (which included the settlements of Maili and Nanakuli) remained sparsely settled due to the scarcity of water.

Throughout the years, the hardship involved in making a living off the land in Maili limited its desirability for community development. By the 1890's, this lack of development made the area suitable for cattle ranching. Lincoln McCandless owned and ranched 4,000 acres of the Lualualei plains.

In 1912, the federal government began opening homestead lands in Lualualei. However, this attracted only a limited number of people. The lack of improved roads, a water system, and other amenities which were becoming available in other communities would remain as major drawbacks for living in the area. Even today, Maili has fewer community amenities (e.g., high schools, commercial areas) than Nanakuli or Waianae town.

In the early 1930's, the governor of the Territory of Hawaii issued two executive orders which turned over 1,356 acres in Lualualei to the Navy for use as an ammunition depot and transmitting station (Kobayashi, 1988). Since that time, the Lualualei Naval Magazine has been the primary ammunition storage for the military on Oahu. In 1986, the Department of Hawaiian Home Lands filed a suit which challenged the transfer of these lands to the Navy. This was based on the fact that the property originally was part of the Hawaiian Home Lands designated by Congress in 1921. A federal judge recently ruled against DHHL.

Ewa: The lower portions of the Ewa Development Plan Area are a coral plain, while the upper portions -- which rise to meet the foothills of the Waianae Mountains -- contain some of Oahu's best agricultural lands.

Most of Ewa's past economic activity and settlements have been in the area's southern and eastern portions, centered on sugar and military activities. The eastern most part of Ewa includes U.S. Naval operations and the Iroquois Point housing along Pearl Harbor's West Loch, while the Barbers Point Naval Air Station is located on Ewa's southern shores.

However, the economic activity which has consumed the most land in Ewa to date has been sugar cane cultivation. Several past operations were consolidated in 1970 under operations of just one plantation, the Oahu Sugar Co. (now one of two remaining Oahu plantations). The Amfac-owned plantation had 18,000 acres under cultivation in Ewa and Central Oahu in 1981, but has shrunk by about a third since then. Almost all of Oahu Sugar's lands are obtained by leases due to expire in the mid-1990's.

In recent years, Ewa's population and economic growth has begun to shift to the area's northwestern portion, nearer Waianae. The hillside community of Makakilo, developed by Finance Realty, has been growing steadily since 1962 and was Ewa's second-largest town (after Ewa Beach) in the 1980 Census.

Along the coast, the Estate of James Campbell (Ewa's largest non-governmental landowner) opened the Campbell Industrial Park in 1958, and the towers and stacks of oil refineries and other industries there are visible from much of Ewa and southern Waianae. A total of 2,400 acres are approved for industrial use there, of which approximately 1,200 acres have thus far been developed (personal communication, Oswald Stender, Chief Executive Officer, Campbell Estate, January 4, 1988).

North of Campbell Industrial Park, the Barbers Point Harbor is currently under construction by the U.S. Army Corps of Engineers as a second civilian harbor for Oahu. And north of that, site construction is presently being carried out for the 640-acre Ko Olina Resort, formerly known as West Beach.

#### 4.1.3 Employment and Economic Base

This section provides an overview of available information concerning employment and general economic activities in the study area. Table IV-10 shows the number of jobs located within the Waianae DP, Maili CDP, and on Oahu as a whole in 1980. The numbers in the table are from the Hawaii State Department of Transportation's (1982) Urban Transportation Planning Package (UTPP), which provides data on the number of jobs located in an area, as compared with the number of employed persons living in an area.

Waianae DP Area: There are a relatively small number of jobs in the Waianae area. Data shown in Table IV-10 indicate a total of 4,036 jobs in 1980. This number is equal to only 40 percent of the resident Waianae civilian labor force in that year. By contrast, the number of civilian jobs islandwide in 1980 was equal to 91 percent of available civilian labor force.

The type of jobs most prominent in the area were in the category of "Professional and Related Services." This likely reflects a large number of teachers, social service professionals, and other government or private-sector service workers. "Retail" jobs also comprised a significant amount of jobs, with over 20 percent of the area's total.

Direct job activities (i.e., those which bring dollars in the region) in the Waianae DP area are limited to a small number of

TABLE IV-10  
OAHU AND STUDY AREA CIVILIAN JOBS BY INDUSTRY  
1980

Industry Category	Jobs in Waianae DP Area	% of Total	Jobs in Maili*	% of Total	Jobs on Oahu	% of Total
Agriculture, Forestry & Fisheries	212	5.3	0	0	4,845	1.5
Mining	0	0	0	0	131	0.4
Construction	273	6.8	0	0	19,064	6.2
Manufacturing	162	4.0	21	14.0	24,246	7.8
Transportation, Communications, & Other Public Facilities	210	5.2	28	19.0	27,695	8.9
Wholesale	81	2.0	0	0	12,955	4.2
Retail	820	20.3	0	0	64,497	20.9
Finance, Insurance & Real Estate	208	5.2	0	0	25,147	8.1
Business & Repair Services	84	2.1	39	26.0	14,489	4.7
Personal Services	161	4.0	0	0	19,803	6.4
Entertainment & Recreation Services	141	3.5	24	16.0	5,622	1.8
Professional & Related Services	1,155	28.6	38	25.0	56,166	18.2
Public Administration	529	13.1	0	0	33,781	10.9
<b>TOTALS (CIVILIAN JOBS)</b>	<b>4,036</b>	<b>100%</b>	<b>150</b>	<b>100%</b>	<b>308,441</b>	<b>100%</b>
Armed Forces	220	N/A	0	N/A	48,251	N/A

\* "Maili" CDP -- boundaries fall entirely within those of Census Tract 96.03.

Source: Urban Transportation Planning Package (printouts of special analyses from 1980 U.S. Census, available from the Hawaii State Department of Transportation).

tourism-related jobs in Makaha, diversified agricultural farm operations, and military activities at Lualualei.

Maili: Economic activity in the Maili CDP is very limited. In 1980, there were 150 jobs in the area, representing only four percent of the total jobs in the Waianae region. As indicated in Table IV-10, there was also a limited variety in the types of jobs available. The most numerous types of jobs were in the "Business and Repair Services" and "Professional and Related Services." Other job types include "Transportation, Communication, and Other Public Facilities," "Entertainment and Recreation Services," and "Manufacturing." This distribution of job types would indicate that Maili contains a small number of scattered service-type operations and a school and other public facilities.

Although located outside the Maili CDP, the Lualualei Naval Magazine is an additional major economic activity in the general Maili area.

Ewa DP Area: UTPP data indicate a total of 9,615 jobs in the Ewa census tracts as of 1980. Of this total, 5,650 (or 59 percent) were civilian jobs. The remaining 3,965 jobs were military.

Major civilian employers in Ewa include the collective activities at the Campbell Industrial Park. At present, there are approximately 120 industries employing 2,500 individuals at the park (personal communication, Oswald Stender, Chief Executive Officer, Campbell Estate, January 4, 1988). Another major employer is Oahu Sugar Company, which currently employs about 450 workers (Community Resources, 1987). The predominant job types in Ewa are in the "Manufacturing" and "Retail" categories.



#### 4.1.4 Population Levels and Socioeconomic Characteristics

Tables IV-11(a) through IV-11(d) provide selected 1970 and 1980 U.S. Census data for the City and County of Honolulu, the Waianae DP Area (equivalent to the Census Bureau's "Waianae Division"), and the various census tracts comprising the Ewa DP Area.

Additionally, Tables IV-12(a) through IV-12(d) provide comparable data for Maili and the other three Census Designated Places in Waianae -- i.e., Waianae Town, Nanakuli, and Makaha.

Waianae DP Area: Waianae's population increased from 24,077 in 1970 to 31,487 in 1980. More recent population estimates are conflicting but indicate slow growth since 1980. The City and County of Honolulu's Department of General Planning (personal communication, Steve Young, planner, November 18, 1987) estimates a 1985 population of 34,903. The Hawaii State Department of Business and Economic Development (1987), using a different method, estimates a 1986 population of just 33,100.

The detailed census characteristics of 1980 indicate that, compared to the County as a whole, Waianae's population was proportionately much more Native Hawaiian and less Oriental; far younger on average (with 40 percent of the population under 18); and less educated on average [Table IV-11(a)].

Waianae's poverty rate for families in 1980 was nearly three times the islandwide rate. Incomes were significantly lower. Households usually consisted of families, but these families were more likely than those elsewhere on the island to be headed by single females [Table IV-11(b)].

Both housing costs and housing values were relatively low. Average household sizes were high, with a consequent high rate of

**TABLE IV-11(a)**  
**Population and Demographic Characteristics: City and County of Honolulu and Various Parts of Study Area, 1970 and 1980**

	CITY AND COUNTY OF HONOLULU		WAIANAE D.P. AREA		EWA D.P. AREAS** (C.T. 83-86.02)	
	1970	1980	1970	1980	1970	1980
<b>TOTAL POPULATION</b>	<b>630,528</b>	<b>762,565</b>	<b>24,077</b>	<b>31,487</b>	<b>24,087</b>	<b>36,234</b>
<b>ETHNICITY</b>						
Caucasian	41.2	34.4	34.9	22.8	60.4	44.5
Japanese	26.8	24.9	9.0	6.9	N/A	8.8
Chinese	7.7	6.9	3.4	1.7	N/A	2.0
Filipino	10.4	12.6	15.3	15.5	N/A	24.8
Hawaiian	8.5	10.5	26.0	40.0	N/A	12.4
Other	5.5	10.4	11.4	13.1	N/A	7.5
<b>AGE</b>						
Less than 5 yr.	9.3	7.9	12.5	11.8	13.3	10.7
5 - 17 yr.	26.2	20.2	35.2	29.0	31.1	27.8
18 - 64 yr.	59.5	64.6	48.7	54.1	53.1	59.3
65 or more yr.	5.0	7.3	3.6	5.1	2.5	3.0
Median age	21.6 yr	28.1 yr	19.2 yr	22.8 yr	N/A	N/A
<b>PLACE OF BIRTH*</b>						
Hawaii	NC	55.1	NC	76.5	NC	49.6
Other U.S.**	NC	30.1	NC	15.9	NC	36.0
Foreign country	NC	14.8	NC	7.6	NC	14.5
<b>RESIDENCE 5 YRS. PREVIOUS†</b>						
(people aged 5+)						
Same house	42.5	48.2	47.0	53.2	31.0	44.0
Same island	NC	25.5	NC	33.6	NC	23.6
Different island	NC	1.3	NC	1.3	NC	0.8
Different state	NC	18.4	NC	18.4	NC	26.1
Different country	NC	6.6	NC	6.6	NC	6.1
<b>EDUCATION‡</b>						
(people aged 25+)						
0-8 years only	20.8	14.4	32.5	19.8	21.0	13.6
High school only	37.5	46.0	30.9	60.9	59.7	56.0
Some post high school	26.2	18.3	31.2	12.4	10.7	17.8
College, 4+ yr.	15.5	21.7	5.4	6.9	8.6	12.6

Notes: † Figures based on 15% sample; hence, numbers represent estimate.  
 †† Including persons born in U.S. territories, and persons born abroad or at sea to American parent/s.  
 ††† In this and immediately following tables, the small Central Oahu town of Kunia (1980 pop. 829) is counted with Ewa rather than Central Oahu because it falls in one of the Ewa census tracts.  
 \*\*NC = 1970 categories or bases "Not Comparable" to 1980 (1970 Census kept a "non-response" category, while 1980 Census allocated non-responses to other categories shown).

Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts, PHC(1)-88; 1980 Summary Tape Files 1-A and 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

**TABLE IV-11(b)**

Family Characteristics and Income Levels: City and County of Honolulu and Various Parts of Study Area, 1970 and 1980

	CITY AND COUNTY OF HONOLULU 1970	1980	WAIANAE D.P. AREA 1970	1980	EWA D.P. AREA (C.T. 83-86.02) 1970	1980
<u>POPULATION IN FAMILIES</u>	N/A	653,118	N/A	29,599	N/A	34,071
as percentage of total population	N/A	85.6%	N/A	94.0%	N/A	94.0%
<u>NUMBER OF FAMILIES</u>	138,277	178,516	4,583	6,797	5,229	8,329
<u>HEAD</u>						
Husband/wife	86.7	82.8	84.9	75.8	89.5	87.9
Male only	3.6	4.5	4.3	5.2	2.4	3.3
Female only	9.8	12.7	10.7	19.0	8.1	8.9
<u>WITH OWN CHILDREN UNDER 18</u>						
Female head	63.4	54.9	71.2	67.3	75.1	70.8
	6.2	7.5	18.4	13.5	6.8	7.1
<u>BELOW POVERTY LEVEL</u>	7.2	7.5	16.4	21.4	8.7	7.2
<u>MEDIAN FAMILY INCOME</u>	\$12,035	\$23,554	\$8,000 to \$8,999	\$16,326	\$10,109	\$21,000
<u>NON-FAMILY HOUSEHOLDS</u>	N/A	53,298	N/A	1,224	N/A	806
percentage below poverty level	N/A	15.7%	N/A	23.4%	N/A	17.5%

Notes: All figures (except "Population in Families" and "Non-Family Households") based on 15% sample; hence, numbers represent estimates.

"N/A" = "Not Available."

Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC(1)-88; 1980 Summary Tape Files 1-A and 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

TABLE IV-11(C)

Housing Stock and Characteristics: City and County of Honolulu and Various Parts of Study Area, 1970 and 1980

	CITY AND COUNTY OF HONOLULU		WAIANAE D.P. AREA		EWA D.P. AREA (C.T. 83-86.02)	
	1970	1980	1970	1980	1970	1980
<b>TOTAL YEAR-ROUND HOUSING UNITS</b>	174,107	250,864	5,633	9,528	5,723	9,465
vacant (total)	5.4%	8.2%	7.9%	16.4%	4.2%	3.4%
vacant for sale	0.6%	0.5%	0.2%	1.0%	0.5%	1.0%
vacant for rent	2.5%	3.6%	4.0%	2.9%	1.9%	0.6%
held for occas'l use	N/A	0.9%	N/A	1.2%	N/A	0.4%
other	N/A	3.2%	N/A	11.3%	N/A	1.4%
<b>TOTAL YEAR-ROUND OCCUPIED UNITS</b>	164,763	230,214	5,165	7,972	5,484	9,139
<b>TENURE</b>						
owner-occupied	45.0%	49.9%	40.6%	51.3%	32.7%	50.2%
renter-occupied	55.0%	50.1%	59.4%	48.7%	67.3%	49.8%
<b>SELECTED CONDITIONS</b>						
lacking some or all plumbing	3.5%	1.5%	8.6%	1.3%	3.0%	0.6%
1.51 or more persons/room	6.9%	7.4%	19.2%	13.7%	6.9%	8.5%
<b>PERSONS PER HOUSEHOLD</b>	3.60	3.15	4.52	3.93	4.39	3.96
<b>MEDIAN CASH RENT (renter-occupied)</b>	\$130	\$279	\$80 to \$99	\$264	\$89 to \$158	\$230 to \$372
as % of median family income	12.9%	14.2%	N/A	19.4%	10.6% - 18.8%	13.1% - 21.3%
<b>MEDIAN VALUE* (owner-occupied)**</b>	\$38,400	\$130,100	\$20,000 to \$24,999	\$77,400	\$29,100 to \$32,000	\$96,000 to \$120,400
<b>MEDIAN MONTHLY MORTGAGE* (owner-occupied)**</b>	N/A	\$194	N/A	\$355	N/A	N/A
as % of median family income	N/A	25.2%	N/A	26.2%	N/A	N/A

Notes: \* For 1980, median values are for non-condominium housing units.  
 \*\* Figures based on 15% sample; hence, numbers represent estimates.  
 "N/A" = "Not Available."

Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC(1)-88; 1980 Summary Tape Files 1-A and 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

**TABLE IV-11(d)**  
**Labor Force Size and Characteristics: City and County of Honolulu and Various Parts of Study Area, 1970 and 1980**

	CITY AND COUNTY OF HONOLULU		WAIANAE D.P. AREA		EWA D.P. AREA (C.T. 83-86.02)	
	1970	1980	1970	1980	1970	1980
<b>POTENTIAL LABOR FORCE</b> (aged 16+)	427,601	574,903	13,654	20,062	14,110	23,862
not in labor force	33.0%	30.8%	42.2%	45.9%	38.3%	31.9%
armed forces	11.5%	10.1%	8.2%	4.2%	25.5%	18.5%
civil. labor force	55.5%	59.1%	49.6%	49.9%	36.3%	49.5%
<hr/>						
<b>CIVILIAN LABOR FORCE</b>	237,338	339,863	6,780	10,008	5,115	11,821
unemployed	3.0%	4.6%	6.5%	7.7%	4.3%	8.0%
<b>TOTAL EMPLOYED</b>	230,252	324,113	6,338	9,236	4,893	10,873
<hr/>						
<b>OCCUPATION</b>						
service manager./profes. technical, sales & adminis.	15.0%	17.6%	26.8%	19.7%	14.0%	19.3%
farm/fish/forest precision, craft, repair operators, fabri-cators, laborers	NC	24.7%	NC	14.3%	NC	14.2%
	NC	33.7%	NC	29.7%	NC	31.0%
	NC	1.8%	NC	2.4%	NC	3.9%
	NC	11.3%	NC	16.6%	NC	15.5%
	NC	10.9%	NC	17.3%	NC	16.3%
<hr/>						
<b>INDUSTRY (selected)</b>						
agric., forest, fish, mining construction	2.1%	1.7%	N/A	2.0%	N/A	6.1%
manufacturing	9.5%	6.6%	16.6%	9.8%	6.6%	7.5%
retail trade	10.3%	7.7%	20.6%	12.4%	18.8%	12.0%
financial, insur., real estate	18.0%	20.5%	13.9%	21.5%	15.7%	20.1%
personal, entertain. & recreat. services	5.6%	8.1%	2.1%	5.9%	2.4%	5.2%
health, educ. & professional public adminis.	7.6%	8.1%	N/A	8.7%	N/A	5.9%
	18.1%	18.5%	12.0%	12.4%	11.0%	12.7%
	12.6%	10.9%	15.7%	11.4%	16.0%	13.4%
<hr/>						
<b>COMMUTE TO WORK</b>						
45 minutes or more	N/A	11.9%	N/A	10.6%	N/A	22.6%
mean travel (min.)	N/A	22.6 m	N/A	32.8 m	N/A	25.8 m

Notes: All figures based on 15% sample; hence, numbers represent estimates.  
 "N/A" = "Not Available" in published form. "NC" = 1970 categories or bases "Not Comparable" to 1980 Census.  
 Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts, PHC(1)-88, and Detailed Characteristics, PC(1)-D13; 1980 Summary Tape File 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

crowding [Table IV-11(c)]. Workers residing in Waianae tended to have a "blue-collar" profile, and a high percentage had to commute more than 45 minutes to work. Waianae's labor force participation rate was lower than the islandwide rate (particularly for females), and unemployment was much higher (particularly for males -- Table IV-11(d), with sex-specific information from original Census sources).

According to unpublished estimates from the Hawaii State Department of Labor and Industrial Relations (personal communication, Melanie Ogata, Research Statistician, January 6, 1988), the estimated 1986 unemployment rates for Waianae census tracts averaged about 7.4 percent, compared to 4.4 percent for the island as a whole.

Maili: The Maili CDP in 1980 had a population of 5,026, the smallest of the four Waianae Coast communities. Census Tract 96.03, containing the Maili CDP and surrounding areas below Paakea Rd., had a 1980 population of 5,711. The City and County of Honolulu's Department of General Planning estimates a 1985 population of 6,020 for this census tract, indicating little recent growth in the Maili area.

The 1980 detailed Census characteristics [Tables IV-12(a) to IV-12(d)] suggest Maili's population generally resembled that of the overall Waianae area. However, Maili appeared to be a very "rooted" community in that 70 percent of its residents had been in the same house five years previously. Maili in 1980 was one of the poorer among the various Waianae communities (with neighboring Waianae Town relatively better off in terms of incomes). Rents were cheaper in Maili, but mortgage payments were high. Maili's resident labor force had proportionately more skilled craftsmen than other Waianae CDP's, and fewer Maili workers commuted long distances to work.

**TABLE IV-12(a)**

Population and Demographic Characteristics: Maili, Waiānāe, Makaha, and Manakuli Area, 1970 and 1980

	MAILI		WAIANAE		MAKAHA		MANAKULI	
	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980
<b>TOTAL POPULATION</b>	4,397	5,026	3,302	7,941	4,644	6,582	6,506	8,185
<b>ETHNICITY</b>								
Caucasian	40.9	27.6	36.8	20.4	41.6	31.5	23.8	15.3
Japanese	7.4	5.9	18.6	10.4	6.6	5.2	3.3	2.4
Chinese	4.7	1.6	1.0	1.8	3.0	2.0	4.1	1.0
Filipino	14.0	19.6	16.7	15.4	18.4	15.5	13.7	13.8
Hawaiian	26.6	34.1	13.0	38.9	23.3	28.6	39.7	58.2
Other	6.4	11.2	13.9	13.1	6.7	17.2	15.5	11.3
<b>AGE</b>								
Less than 5 yr.	14.5	11.8	10.1	12.0	11.8	15.0	13.7	10.7
5 - 17 yr.	34.5	30.1	33.1	30.8	44.8	21.9	38.7	31.6
18 - 64 yr.	48.1	53.1	51.1	52.3	39.9	56.4	44.8	53.7
65 or more yr.	2.9	4.4	5.4	4.9	3.5	6.7	2.8	4.0
Median age	18.0 yr	22.4 yr	21.0 yr	22.0 yr	18.0 yr	24.3 yr	16.0 yr	21.4 yr
<b>PLACE OF BIRTH*</b>								
Hawaii	NC	82.1	NC	77.6	NC	62.9	NC	84.5
Other U.S.**	NC	10.3	NC	14.0	NC	28.9	NC	9.7
Foreign country	NC	7.6	NC	8.4	NC	8.2	NC	5.8
<b>RESIDENCE 5 YRS. PREVIOUS†</b> (people aged 5+)								
Same house	51.6	70.4	55.0	50.2	42.5	38.7	45.8	53.6
Same island	NC	19.5	NC	41.9	NC	37.5	NC	36.0
Different island	NC	3.2	NC	0.2	NC	2.2	NC	1.1
Different state	NC	6.5	NC	7.1	NC	19.5	NC	8.2
Different country	NC	0.4	NC	0.6	NC	2.1	NC	1.1
<b>EDUCATION‡</b> (people aged 25+)								
0-8 years only	23.6	17.3	27.1	21.2	32.9	16.7	35.7	16.6
Hi school only	48.6	67.0	53.9	57.0	43.3	56.8	32.8	70.4
Some post high school	23.5	10.2	10.1	13.9	15.3	15.8	28.3	10.0
College, 4+ yr.	4.3	5.5	8.6	7.9	8.5	10.7	3.2	3.0

Notes: † Figures based on 15% sample; hence, numbers represent estimate.  
 ‡ Including persons born in U.S. territories, and persons born abroad or at sea to American parent/s.

"NC" = 1970 categories or bases "Not Comparable" to 1980 (1970 Census kept a "non-response" category, while 1980 Census allocated non-responses to other categories shown).

Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts, PHC(1)-88; 1980 Summary Tape Files 1-A and 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

**TABLE IV-12(b)**

Family Characteristics and Income Levels: Mailli, Waianae, Makaha, and Nanakuli Area, 1970 and 1980

	MAILLI		WAIANAE		MAKAHA		NANAKULI	
	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980
<b>POPULATION IN FAMILIES</b>	N/A	4,697	N/A	7,537	N/A	5,855	N/A	7,792
as percentage of total population	N/A	93.5%	N/A	94.9%	N/A	88.9%	N/A	95.2%
<b>NUMBER OF FAMILIES</b>	899	1,104	700	1,711	932	1,572	1,119	1,584
<b>HEAD</b>								
Husband/wife	85.4	74.5	86.3	79.5	83.0	72.9	82.9	73.8
Male only	3.8	6.8	4.4	3.3	4.4	5.7	4.9	7.5
Female only	10.8	19.2	9.3	17.2	12.6	21.4	12.2	18.7
<b>WITH OWN CHILDREN UNDER 18</b>	N/A	68.1	N/A	72.0	N/A	60.9	N/A	70.6
Female head	N/A	13.6	N/A	12.0	N/A	16.2	N/A	13.3
<b>BELOW POVERTY LEVEL</b>	17.6	22.5	44.2	16.7	15.8	22.8	15.6	20.8
<b>MEDIAN FAMILY INCOME</b>	\$9,253	\$15,801	\$9,700	\$19,466	\$8,895	\$14,767	\$9,733	\$16,689
<b>NON-FAMILY HOUSEHOLDS</b>	N/A	216	N/A	311	N/A	485	N/A	248
percentage below poverty level	N/A	20.8%	N/A	21.5%	N/A	14.2%	N/A	24.6%

Notes: All figures (except "Population in Families" and "Non-Family Households") based on 15% sample; hence, numbers represent estimates.

"N/A" = "Not Available."

Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC(1)-88; 1980 Summary Tape Files 1-A and 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.



TABLE IV-12(C)

Housing Stock and Characteristics: Maui, Waianae, Makaha, and Hanakuli Study Area, 1970 and 1980

	MAUI		WAIANAE		MAKAHA		HANAKULI	
	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980
<b>TOTAL YEAR-ROUND HOUSING UNITS</b>	1,043	1,390	908	2,075	1,288	3,199	1,298	1,896
vacant (total)	N/A	9.6%	N/A	6.1%	N/A	37.2%	4.1%	3.6%
vacant for sale	N/A	1.4%	N/A	1.2%	N/A	1.5%	N/A	0.2%
vacant for rent	N/A	2.8%	N/A	2.9%	N/A	3.8%	N/A	2.0%
held for occas'l use	N/A	4.6%	N/A	0.6%	N/A	1.0%	N/A	0.3%
other	N/A	1.2%	N/A	1.7%	N/A	30.9%	N/A	1.1%
<b>TOTAL YEAR-ROUND OCCUPIED UNITS</b>	997	1,264	843	1,943	1,072	2,010	1,243	1,828
<b>TENURE</b>								
owner-occupied	41.0%	53.1%	46.6%	60.9%	29.9%	57.7%	47.0%	65.9%
renter-occupied	59.0%	46.9%	53.4%	39.1%	70.1%	42.3%	53.0%	34.1%
<b>SELECTED CONDITIONS</b>								
lacking some or all plumbing	3.2%	0.5%	9.8%	1.6%	3.9%	1.0%	14.7%	1.4%
1.51 or more persons/room	17.1%	10.5%	16.5%	3.8%	14.6%	13.6%	23.5%	14.8%
<b>PERSONS PER HOUSEHOLD</b>	4.40	3.98	3.89	4.08	4.31	3.25	5.20	4.47
<b>MEDIAN CASH RENT (renter-occupied)</b>	\$97	\$239	\$115	\$259	\$110	\$282	\$85	\$268
as % of median family income	12.6%	18.2%	14.2%	15.9%	14.8%	22.9%	24.3%	20.9%
<b>MEDIAN VALUE* (owner-occupied)</b>	\$23,500	\$80,300	\$28,800	\$85,100	\$38,600	\$96,000	\$17,100	\$61,300
<b>MEDIAN MONTHLY MORTGAGE* (owner-occupied)†</b>	N/A	\$437	N/A	\$400	N/A	\$432	N/A	\$287
as % of median family income	N/A	33.2%	N/A	24.7%	N/A	35.1%	N/A	1.7%

Notes: \* For 1980, median values are for non-condominium housing units.

† Figures based on 15% sample; hence, numbers represent estimates.

\*\* "N/A" = Not Available.

Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC(1)-88; 1980 Summary Tape Files 1-A and 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

TABLE IV-12(d)

Labor Force Size and Characteristics: Maili, Waianae, Makaha, and Nanakuli Area, 1970 and 1980

	MAILI		WAIANAE		MAKAHA		NANAKULI	
	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980	CENSUS DESIGNATED PLACE 1970	CENSUS DESIGNATED PLACE 1980
<b>POTENTIAL LABOR FORCE</b> (aged 16+)	2,454	3,107	2,055	4,949	2,631	4,358	3,318	5,190
not in labor force	41.2%	50.0%	39.9%	39.0%	49.5%	44.4%	42.9%	49.7%
armed forces	4.0%	2.3%	7.0%	2.4%	4.2%	1.7%	3.8%	4.6%
civil. labor force	54.8%	47.7%	53.1%	58.6%	46.3%	50.9%	53.3%	45.7%
<b>CIVILIAN LABOR FORCE</b>	1,346	1,482	1,091	2,902	1,218	2,217	1,770	2,371
unemployed	5.9%	6.4%	5.5%	9.3%	2.6%	5.2%	8.6%	8.3%
<b>TOTAL EMPLOYED</b>	1,267	1,387	1,031	2,632	1,150	2,101	1,617	2,174
<b>OCCUPATION</b>								
service	NC	17.5%	NC	23.9%	NC	18.6%	NC	18.7%
manager./profes.	NC	14.7%	NC	12.9%	NC	15.6%	NC	12.4%
technical, sales & adminis.	NC	19.8%	NC	23.6%	NC	24.0%	NC	22.0%
farm/fish/forest	NC	4.0%	NC	6.2%	NC	4.7%	NC	4.0%
precision, craft, repair	NC	15.5%	NC	14.1%	NC	19.9%	NC	18.9%
operators, fabri-cators, laborers	NC	28.5%	NC	19.3%	NC	17.2%	NC	24.0%
<b>INDUSTRY (selected)</b>								
agric., forest, fish, mining	N/A	1.5%	N/A	5.1%	N/A	2.9%	N/A	2.3%
construction	N/A	11.2%	N/A	8.6%	N/A	16.5%	N/A	17.4%
manufacturing	N/A	14.7%	N/A	7.3%	N/A	12.2%	N/A	8.6%
retail trade	N/A	17.7%	N/A	19.9%	N/A	18.8%	N/A	16.2%
financial, insur., real estate	N/A	4.4%	N/A	2.8%	N/A	6.2%	N/A	2.3%
personal, entertain. & recreat. services	N/A	3.9%	N/A	6.7%	N/A	5.0%	N/A	8.2%
health, educ. & professional	N/A	14.9%	N/A	12.9%	N/A	14.6%	N/A	13.1%
public adminis.	N/A	14.1%	N/A	19.6%	N/A	10.1%	N/A	16.4%
<b>COMMUTE TO WORK</b>								
45 minutes or more	N/A	29.8%	N/A	14.9%	N/A	42.6%	N/A	40.6%
mean travel (min.)	N/A	29.7 m	N/A	33.7 m	N/A	33.8 m	N/A	33.8 m

Notes: All figures based on 15% sample; hence, numbers represent estimates. "N/A" = "Not Available" in published form. "NC" = 1970 categories or bases "Not Comparable" to 1980 Census.

Sources: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts, PHC(1)-88, and Detailed Characteristics, PC(1)-D13; 1980 Summary Tape File 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

The Hawaii State Department of Labor and Industrial Relations (DLIR) estimates 1986 unemployment in the Maili Census Tract 96.03 as 5.5 percent.

Ewa DP Area: Ewa's population increased by 50 percent from 1970 (24,087) to 1980 (36,234). However, City and County planners estimate the 1985 population for the Ewa DP census tracts summed to just 36,738, representing little growth since 1980. That slow growth reflected an islandwide slowdown in housing construction, a situation which has begun to change in the past several years.

Ewa's 1980 population characteristics showed the influence of its dominant economic activities -- i.e., the military and sugar plantation activities. Ethnically, the population was predominantly Caucasian and, secondarily, Filipino. Ewa residents were younger on average than most Oahu residents and much more mobile. Incomes were lower on average, and household sizes were higher. Workers living in Ewa tended to be blue-collar and commuted farther than most Oahu residents (although not as far as Waianae workers).

Unemployment was higher in Ewa during 1980 than it was islandwide or even in Waianae. The State DLIR estimates average 1986 unemployment in these census tracts as about 8.3 percent.

#### 4.1.5 Lifestyle

Waianae and Ewa are often considered "rural," but lifestyles in these areas are diverse and sometimes complex. For example, Waianae Coast residents strongly value agriculture and ocean-oriented activities, although the large majority actually live in well-settled towns (Nanakuli, Maili, Waianae and Makaha). Ewa includes, along with plantation camps, middle-income suburbs and military communities.

In survey responses, Waianae residents have indicated that social ties are central to the notion of a distinctive "Waianae lifestyle" (Willinger and Sine, 1982). Respondents see friendliness or ohana relationships as "the nicest things" in their area. Major reported elements of "country" life are a relatively slow pace, interpersonal relations and space in which to enjoy them.

The distance between Waianae and the major urban areas brings social problems. Unemployment is high, and many workers must commute over 45 minutes to work each day [see Table IV-11(d)]. Welfare caseloads are among the highest on Oahu. Crime and youth problems are, as noted below, concerns of residents. Furthermore, both sociological studies and needs assessment surveys have shown that large minorities in the population show evidence of family and personal stress (Gallimore and Howard, 1968; White, 1982; Willinger and Sine, 1982).

#### 4.1.6 Community Issues and Concerns

The purpose of this section is to identify major community concerns and attitudes which may be directly or indirectly relevant to the project. The focus here will be on general issues and viewpoints, rather than on the specific concerns residents mention with regard to the project. Project-specific concerns will be determined through the normal governmental review process, including responses to this EIS.

Public Opinion Surveys: Opinion surveys of Oahu residents have shown that housing, education, traffic, jobs and crime have been the major islandwide concerns throughout the 1980's. (For a summary of the data, see Aloha United Way and Health and Community Services Council, 1987.) Concern about traffic congestion has been increasingly voiced in the 1980's.

There are few recent surveys of the Waianae or Ewa areas alone. The Waianae Neighborhood Board conducted a mail-out survey in late 1987, although the low return rate (788 responses from 10,961 mailed out) suggests results may not be necessarily representative. Respondents to this survey indicated the most important Waianae problems were -- in order -- education, law and order, and employment. ("Housing" was not a choice on the list of problems.) There were also many write-in complaints about litter, pollution, and dumping.

Additionally, testimony at various public hearings indicates that Waianae residents have been sharply divided over proposed Leeward Oahu economic and/or residential developments. By contrast, Ewa residents have generally supported such development. In a 1984 Ewa Neighborhood Board mail-out survey (published in the August 1986 Board newsletter), about 73 percent of respondents favored major developments such as Ko Olina and the Ewa Marina housing project.

In earlier surveys, Waianae residents identified unemployment as their primary concern (Willinger and Sine, 1982, Alu Like, 1980), and also expressed strong concern over crime and youth problems.

Issues Addressed by the Waianae Neighborhood Board: Minutes of the Waianae Neighborhood Board meetings held during the past year (January 1987 to December 1987) provide another source of information about current issues and concerns.

A consistent focus of the Waianae Neighborhood Board has been adequacy and quality of public services and facilities. Infrastructure and transportation problems were often discussed in a local and regional context (addressing issues both within and between the nearby communities of Makaha, Waianae, Nanakuli and Maili). Board members often expressed concern regarding the physical and qualitative aspects of the educational system, i.e.

funding for physical improvements to dilapidate structures and teacher qualifications. Other concerns related to the adequate provision of services such as police and fire protection.

The Board generally supported land use proposals, with the exception of development makai of Farrington Highway. Most discussions centered on the cumulative impacts of various planned developments and the adequacy of existing infrastructure and public services to accommodate this growth.

Discussions of housing proposals in particular have centered on the following concerns: housing types and affordability; security; water availability; impacts to local small farmers; and traffic impacts. Such proposals often raised questions concerning the ability of current infrastructure and public service systems to meet additional demand.

#### 4.2 PROBABLE IMPACTS

Specific project impacts are discussed in the following section. This section provides available information on issues which may provide a context for the impact assessment. These issues involve likely changes that may occur in the study area even without the proposed project, such as: (1) additional housing planned for the study area; (2) new employment opportunities for residents in the area; and (3) major new infrastructure improvements being planned which may affect the area's overall character.

##### 4.2.1 Planned and Proposed New Housing

Housing For All Market Segments: The Oahu General Plan intends for the Waianae Development Plan area to maintain its rural character, whereas the Ewa Development Plan area is designated as Oahu's "Secondary Urban Center." Consistent with these policies,

Table IV-13 indicates substantial growth in residential housing units in Ewa, while only limited residential growth in Waianae.

In Waianae, only two projects, the Mauna Olu Subdivision and Valley Homes, currently have both Development Plan and Land Use Commission approvals. These projects are expected to provide a total of 235 units, all in Makaha Valley. The only other known private project at this time is the Makaha Valley Retirement Community, which is expected to have 400 units.

The Department of Hawaiian Home Lands (DHHL) currently has long-range plans for developing 604 acres in Nanakuli. This would provide approximately 1,375 housing lots to individuals of Hawaiian ancestry. At present, 173 lots have been awarded (personal communication, Charles Ice, Planner, Department of Hawaiian Home Lands, December 29, 1987). The actual construction of housing in the area is highly uncertain at this point. Factors which control this development include the ability of DHHL to provide infrastructure for the area and the ability of landowners to obtain financing.

According to present estimates, nearly 37,000 new residential housing units may be built in Ewa over the long-term. Substantial infilling can be expected to occur in Makakilo, along with more modest growth in the Ewa Beach and Ewa Village areas. Two major projects, Gentry Ewa (Increment I) and Ko Olina (also known as West Beach), have recently begun construction. The Gentry project will continue the transformation of Ewa along Ft. Weaver Road into a major suburban community. Ko Olina will create an entirely new type of community in the area-- one highly oriented towards resort-related activities and higher-density apartments for residents.

In the long-term, development in the Kapolei Town Center and surrounding lands is expected to transform the Ewa Plain into a major urban center, and may ultimately provide over 14,000 housing units.

Affordable Housing: A number of the projects shown in Table IV-13 are expected to provide moderately-priced units. However, all but one of these are in Ewa rather than Waianae:

- o The Valley Homes project in Makaha Valley is expected to provide 119 single-family homes in the \$95,000 to \$99,000 price range, and 22 apartment units for about \$55,000 each.
- o About 40 percent of the units built in the Kapolei Village project by the Hawaii Finance and Development Corporation and the City Department of Housing and Community Development would be priced for "gap group" buyers (i.e., individuals seeking units with a maximum price of \$120,000).
- o The Gentry Ewa project will include approximately 250 units for gap group buyers.
- o The West Loch project currently being proposed by the City Department of Housing and Community Development is expected to provide 760 gap group units.

#### 4.2.2 Employment Prospects

The future employment prospects for Waianae area residents cannot be projected with any precision. On one hand, relatively few major projects are planned for the area, so no one employer can account for a major increase in jobs. On the other hand, many of the jobs created by the Ko Olina development and other large



**TABLE IV-13**  
**POTENTIAL NEW STUDY AREA HOUSING UNITS**

	Ewa	Waianae
Existing Developments (Remaining Capacity)*	-----	-----
--Makakilo	3,000	
--Ewa Beach Area	400	
--Ewa Village	380	
SUBTOTAL	3,780	
New Developments With Land Use Commission and Development Plan Approval		
--Gentry Ewa Increment I	3,300	
--Ewa Marina	4,850	(NOTE: Temporarily suspended)
--West Beach (Ko Olina)	5,200	
--Mauna Olu Subdivision		94
--Valley Homes		141
SUBTOTAL	13,350	235
New Developments With Only Development Plan Approval		
--Kapolei Town Center	3,000	
--Kapolei Village	4,871	
--West Beach (expansion)	6,600	
SUBTOTAL	14,471	
Proposed Developments With No Government Approvals		
--Gentry Ewa Increment II	3,850	
--West Loch Estates	1,500	
--Makaha Valley Retirement Community		400
SUBTOTAL	5,350	400
Other Possible Developments		
--Department of Hawaiian Home Lands in Nanakuli		1,375
<b>TOTAL DEVELOPMENTS</b>	<b>36,951</b>	<b>2,010</b>

\*Note: Remaining capacity only in identifiable areas, some additional capacity scattered throughout all areas.

Source: Interviews with developers and planners.

projects in Ewa could well go to Waianae residents and Ewa resort development could also stimulate some indirect jobs in Waianae.

In the Waianae area, the Pacific Basin Conference Center is expected to add 240 jobs (see Table IV-14). Furthermore, the Development Plan Special Provisions for the area allow for another future 300 hotel units in Makaha.

In Ewa, current employment projections (including developer estimates, plus additional research conducted by Community Resources, Inc., 1987) add up to a forecast of over 31,000 jobs in the long-term. This figure must be viewed with some caution, as it is based on developers' expectations for a relatively long period of time. Particular projects could easily be scaled down or cancelled.

Expansion is ongoing at Campbell Industrial Park and construction has begun at Ko Olina. The expansion of the former is expected to create additional industrial jobs and, at Barber's Point, new stevedoring and warehouse jobs. The Ko Olina plan calls for about 100 acres of resort and resort-connected commercial activities. The largest projected development in Ewa, the Kapolei Town Center, includes over 400 acres for commercial use.

#### 4.2.3 Major Infrastructure Improvements

In the Waianae Development Plan area, only modest infrastructural improvements are currently planned. These will meet existing needs and the needs of a somewhat larger population. Specific projects which may have the most impact on the character of the area include the following:

- o Widening of Farrington Highway between Makaha and Nanakuli;

**TABLE IV-14**  
**POTENTIAL NEW STUDY AREA EMPLOYMENT**

	Ewa -----	Waianae -----
<b>Existing Developments (Additional Potential)</b> -----		
--Campbell Industrial Park (including the Barbers Point Harbor)	4,910	
SUBTOTAL	4,910	
<b>New Developments With Land Use Commission and Development Plan Approval</b> -----		
--West Beach (Ko Olina)	5,130	
--H-POWER	65	
--St. Francis Hospital	500	
--Camp Malakole Industrial Area	100	
SUBTOTAL	5,795	
<b>New Developments With Only Development Plan Approval</b> -----		
--Kapolei Town Center (Includes the Makakilo Shopping Center)	19,373	
--Makaha Valley Retirement Community		N/A
SUBTOTAL	19,373	
<b>New Developments With Only Land Use Commission Approval</b> -----		
--Pacific Basin Conference Center		240
SUBTOTAL		240
<b>Proposed Developments With No Government Approvals</b> -----		
--Amfac Theme Park	1,200 (NOTE: Temporarily suspended)	
SUBTOTAL	1,200	
<b>TOTAL DEVELOPMENTS</b>	<b>31,278</b>	<b>240</b>

Source: Personal contacts with developers, plus additional research conducted by Community Resources, Inc., 1987.

- o Improvements to Waianae Valley Road, from Farrington Highway to the back of Waianae Valley;
- o A new County Government District Office building in Waianae;
- o A community park in Nanakuli; and
- o An elementary school in Maili.

Infrastructural improvements planned for the Ewa area are of greater scope than those for Waianae. These include:

- o Major road improvements to the H-1 Freeway between Kunia Road and Makakilo, to Farrington Highway from Waipahu to the proposed Kapolei Town Center, and to Fort Weaver Road from the Ewa town area to Ewa Beach; and
- o A number of public facility improvements which will include new fire and police stations, schools and parks.

#### 4.3 PROJECT IMPACTS

##### 4.3.1 Population

Growth Trends: Table IV-15 shows recent population growth trends for the City and County of Honolulu, Waianae, Census Tract 96.03 (containing Maili), and the Ewa DP Area. The Table indicates that Waianae has been growing significantly faster than the island as a whole since at least 1970. The Maili area, however, has been growing more slowly than the overall Waianae Coast or Oahu as a whole. Maili appears to be one of the slowest growing parts of Waianae.

**TABLE IV-15**  
**POPULATION TRENDS FOR CITY AND COUNTY OF HONOLULU,**  
**WAIANAE, MAILI AND EWA**

	City and County of Honolulu	Waianae	Census Tract 96.03 (incl. Maili)	Ewa*
	-----	-----	-----	-----
April 1, 1970 Population	630,528	24,077	5,100	24,087
April 1, 1980 Population	762,565	31,487	5,711	36,234
July 1, 1985 Population (estimated)	811,096	34,903	6,020	36,738
 <b>Average Annual Growth Rates</b> -----				
1970 to 1980	1.9%	2.7%	1.1%	4.2%
1980 to 1985	1.2%	2.0%	1.0%	0.3%

\* "Ewa DP Area" approximately defined as census tracts 83-86.02. For 1970 and 1980, the small Central Oahu town of Kunia (1980 pop. 829) is counted with Ewa rather than Central Oahu because it falls in one of the Ewa census tracts.

Source: U.S. Census, 1970, 1980; 1985 estimates obtained from City and County of Honolulu Department of General Planning (personal communication, Steve Young, planner, November 18, 1987).

On-Site Population From Project: The project calls for the construction of 1,435 dwelling units over a five-year period beginning in 1990. This would amount to 287 units per year from 1990 through 1994. The City and County of Honolulu's Department of General Planning (DGP) currently forecasts average household size in Waianae in the year 2005 as 2.9 persons (City and County of Honolulu, DGP, 1985, 1987), and the county uses this number to determine dwelling unit capacity. The figure 2.9 is a weighted average of multi- and single family household sizes projected into the future, when household sizes are expected to decrease from current levels.

Therefore, using this County figure:

$$1,435 \text{ units} \times 2.9 \text{ persons/unit} = 4,162 \text{ project residents.}$$

Assuming construction of 287 units per year, the annual population increment would be approximately 832 people.

It should be noted that little or none of the on-site project population is expected to be new to the island. The Maili Kai project would provide housing for existing Oahu residents, many of them already living in the leeward area but in need of improved housing.

If the Maili Census Tract 96.03 were to continue growing only at its recent historical rate of about one percent a year, its 1994 population would be a little under 6,600. The project would thus boost Maili's population to around 10,000 or 11,000, changing it from the Waianae Coast's smallest community to perhaps the largest. (Or the second largest after Nanakuli, depending on whether or not substantial Hawaiian Homes development -- which does not necessarily have to follow City and County population guidelines discussed in the next section -- actually takes place in Nanakuli).

Oahu General Plan Guidelines: The General Plan for the City and County of Honolulu (1982) sets forth guidelines for future growth in the eight Development Plan Areas comprising the island for a 20-year period. The General Plan identifies Waianae as a "rural" area. Policies relevant to such a designation include managing physical growth and development so that:

- o An undesirable spreading of development is prevented; and
- o The Waianae proportion of the islandwide resident population remains close to the present proportion.

Waianae's estimated 1985 population of 34,900 represented 4.3 percent of the estimated islandwide population. The General Plan population distribution guideline for Waianae provides for a population range of 4.2 to 4.6 percent of the island's total population in the year 2005. The official population forecast provided to the City and County of Honolulu by the Hawaii State Department of Planning and Economic Development (1984) foresees 954,500 Oahu residents by the year 2005, indicating an expected population range in Waianae of 40,100 to 43,900 residents by that year (see Table IV-16).

Project Implications for Other Waianae Residential Growth: DGP has recently amended its estimate of the population capacity of existing housing plus approved but yet-undeveloped residentially-designated areas. In its report, Development Plan Status Review (City and County of Honolulu, DGP, 1987) DGP has evaluated the amount of developable land, potential housing supply and the population capacity under the current Development Plan for Waianae and other areas.

(According to DGP, developable land is defined as land designated on the Development Plan for Residential or Apartment uses and

TABLE IV-16  
CITY AND COUNTY OF HONOLULU  
POPULATION GUIDELINES AND PROJECTIONS FOR THE YEAR 2005

GENERAL PLAN GUIDELINES  
-----

DP Area	Percentages	Year 2005 Target Population	Current Population Capacity*	Popula- tion Not Yet Pro- vided For
-----				
Waianae	4.2% -	40,100 -	38,200	1,900 -
	4.6%	43,900		5,700
Ewa	9.0% -	85,900 -	91,700	0 -
	10.0%	95,500		3,800
Central Oahu	12.8% -	122,200 -	144,000	0 -
	14.2%	135,500		0
Primary Urban Center	47.5% -	453,400 -	474,200	0 -
	52.5%	501,100		26,900
E. Honolulu	6.2% -	59,200 -	56,700	2,500 -
	6.8%	64,900		8,200
Koolaupoko	12.4% -	118,400 -	123,900	0 -
	13.6%	129,800		5,900
Koolauloa	1.3% -	12,400 -	13,700	0 -
	1.5%	14,300		600
North Shore	1.6% -	15,300 -	15,300	0 -
	1.8%	17,200		1,900
-----				
TOTAL, ALL OAHU DP AREAS	95.0-105.0%	906,800 - 1,002,200	957,700	4,400 - 53,000

NOTE: Percentages are applied to projected year 2005 population of 954,500, current official State projection.

\* Source: City and County of Honolulu, Department of General Planning (1987), Development Plan Status Review, p. 43.



considered either usable, underutilized or the subject of Development Plan action.)

DGP determined that the Waianae DP Area as of June 1986 had a total of 772 developable acres. DGP states that most of this capacity is in Makaha Valley, on the opposite end of Waianae from the Maili Kai project.

Existing housing plus this developable land could accommodate a year 2005 population of 38,200, meaning that Waianae currently lacks residentially-designated land to provide for the remaining population growth permitted under the General Plan. This remainder would number from 1,900 to 5,700, depending on whether the low- or the high-range figure is used (Table IV-13).

The Maili Kai project would absorb approximately 4,200 people of this remaining population capacity -- more than would be available under the low range but less than would be available under the high range. Taking the high range number of 5,700 and subtracting 4,200 leaves 1,500 people. At DGP's standard 2.9 household size, this would still allow for the possibility of building another 520 Waianae units above and beyond (1) all existing units; (2) all units on yet-undeveloped but approved and "developable" land; and (3) the Maili Kai project itself.

Additionally, the Department of Hawaiian Home Land's tentative long-range plans to develop some 1,375 homes in Nanakuli would not necessarily require City approvals and thus may not be affected by City and County approvals for other Waianae projects.

#### 4.3.2 Employment

On-site employment impacts will be generated by construction activities and subsequent golf course operations at Maili Kai. Some additional off-site jobs will be generated as new residents

stimulate commercial and industrial support jobs in the surrounding community.

Construction Phase: Based on discussions with several Hawaii housing developers, it is estimated that approximately one construction worker will be required per house per year. This would mean an average annual employment of approximately 287 construction workers for the five-year period, with somewhat more workers in the initial year when infrastructure and golf course sitework is being carried out.

Golf Course Operations: The operation of a nine-hole golf course is anticipated to generate approximately 15 full-time jobs. This is derived by taking one-half of the Department of General Planning's standard of 30 jobs for an 18-hole course.

Off-Site Jobs in the Waianae Region: U.S. Census data giving leeward Oahu job figures from the Urban Transportation Planning Package (Hawaii State Department of Transportation, 1982) suggest that each 1,000 residents generate approximately 110 commercial, light industrial and local government support jobs in the immediately surrounding community.

Thus, the Maili Kai project's expected 4,162 residents could generate up to 460 new support jobs (storekeepers, teachers, etc.) in the Waianae area, depending on how many of these residents come from outside the area.

#### 4.3.3 Fiscal Impacts

Fiscal impact analysis is concerned with the financial impact of private development on government's capital improvement and operational budgets. It utilizes a projection of direct public (i.e., State and County) costs and revenues associated with the project. Only direct impacts are considered in this analysis

because indirect impacts -- such as increased property values of adjacent parcels -- are difficult to predict with accuracy. Only public costs and revenues are considered, as distinguished from private costs incurred by the developer and passed on to the consumer. All calculations are in 1987 dollars.

Growth Assumptions: Table IV-17 summarizes basic assumptions, including project components and timetable. For real property tax base purposes, the weighted average home value is approximately \$66,422 (less \$20,000 homeowner exemptions). All units are assumed to be owner-occupied. Unimproved residential land is assumed to be valued at \$30,000 per acre.

The golf course is expected to generate annual revenues of approximately \$1,080,000 and an annual payroll of \$278,220.

Public Revenues: State government revenues will be generated during both the construction and operational phases. During construction, State revenues will be derived from the four percent excise tax on finished home sales, 0.05 percent conveyance tax, and income taxes. It is estimated that this revenue will be approximately \$6,750,725 (Table IV-18).

State revenues during the operational phase will be derived from the excise tax on golf course receipts (approximately \$43,000 per year), income taxes from residents (\$801,130 per year), and other incomes (\$1,128,557 per year). The total annual State revenue during the operational phase is estimated to be approximately \$1,972,887 (Table IV-18).

City and County revenues will begin after the zoning of land but will be at their highest after development, during the operational phase. These revenues will be derived from real property taxes as well as other income from fees and services. At full operation, the County may expect approximately \$625,270 in real

**TABLE IV-17  
ASSUMPTIONS**

PROPOSED PROJECT (1)	AMOUNT					
Homes	1435 Units					
Golf Course (Nine Holes)	112.5 acres					
<b>CONSTRUCTION PHASE</b>						
Duration	5 years					
Average Annual Employment	287 jobs					
Average Payroll (\$34,886/job) (2)	\$10.01 million per year					
<b>FULL DEVELOPMENT</b>						
Population (2.9 people/unit) (3)	4,162 residents					
Employment (on-site)	15 Jobs					
Golf Course (4)						
<b>PROPERTY TAX BASE</b>						
	1989	1990	1991	1992	1993 Full Operation	
Number of Units	0	287	574	861	1148	1435
Unimproved Land (acs.)	163.5	130.8	98.1	65.4	32.7	0
Homes (\$66,422 per home) (5)	\$0	\$19,063,114	\$38,126,228	\$57,189,342	\$76,252,456	\$95,315,570
Unimproved Land (\$30,000 per ac.) (6)	\$4,905,000	\$3,924,000	\$2,943,000	\$1,962,000	\$981,000	\$0
<b>GOLF COURSE OPERATIONS</b>						
Sales (200 players per day, and \$15 per player) (7)	\$1,080,000	\$1,080,000	\$1,080,000	\$1,080,000	\$1,080,000	\$1,080,000
Payroll (\$18,548 per job) (8)	\$278,220	\$278,220	\$278,220	\$278,220	\$278,220	\$278,220
<b>HOUSEHOLD INCOME</b>						
\$26,100 per home (9)	\$7,490,700	\$14,981,400	\$22,472,100	\$29,962,800	\$37,453,500	
<b>INDUCED REGIONAL PAYROLL</b>						
Payroll (\$18,548 per job) (8, 10)	\$0	\$1,698,125	\$3,396,250	\$5,094,375	\$6,792,500	\$8,490,625

Notes to Table 8

- (1) Phillips Brant Reddick Hawaii, Inc. 1988.
- (2) Based on average weekly earnings for construction workers in 1985, adjusted for inflation. DPED Data Book: 1985, p.355.
- (3) Based on Department of General Planning, Residential Development Implications of the Development Plans, 1985
- (4) Based on Department of Planning, Estimates for Milliani mauka.
- (5) Weighted average unit price derived from John Child & Co.
- (6) Community Resources, Inc. estimate based on residential vacant land in Waianae.
- (7) Community Resources, Inc. based on Village Park expansion EIS, 1986.
- (8) Average State salary for 1985, adjusted to 1987 for inflation. DPED Data Book: 1985, p.352.
- (9) Derived from average home price.
- (10) Derived from Hawaii State Department of Transportation, 1982.

**TABLE IV-18**  
**STATE AND COUNTY REVENUES, EXPENDITURES AND NET IMPACT**

REVENUES	1989	1990	1991	1992	1993 Full Operation	Total
<b>CONSTRUCTION PHASE (STATE REVENUES)</b>						
7.0825% of Property Tax Base (1)	\$0	\$1,350,145	\$1,350,145	\$1,350,145	\$1,350,145	\$6,750,725
<b>OPERATIONAL PHASE (STATE REVENUES)</b>						
4% Golf Course Receipts		\$43,200	\$43,200	\$43,200	\$43,200	\$43,200
Income Tax (3.1% household income) (2)	\$0	\$160,226	\$320,452	\$480,678	\$640,904	\$801,130
Other Revenues (3)	\$0	\$238,395	\$460,936	\$683,476	\$906,016	\$1,128,557
<b>TOTAL ANNUAL STATE REVENUE</b>	<b>\$0</b>	<b>\$441,821</b>	<b>\$824,588</b>	<b>\$1,207,354</b>	<b>\$1,590,121</b>	<b>\$1,972,887</b>
<b>OPERATIONAL PHASE (COUNTY REVENUES)</b>						
Property Tax						
—Unimproved Land (\$6.56 per \$1,000)	\$32,177	\$25,741	\$19,306	\$12,871	\$6,435	\$0
—Homes \$6.56 per \$1,000)	\$0	\$125,054	\$250,108	\$375,162	\$500,216	\$625,270
Other Revenues (\$185 per resident) (4)	\$0	\$106,243	\$212,486	\$318,729	\$424,972	\$531,215
<b>TOTAL COUNTY REVENUES</b>	<b>\$32,177</b>	<b>\$257,039</b>	<b>\$481,900</b>	<b>\$706,762</b>	<b>\$931,624</b>	<b>\$1,156,486</b>
<b>TOTAL STATE AND COUNTY REVENUES</b>	<b>\$32,177</b>	<b>\$698,860</b>	<b>\$1,306,488</b>	<b>\$1,914,116</b>	<b>\$2,521,745</b>	<b>\$3,129,373</b>
<b>EXPENDITURES</b>						
Major Capital Improvements (School) (5)						\$1,600,000
<b>SERVICES FOR RESIDENTS</b>						
County (\$372 per resident) (6)	\$0	\$213,635	\$427,270	\$640,904	\$854,539	\$1,068,174
State (\$658 per resident) (7)	\$0	\$377,881	\$755,762	\$1,133,643	\$1,511,523	\$1,889,404
<b>TOTAL STATE AND COUNTY</b>	<b>\$0</b>	<b>\$591,516</b>	<b>\$1,183,031</b>	<b>\$1,774,547</b>	<b>\$2,366,062</b>	<b>\$2,957,578</b>
<b>NET POSITIVE IMPACT</b>						
County	\$32,177	\$43,404	\$54,631	\$65,858	\$77,085	\$88,312
State	\$0	\$63,941	\$68,826	\$73,712	\$78,597	\$83,483
<b>TOTAL STATE AND COUNTY</b>	<b>\$32,177</b>	<b>\$107,344</b>	<b>\$123,457</b>	<b>\$139,570</b>	<b>\$155,682</b>	<b>\$171,795</b>

Notes to Table 9

- (1) C&C of Honolulu, "Impact of Construction on Employment and Tax Revenues," April 1978.
- (2) Average tax rate on personal income, DPED, Data Book: 1985.
- (3) Includes: inheritance and estate taxes; conveyance taxes, licenses and permits; fines, forfeits and penalties, charges for services; and other revenues. Also includes personal income tax of direct and indirect regional workers.
- (4) Derived from "Comprehensive Annual Financial Report, Fiscal Year Ended June 1984" and adjusted for inflation.
- (5) State of Hawaii Department of Education, derived from personal conversation with Ton Maki.
- (6) Derived from "Comprehensive Annual Financial Report, Fiscal Year Ended June 1984" and adjusted for inflation.
- (7) Derived from "Annual Financial Report of the State of Hawaii for the Fiscal Year Ended June 30, 1985" and adjusted for inflation.

property taxes and \$531,215 in other revenues for a total annual revenue of approximately \$1,156,486 (Table IV-18).

Public Expenditures: All major capital improvements for the project, with the exception of a new school, will be provided by the petitioner. The estimated cost to the State for the school is \$1.6 million.

Operational expenditures to support residents of Maili Kai will be about \$1.06 million per year for the County and \$1.8 million per year for the State (Table IV-18). These expenditures are estimated at \$372 per resident for the County and \$658 per resident for the State. The expenditures cover general government, public safety, health, sanitation, education, culture and recreation, water, highways and streets, and public transportation.

Net Impact: State and County revenues derived from the development of an affordable housing project at Maili Kai are expected to exceed expenses, both in terms of capital construction (\$6,750,725 in State construction revenues versus \$1.6 million in school construction costs) as well as operation and maintenance. It should be noted that while the operational surplus is modest, affordable housing projects analyzed in relative isolation (as is the case with Maili Kai) rarely pay for themselves. This is due to the low property tax assessment as well as the lower than average household incomes.

#### 4.4 MITIGATION MEASURES

In general, the socioeconomic impacts that would result from the proposed project are the same as those that would result from any new residential project that is to be located in a fairly well established area in which substantial growth has not occurred over the past several years. There most likely will be feelings of anxiety toward the "newcomers" and some apprehensions as to the relative roles of the old versus the new. It is believed that these feelings will be short-term as the new community becomes absorbed into the old. As noted in Chapter II, Section 4, the majority of the new area residents will probably come from other areas of Oahu and as such will have been assimilated into and be a part of the larger Oahu community. Those new residents of Maili Kai that are from the Waianae area will most likely have less assimilation problems than those from other parts of Oahu. Potential long-term adverse social impacts do not appear to be likely, and, as such, do not require specific mitigation measures.

Similarly, although the fiscal impacts of the proposed project appear to be an imbalance of public expenditures versus revenues, there do not appear to be any specific mitigation measures that could be taken to prevent this occurrence. As noted previously in Section 4.3.3, affordable housing projects analyzed in relative isolation (as is the case with Maili Kai) rarely pay for themselves. This is due to the low property tax assessment as well as the lower than average household incomes.

## 5. INFRASTRUCTURE

### 5.1 HIGHWAYS

#### 5.1.1 Existing Conditions

Access to the Maili Kai property is via the H-1 Freeway, Farrington Highway and Kaukama Road. The H-1 Freeway connects to Farrington Highway approximately six miles south of the project site and the property is located approximately 2,000 feet east (mauka) of Farrington Highway. Kaukama Road, a 60-foot wide, fully paved roadway complete with concrete curbs, gutters, storm drains, street lights and sidewalks, provides access to the center of the project property. Recently a fence and gate were placed across Kaukama Road about 900 feet east of Farrington Highway for security purposes. The fence will be removed to allow access to the property at the time the first residential units are completed. The property can also be accessed via a private dirt road off Hakimo Road to the south of the property and via Kaukama Road northeast and Ilili Road east of the property. The latter two roads are also unpaved and do not proceed completely into the project property.

Kaukama Road meets Farrington Highway in an unsignalized T-intersection. In the vicinity of Kaukama Road, Farrington Highway has a right-of-way of 90 feet, which allows two travel lanes in each direction. A separate eastbound left turn lane and a short, channelized westbound right turn lane are provided at Kaukama Road.

Internal roadways and streets would be designed to meet applicable county standards. In general, on-street parking would be discouraged and speed limits set in accordance with applicable traffic code requirements.



5.1.2 Probable Impacts

To determine existing and forecast traffic and roadway conditions in the future, a traffic assessment was performed for this EIS (see Appendix F). Existing conditions on Farrington Highway near Kaukama Road are based on 1985 traffic data from the State Department of Transportation. Based on present development plans and completion of the project by 1995, existing and forecast traffic volumes are shown in Table IV-19. The increase in traffic volume shown in the Table includes traffic generated by the Ewa Town Center and the expansion of the Sheraton Makaha and Mauna Olu residential lots.

TABLE IV-19  
 FARRINGTON HIGHWAY TRAFFIC VOLUMES  
 (Peak Average Volume Vehicles per Hour)

	<u>EASTBOUND</u>	<u>WESTBOUND</u>
1985		
AM Peak Hour	820	730
PM Peak Hour	650	1,170
1995		
AM Peak Hour	1,080	860
PM Peak Hour	740	1,900

The project traffic is based on trip rates compiled by the Institute of Transportation Engineers in the informational report, Trip Generation, Third Edition. Table IV-20 shows the trip rates and Table IV-21 shows the number of vehicles expected to be generated by the various types of residential units.

The traffic assessment performed estimated that, on Farrington Highway, about 20 percent of the AM peak hour project traffic would arrive or travel towards the west, while the other

80 percent would be headed in the east direction. For the PM peak hour, 70 percent would arrive from the east and the remaining 30 percent would travel towards the west (see Appendix F).

TABLE IV-20  
TRIP RATES

	<u>Single Family</u>	<u>Multi- family</u>
Daily (Enter & Exit)	10.0	6.1
AM Peak Hour		
Enter	0.21	0.1
Exit	0.55	0.4
PM Peak Hour		
Enter	0.63	0.47
Exit	0.37	0.23

TABLE IV-21  
PROJECT TRIP GENERATION

	<u>Single Family</u>	<u>Multi- family</u>	<u>TOTAL</u>
Daily (Enter & Exit)	5,460	5,514	10,974 vpd <sup>1</sup>
AM Peak Hour			
Enter	115	90	202 vph <sup>2</sup>
Exit	300	362	662 vph
PM Peak Hour			
Enter	344	425	769 vph
Exit	202	208	410 vph

-----  
1 Vehicles per day.  
2 Vehicles per hour.

When approximately 15 percent of the dwelling units are completed, traffic signals at the Farrington Highway/Kaukama Road intersection would be warranted by the peak hour criteria in the U.S. Department of Transportation, Federal Highway Administration, Manual on Uniform Traffic Control Devices for Streets and Highways, 1978, as amended. However, because a mountain ridge (Puu O Hulu Kai) creates a sight distance problem in the west bound direction, earlier installation of the signals has been recommended (see Appendix F). In addition, advance warning signs for westbound traffic, including flashing lights when this approach has the red phase, may be needed when the Farrington Highway/Kaukama Road signals are installed. It is also noted that Kala Aupuni Street could provide a future connection to Kaukama Road, if and when, the street is extended by others for their adjoining development. Because there is uncertainty to development of adjoining lands and/or Kala Aupuni Street, project access and traffic is not dependent upon its use.

#### 5.1.3 Mitigation Measures

To ensure the smooth and safe flow of traffic into and out of the proposed project and along Farrington Highway, the Farrington Highway/Kaukama Road intersection will be signalized, and advance warning signs with flashing lights to indicate the red phase of the signal for Farrington Highway will be placed on Farrington Highway. In addition, Kaukama Road will be striped for four lanes, two in each direction. Also, the Kaukama Road approach to Farrington Highway will be marked such that there is a left turn lane and an optional lane for left and right turns. The right turn lane on the Farrington Highway westbound approach to Kaukama Road will be lengthened. The developer would also continue to work with the State Department of Transportation, Highways Division and County Departments of Public Works and Transportation Services regarding possible other highway/roadway improvements that may be required. Internal roadways would be

designed in accordance with applicable roadway design standards and preliminary plans would be submitted to appropriate agencies for review as soon as they are available. Other possible mitigation measures, that would be considered by the developer, should they be required, could include implementing traffic management programs such as ridesharing, carpooling, subscription bus service, van pools, carpool computer matching service, provision of park and ride and day care facilities as appropriate. Additionally, although generally heavy equipment operations would be limited to on-site construction activities, neighboring areas would be advised of possible off-site equipment movements and the developer would coordinate activities with the State Department of Transportation and provide special duty officers as required.

## 5.2 WATER SUPPLY

### 5.2.1 Existing Conditions

The potable water system serving the proposed project site includes a 12-inch water main that was installed under the Kaukama Road Improvement District. The 12-inch main connects to a 1.5 million gallon reservoir located on the Puu O Hulu Kai ridge. A 20-inch water main in Hakimo Road, south of the property, could be connected to if required to meet fire protection flow requirements.

As noted previously in Section 1.3.1, the Board of Water Supply (BWS) is presently developing new water sources (wells) in upper Makaha Valley to provide for the forecast growth of the Waianae area and to reduce dependence on the Pearl Harbor aquifer. It is estimated that the new wells will provide about 4.0 MGD of additional water. Construction of these improvements is phased such that four wells are expected to be on-line in 1990. Long-range BWS plans also include the development of an additional 2.0

MGD of groundwater resources in Waianae Valley. It has been estimated that the proposed project would require a total of approximately 0.70 MGD for domestic purposes, i.e., residential units, park and golf clubhouse. Alternate sources of water would be developed on-site or in cooperation with the BWS for golf course irrigation purposes. It is estimated that approximately 0.404 MGD of irrigation water would be required for the golf course. The developer has entered into negotiations with BWS regarding potable water supplies and cooperative development of those supplies by participation in funding or construction of new deep wells and transmission mains in the Makaha/Waianae area.

The construction of on-site potable water distribution and fire fighting facilities will be in accordance with BWS and Fire Department standards. Also, a potable water master plan will be prepared and submitted to the BWS prior to grant of tentative subdivision approval.

#### 5.2.2 Probable Impacts

Based on in progress water resource exploration programs by the BWS; negotiations between the developer for joint development of those resources; and the relatively small quantity of potable water required by the proposed project, the proposed project is not expected to significantly affect either local or regional water supplies adversely. The new potable water distribution system within the development and water lines for fire protection purposes will be designed and installed in accordance with applicable city and county standards and, if required, subject to the approval of the State Director of Health. In addition to extension of water transmission and distribution lines to serve the project, the proposed project would also be required to construct a storage reservoir with a capacity of 1.0 million gallons. The site of the reservoir would most likely be at the site of the present BWS reservoir. Sufficient land area is

available for another reservoir. For golf course irrigation the developer proposes to develop on-site wells. The brackish water found in the limestone aquifer at shallow depth is too brackish for domestic and ordinary farm uses but may be acceptable for salt-tolerant plants. The brackish water would be stored and pumped into the irrigation pipe system from lined ponds located in the golf course. Treatment, in accordance with appropriate state and county regulations may be required if the salinity of the groundwater is too high for irrigation purposes.

### 5.2.3 Mitigation Measures

Due to the lack of expected significant impacts on the potable water resources of the area, mitigation measures to minimize potential adverse impacts do not appear to be warranted at this time. Should future conditions change, the developer would work with appropriate governmental agencies to minimize potential adverse impacts.

## 5.3 WASTEWATER DISPOSAL

### 5.3.1 Existing Conditions

The proposed project property is served by a 36-inch interceptor line from the Waianae Wastewater Treatment Plant extending to the Maili Kai property boundary with an 18-inch diameter sewer pipe as shown on Figure IV-13. The line is sized to serve the proposed project and on-going improvements and expansion of the treatment plant have been designed to serve the forecast population growth of the Waianae area, including that which would result from the Maili Kai project. It is estimated by the City and County Department of Public Works that the wastewater treatment system has adequate capacity to serve approximately 1,800 residential units at Maili Kai. It is estimated that approximately 0.40 MGD of domestic sewage would be generated by

the proposed project (Table IV-22). A sewer master plan will be submitted to the city for review and approval of the adequacy of the waste treatment system.

TABLE IV-22

MAILI KAI WASTEWATER GENERATION

<u>SOURCE</u>	<u>NO. OF UNITS</u>	<u>GPD/UNIT<sup>1</sup></u>	<u>TOTAL WASTEWATER GENERATED/DAY</u>
Single Family	531	320	169,920
Multifamily	904	224	202,496
Park and Golf Clubhouse	---	---	<u>27,584</u>
TOTAL WASTEWATER GENERATED			400,000

1. GPD = Gallons per Day.

5.3.2 Probable Impacts

Based on the on-going improvements and expansion of the Waianae Waste Treatment plant; the estimated relatively low quantity of wastewater to be generated by the proposed project (see Table IV-22); and the adequacy of main interceptor lines serving the project site, significant effects on the waste treatment facilities serving the area are not expected to be caused by the proposed project. The proposed project will be connected to the existing 18-inch sewer line in Maipalooa Road.

5.3.3 Mitigation Measures

Due to the lack of expected adverse impacts on the waste treatment system serving the project area, mitigation measures to minimize potential adverse impacts do not appear warranted at this time. The developer will continue to work with appropriate






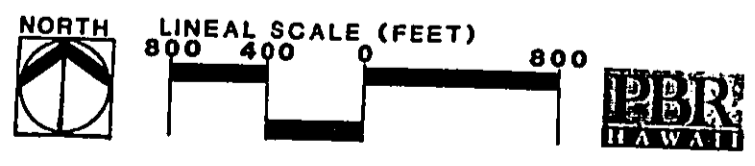


FIGURE IV-13  
**MAILI KAI PROPERTY**  
MAILI, OAHU

**EXISTING INFRASTRUCTURE**

**LEGEND**

-  DRAIN LINE
-  SEWER LINE
-  WATER LINE



governmental agencies to ensure the proper and safe disposal of wastewater generated by the proposed project.

#### 5.4 SOLID WASTE DISPOSAL

##### 5.4.1 Existing Conditions

At present, solid waste generated in neighboring residential areas is collected and disposed of by the City and County, Department of Public Works, Refuse Division. Also, as noted previously, the site itself is used as an illegal dumping ground for construction, industrial and domestic solid waste. It is estimated that the proposed project would generate approximately 13 tons of solid waste per day which would be collected and disposed of by the City and County. During the construction phase, solid wastes would be collected and disposed of by the building contractor(s). Further, if the golf course is privately owned and operated, it is possible that solid waste generated at the golf course would be collected and disposed of by a private refuse collection company. It is presumed that the domestic solid waste generated by the residents of the development would be of similar composition to that generated in other Oahu residential neighborhoods.

##### 5.4.2 Probable Impacts

Due to the relatively low level of solid waste to be generated by the residents of the development and the existing City and County refuse collection system, it appears that impacts resulting from solid waste generation and disposal would be minimal and insignificant. Based on an average generation rate of approximately 18 pounds per day per dwelling unit and approximately 9,500 housing units in the Waianae District, the solid waste refuse to be generated by the proposed project

represents an approximate 13 percent increase over present refuse generation for the district.

#### 5.4.3 Mitigation Measures

Due to the lack of expected significant impacts to the existing and/or planned solid waste refuse collection and disposal system, mitigation measures to minimize potential adverse impacts do not appear warranted. As noted, should the golf course be privately owned and operated, it is likely that a private refuse collection and disposal company would service the golf course.

### 5.5 ELECTRICAL POWER AND COMMUNICATION SYSTEMS

#### 5.5.1 Existing Conditions

Underground electric, telephone and cable TV (CATV) services were extended along Kaukama Road from Farrington Highway at the time the Kaukama Road was improved. Electric service was only supplied to a City and County street light transformer located near the Farrington Highway/Kaukama Road intersection. Future work will require extending all utility services into and throughout the project site. There are no existing Hawaiian Electric Company (HECO) transmission and distribution lines crossing or in proximity to the proposed development. Therefore, the existing HECO system will have to be extended and reinforced to provide adequate service in the project area. However, HECO does not anticipate construction of a new substation for the proposed Maili Kai project. Electrical service within the development would be via underground lines. Total electrical service demand of the development will depend on the final subdivision design and numbers of residential units developed.

At present, it is contemplated that electrical power would be used for both water heating and cooling purposes. However,

during final design stages of the project, the developer will investigate the possible use of solar water heating and the use of gas for water heating and cooling purposes. Engineering and economic analyses will be performed to determine the most economical and energy conservation efficient method of providing hot water heating and cooling to the residential units.

As noted, underground telephone lines have also been extended along Kaukama Road to the project site. Hawaiian Telephone Company (HawTel) lines are adequate to serve the proposed project and would be extended underground to service the residential units.

Cable TV service would be extended to residential units and provided by Oceanic Cablevision. This service is also adequate to serve the expected number of new customers.

#### 5.5.2 Probable Impacts

Based on the availability of presently adequate service capabilities of the electrical, telephone and cable TV utilities, significant impacts to or from these services are not expected to result from the proposed project.

#### 5.5.3 Mitigation Measures

Based on the lack of expected impacts resulting to or from electrical, telephone or cable TV services, mitigation measures to minimize potential adverse impacts do not appear warranted.

## 6. PUBLIC SERVICES AND FACILITIES

### 6.1 PUBLIC SCHOOLS

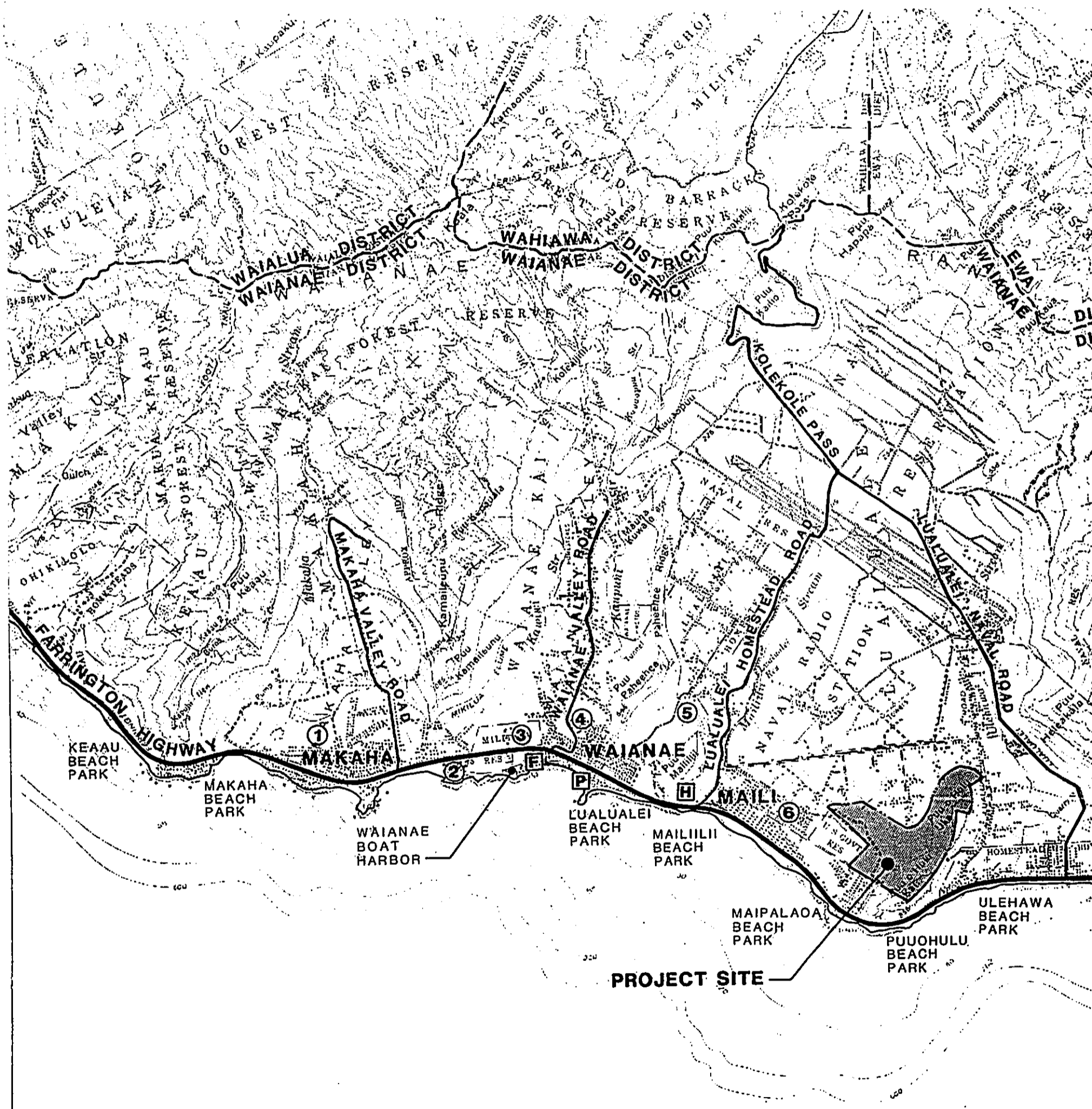
#### 6.1.1 Existing Conditions

At present, nine public schools service the Waianae District. Maili Elementary School and Playground are within one mile of the project site and Nanakuli and Waianae Intermediate and High Schools are within four miles of the project site (see Figure IV-14). According to the State Department of Education Facilities Branch, existing schools in the district appear to be at less than full room capacity, based on a maximum design criterion of 25 students per classroom and present (1987-1988) enrollments (Table IV-23). It is the Department of Education's intent to utilize the existing facilities to their designed capacities prior to constructing new facilities. Currently most schools in the project area have between 10 and 20 percent of their capacity available to accommodate future growth.

#### 6.1.2 Probable Impacts

As noted previously in Chapter II, Section 4, based on an average household size of 2.9 persons, the proposed project is expected to increase the population level of the area by about 4,200 persons. Based on this population increase, the State Department of Education has estimated that the numbers of students shown in Table IV-24 would reside in the development.

Based on the increases shown in Table IV-24, the Department of Education Facilities Branch estimates that one new elementary school in the area would be required. This school could be located in the general area as shown on the Waianae Development Plan Public Facilities Map (Figure II-7) or within the Maili Kai property and would serve the Maili Kai and adjacent residential



**FIGURE IV-14**  
**MAILI KAI PROPERTY**  
 MAILI, OAHU

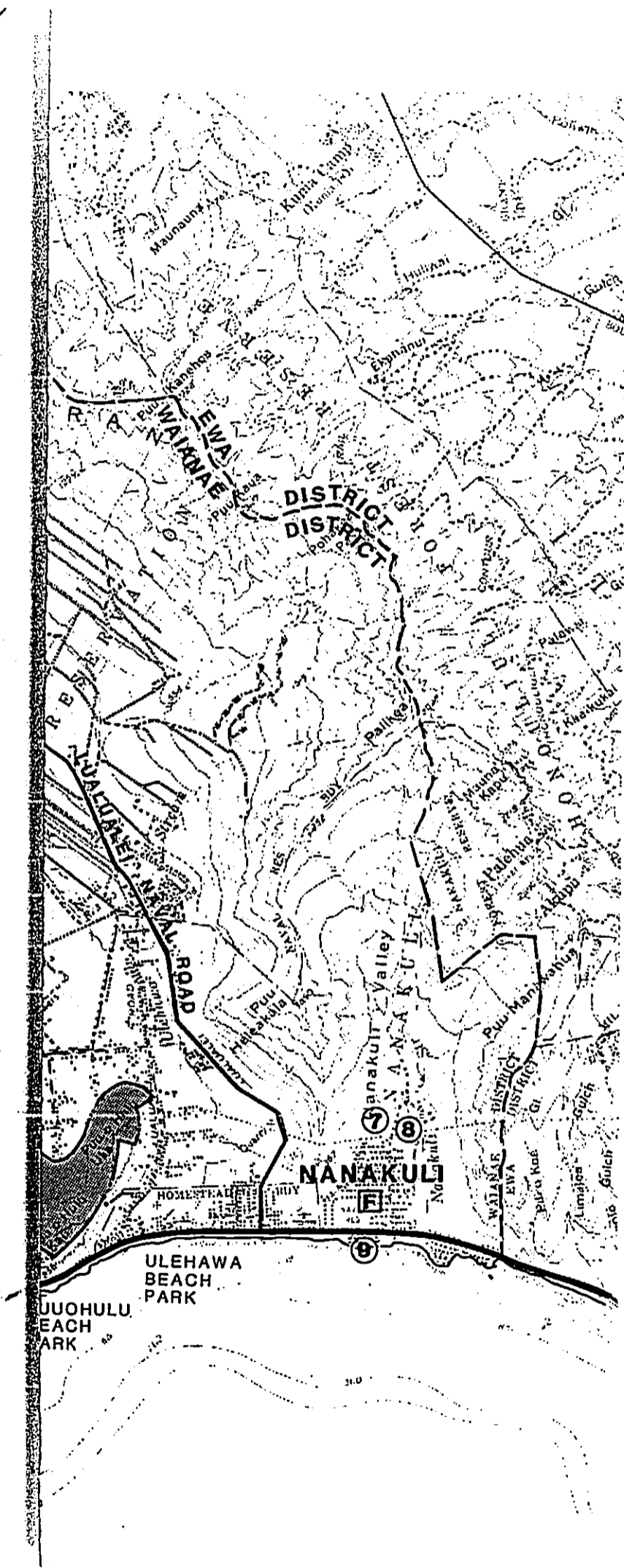
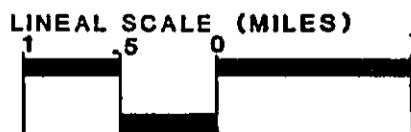
**PUBLIC FACILITIES**

**LEGEND:**

- P** POLICE STATION
- F** FIRE STATION/EMERGENCY AMBULANCE
- H** WAIANAE COMPREHENSIVE HEALTH CENTER

**EXISTING PUBLIC SCHOOLS**

- ① MAKAHA ELEMENTARY SCHOOL (K-6)
- ② WAIANAE HIGH SCHOOL (9-12)
- ③ WAIANAE INTERMEDIATE SCHOOL (7-8)
- ④ WAIANAE ELEMENTARY SCHOOL (K-6)
- ⑤ LEIHOKU ELEMENTARY SCHOOL (K-6)
- ⑥ MAILI ELEMENTARY SCHOOL (K-6)
- ⑦ NANAKULI HIGH SCHOOL (9-12)
- ⑧ NANAKULI INTERMEDIATE SCHOOL (7-8)
- ⑨ NANAKULI ELEMENTARY SCHOOL (K-6)



areas. The cost of the school and associated facilities would be borne by the developer, either directly or indirectly through contribution to the State Department of Education.

TABLE IV-23  
EXISTING SCHOOL (K-12) CAPACITY LEVELS  
IN THE WAIANAЕ DISTRICT

<u>School</u>	<u>Grades</u>	<u>Number of Classrooms(1)</u>	<u>Designed Capacity(2)</u>	<u>1987-1988 Enrollment(3)</u>	<u>Future Expansion</u>
Leihoku	K-6	34	850	737	113
Maili	K-6	45	1,125	899	226
Makaha	K-6	42	1,050	945	105
Nanakuli	K-6	22	550	439	111
Nanakuli Inter.& H. S.	7-12	64	1,060	1,053	547
Nanikapono	K-6	49	1,225	1,049	176
Waianae	K-6	50	1,250	1,021	229
Waianae Inter.	7-9	48	1,200	996	234
Waianae H.S.	9-12	80	2,000	1,801	199

Notes:

1. Room numbers based on Classroom Utilization Report January-March 1987, Department of Education Facilities Branch.
2. Capacity criteria used by Department of Education Facilities Branch: (Number of Classrooms) x (25) = Designed Capacity.
3. Enrollment Projections of the Public Schools in Hawaii, 1987-1992, Revised September 11, 1987. Department of Education information Services Branch.

TABLE IV-24  
MAILI KAI STUDENT ENROLLMENT IMPACT

<u>School</u>	<u>Grades</u>	<u>Projected Students</u>
Maili Elementary	K-6	300 - 450
Waianae Intermediate	7-8	80 - 120
Waianae High School	9-12	150 - 200

The above projections are based on the planned 1,435 units which include single family, townhouse and apartment units.



### 6.1.3 Mitigation Measures

As noted, the proposed development would increase the number of elementary school students to the extent that existing nearby public elementary schools would be utilized to over capacity. As such, a new elementary school would be required and would be constructed at the developer's expense. Other schools would experience increases in the numbers of students, but have sufficient capacity to absorb those students without the need for additional classrooms or other facilities. Provision of a new elementary school in the Maili area appears to be the only mitigation measure required at this time. The developer would continue to work with the Department of Education to ensure that adequate public school facilities are provided and that the Department of Education is involved with the siting of the new school.

## 6.2 HEALTH CARE FACILITIES

### 6.2.1 Existing Facilities

Public health care in the Waianae District is provided by and from the Waianae Coast Comprehensive Health Care Center, located just to the north of the project site. Additionally, ambulance service is available from the Waianae Fire Station, approximately 3.5 miles northwest of the project site.

### 6.2.2 Probable Impacts

The increased population level of the Waianae District, as a result of the proposed project, is not expected to impact the levels of service provided by either the Waianae Coast Comprehensive Health Care Center or fire department ambulance service. It is possible that additional staffing for both

facilities may be required, however, that has not been determined to date. It appears that both services are adequately staffed to handle the increased population.

#### 6.2.3 Mitigation Measures

Based on the lack of expected impacts, mitigation measures do not appear warranted at this time.

### 6.3 POLICE AND FIRE PROTECTION

#### 6.3.1 Existing Conditions

Police and fire protection services are located in Waianae town, approximately 3.5 miles northwest of the project site. The services include a police substation and a fire station with one fire truck and one tanker truck. Another fire station, with the same capabilities as the Waianae Station, is located in Nanakuli, about 3.5 miles southeast of the project site. The Fire Department is planning a new station that would be located in the Campbell Industrial Park and would be completed in 1972. This station will provide an additional engine and ladder company with 13 on-duty personnel.

Both police and fire protection services are of great concern to the residents of the area, as evidenced by comments raised at the Neighborhood Board meetings (see Section 4.1.6). Both the police and fire departments continue to work with the residents of the district to maintain and/or improve existing levels of service. Existing and planned police and fire protection services and facilities are considered adequate.

### 6.3.2 Probable Impacts

Although the proposed project will increase the population level and number of dwelling units in the district, it appears, based on comments received from both the police and fire departments, that the project will not impact either department and/or their abilities to provide the levels of service required.

### 6.3.3 Mitigation Measures

Based on the lack of expected impacts, resulting from the proposed project, on the level of services provided by the police and fire departments, mitigation measures do not appear warranted at this time. However, based on suggestions provided by the Police Department, during design stages of the residential units, consideration will be given to environmental security, e.g., deadbolts, window locks, adequate lighting, etc. for both the residential units and public recreational facilities.

## 6.4 RECREATIONAL FACILITIES

### 6.4.1 Existing Conditions

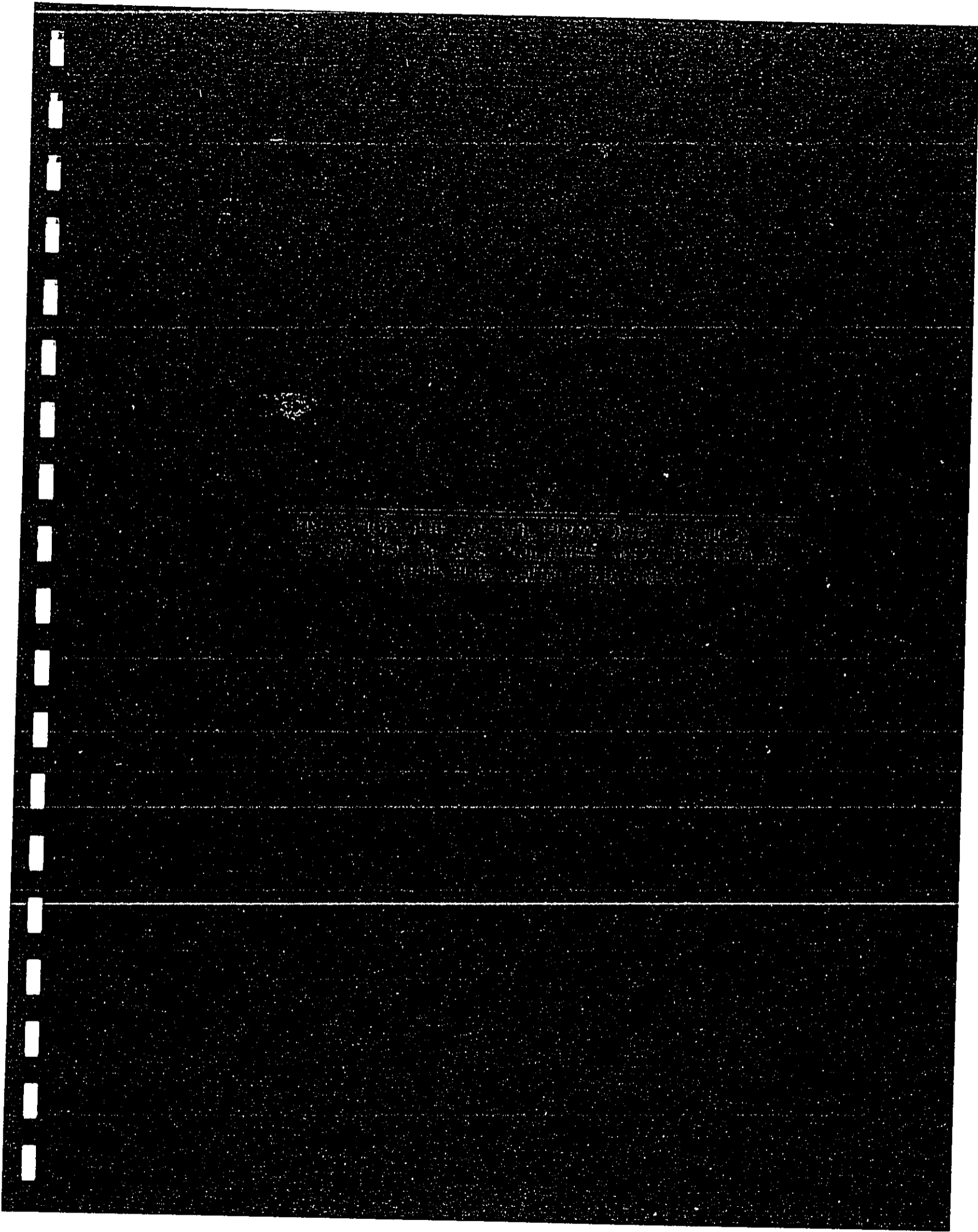
Existing public recreational facilities in the Waianae District include Ulehawa and Maili Beach Parks, Maili Playground and Nanakaipono Playground, Makaha Beach Park, Waianae Regional Park and Waianae Boat Harbor (Pokai Bay). In addition, there are several privately owned recreational facilities, a majority of which are open to the general public, e.g., Makaha Valley Country Club golf courses. The proposed project includes provisions, in accordance with appropriate City and County Department of Parks and Recreation regulations, for a public park, which will be about 11.5 acres in size, and a nine-hole golf course that will be open to the general public.

6.4.2 Probable Impacts

The proposed project is not expected to significantly impact any of the present or planned public recreational facilities in Waianae District. The provision of a public park and golf course within the proposed project will add to the recreational facilities of the district.

6.4.3 Mitigation Measures

Due to the lack of expected significant impacts to the district public recreational facilities as a result of the proposed project, mitigation measures do not appear warranted. The developer will continue to work with the City and County Department of Parks and Recreation regarding the location and size of the proposed park to assure that the site meets city standards and park dedication requirements.



CHAPTER V

**RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS,  
POLICIES AND CONTROLS FOR THE AFFECTED AREA**

The applicable governmental land use policies, goals and controls affecting the proposed project property are the Hawaii State Plan, the State Housing Functional Plan, the Oahu General Plan, the Waianae Development Plan Special Provisions and Land Use Map and the State Land Use Map designation. A Waianae Development Plan (DP) amendment application to the City and County of Honolulu Department of General Planning (DGP) requesting redesignation of the property from Agriculture to Residential was submitted on November 4, 1987. Subsequently, this application was modified to redesignate 32.5 acres to Low Density Apartment; and 136 acres to Residential and resubmitted on January 15, 1988. Upon acceptance of this Environmental Impact Statement, the D P amendment will be processed by DGP. The remaining approvals (Zoning Request and Subdivision approval) will be applied for sequentially or concurrently as allowed by law.

The proposed project would be consistent with: the Hawaii State Plan; the State Functional Plans, especially the State Housing Functional Plan and the State Agriculture Functional Plan; the Oahu General Plan; and, upon approval of the requested DP amendment, the Waianae Development Land Use Plan. The proposed project's relationship to these and other relevant land use plans and controls is described in the sections that follow.

1. HAWAII STATE PLAN

1.1 PART I

The Hawaii State Plan serves as a guide for future long-term development of the State, including identification of goals, objectives, policies and priorities for the State; a basis for determining priorities and allocating limited resources; and coordination of State and County Plans. In addition to the State Plan, twelve functional plans have been developed that set forth the policies, statewide guidelines and priorities within specific fields of activities. In this section, State Plan objectives and policies relevant to the proposed Maili Kai project are presented and commented upon. Policies that are also included in the applicable functional plans are discussed in the next section. The numbers in parentheses below refer to the appropriate section of the Hawaii State Plan.

(226-5) Objectives and Policies for Population.

(b) (3) "Ensure that adequate services and facilities are provided to accommodate the desired distribution of future growth throughout the State."

Comment: The phased expansion and installation of new infrastructure components necessary to serve the Maili Kai project will be provided by the developer. Installation of facilities and services to support population growth in the area will require minimal use of public funds. Public funds required for operation and maintenance should be offset by increases in property and State income tax revenues. All capital improvement projects planned for future dedication to a public agency, such as the planned public park, will be designed to City and County standards.

- (b) (7) "Plan the development and availability of land and water resources in a coordinated manner so as to provide for desired levels of growth in each geographic area."

Comment: The proposed Maili Kai project would permit presently unused and potentially unsuitable and incompatible agricultural lands to be employed for residential purposes that are compatible with surrounding land uses. Further, the proposed project population level would be consistent with City and County population growth policies for the area.

- (226-6) Objectives and Policies for the Economy in General.

- (b) (6) "Strive to achieve a sustained level of construction activity responsive to and consistent with State growth objectives."

Comment: Construction at Maili Kai will occur over a five-year period, resulting in 1,435 new housing units. Island-wide, approximately 6,000 new units are required each year to fulfill the housing needs of the population. This rate has been fairly steady for the last ten years. The pace of construction of the Maili Kai units would assist in meeting the housing demands of the State and would be consistent with the State's growth objectives.

- (b) (10) "Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems."

Comment: At present, the Waianae area is experiencing an unemployment rate of over 16 percent while the State average is around 3.8 percent. The increased population level of the area that would result from the proposed project as well as the construction of the proposed housing units would provide increased job and economic opportunities directly and indirectly



through the expected expansion of service industries that would serve the new and existing area residents.

- (b) (14) "Promote and protect intangible resources in Hawaii, such as scenic beauty and the aloha spirit, which are vital to a healthy economy."

Comment: A key factor in the planning and design of the Maili Kai project has been the retention of the views of the spectacular Waianae mountain range and Puu O Hulu Kai ridgeline from both outside and within the project boundaries. Further, the project has been planned to complement adjacent residential neighborhoods, thereby encouraging and fostering the aloha and ohana spirits that are characteristic of the Waianae and Maili areas.

- (226-12) Objectives and Policies for the Physical Environment (Scenic, Natural Beauty and Historic Resources).

- (b) (1) "Promote the preservation and restoration of significant natural and historic resources."

Comment: As noted in Chapter IV, Sections 1.8 and 3, the natural and historic resources of the project site will be preserved in compliance with appropriate federal, state and county rules and regulations. Further, significant historic sites would be incorporated into the project as educational features.

- (b) (3) "Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes and other natural features."

Comment: The proposed project has been designed such that the views and vistas of the Waianae Mountains, Puu O Hulu Kai ridgeline and the ocean that are afforded the site are maintained and preserved. Further, the addition of landscaping to the site

would improve the aesthetic character of the area as viewed from both within and outside the project boundaries.

- (b) (5) "Encourage the design of developments and activities that complement the natural beauty of the islands."

Comment: The proposed project has been planned and will be designed to complement the surrounding environment and the vistas accorded the project area. The proposed golf course would complement the background view of the Waianae mountain range, Puu O Hulu Kai ridgeline and the ocean vistas that are available from the site.

- (226-13) Objectives and Policies for the Physical Environment (Land, Air and Water Quality).

- (b) (2) "Promote the proper management of Hawaii's land and water resources."

Comment: The proposed project lands are marginally suitable for agricultural purposes due to the poor quality of the soils and the lack of available water supplies at costs that are economical for agricultural activities. The proposed project would allow the land to be employed in its highest and best use while allowing a fair return on the development of water supplies that would be required for residential versus agricultural activities.

- (b) (6) "Encourage design and construction practices that enhance the physical qualities of Hawaii's communities."

Comment: The proposed project structures would be designed to complement the surrounding area and the vistas afforded the project site. Further, the proposed project would improve the quality of surrounding neighborhoods both directly and indirectly by encouraging increased maintenance and upkeep of surrounding residences.

- (b) (7) "Encourage urban developments in close proximity to existing services and facilities."

Comment: The proposed Maili Kai project is approximately 3.5 miles from the recently expanded Waianae Sewage Treatment Plant, within ten miles of the H-POWER plant at Campbell Industrial Park, within five miles of police and fire stations at Nanakuli and Waianae and within five miles of Hawaiian Electric Company's Kahe Generating Station. Potable water supplies are within five miles of the project site. As such, the proposed project is consistent with the State policy of locating urban developments close to existing services.

- (226-14) Objective and Policies for Facility Systems In General.

- (b) (1) "Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans."

Comment: The proposed project is located such that planned and on-going improvements to state and county service facilities are within close proximity to the site.

- (226-19) Objectives and Policies for Socio-cultural Advancement (Housing).

- (a) (1) "Greater opportunities for Hawaii's people to secure reasonably priced, safe, sanitary, livable homes located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals."

Comment: The proposed Maili Kai project would provide a range of new housing opportunities to existing and new residents of the Maili and Waianae areas. The homes would be reasonably priced, safe, sanitary and located where those desiring a rural type lifestyle could reside.

- (a) (2) "The orderly development of residential areas sensitive to community needs and other land uses."

Comment: The proposed project has been planned with the input of adjacent neighbors. Additional meetings will take place with the Waianae Neighborhood and farmer's groups to address concerns of the area residents and surrounding businesses. As such, the needs and desires of the community have and will be considered and incorporated into the project. Further, the project will provide a suitable and desirable buffer between existing and planned residential areas and agricultural activities that might otherwise be incompatible land use activities.

- (b) (1) Effectively accommodate the housing needs of Hawaii's people."

Comment: The proposed project has been planned to provide a range of housing opportunities to Hawaii's people in general and, specifically, existing and new residents of the Waianae Coast area.

- (b) (2) "Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income and gap-group households;

- (b) (3) Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style and size of housing;

- (b) (5) Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services and other concerns of existing communities and surrounding areas; and

- (b) (7) Foster a variety of lifestyles traditional to Hawaii through the design and maintenance of neighborhoods that reflect the cultures and values of the community."

Comment: The preceding four Hawaii State Plan policies are embodied in the proposed Maili Kai project. Housing choices for low-, moderate-income and gap group households will be increased; home ownership and rental opportunities will be increased in terms of quality, location, costs, densities, style and size of housing; the planned design and location of the project has taken into consideration the physical setting, accessibility to public facilities and services and other concerns of existing neighborhoods and surrounding area land uses; the project is expected to aid in an increased awareness of traditional lifestyles and foster improved maintenance of existing residential units that reflect the cultures and values of the surrounding community.

(226-20) Objectives and Policies for Sociocultural Advancement (Health).

(a) (2) "Maintenance of sanitary and environmentally healthful conditions in Hawaii's communities."

Comment: The present vacant status of the project property leads to the area being used as an illegal, but convenient, dumping area for abandoned vehicles, miscellaneous rubbish, possibly other illegal activities and a breeding ground for feral rats and mice that invade adjacent residential units. The proposed project would eliminate these activities and allow the property to be a positive contributing factor to the character of the surrounding area.

(226-23) Objective and Policies for Sociocultural Advancement (Leisure).

(b) (2) "Provide a wide range of activities and facilities to fulfill the cultural, artistic and recreational needs of all diverse and special groups effectively and efficiently."

- (b) (4) Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological or biological values while ensuring that their inherent values are preserved.
- (b) (5) Ensure opportunities for everyone to use and enjoy Hawaii's recreational resources."

Comment: The proposed Maili Kai project includes provisions for a public park, open spaces and a golf course that would be open to the public. As such, a wide range of recreational facilities and opportunities would be made available to the residents of Maili Kai in particular, as well as the residents of the Waianae Coast area. In addition, view planes toward the Waianae mountain range would be retained as would the Puu O Hulu Kai ridgeline and slopes. These areas are historically, geologically and biologically distinct and would be available for educational and recreational enjoyment.

#### 1.2 PART III PRIORITY GUIDELINES

##### (226-103) Economic Priority Guidelines

(d) "Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:"

(d) (1) "Identify, conserve and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands."

Comment: The soils of the proposed Maili Kai project property are marginally suitable for agricultural activities due to their rocky and plastic nature. The soils could possibly be productive for agricultural crops if irrigation systems were available and if the rocks were removed from the soils. However, both of these conditions would be expensive and time consuming to implement, thereby rendering agricultural activities uneconomical. Other

agricultural activities also do not appear to be either required in today's market or for the foreseeable future (see Appendix H). There appear to be sufficient pig and chicken farms in the area and on the island to supply the demand. Aquacultural activities also do not appear to be a possibility at present and/or for the foreseeable future given the high costs of establishing and maintaining such facilities. In addition, there appear to be more than sufficient, better suited agricultural lands in the vicinity and elsewhere on Oahu that could be utilized should market conditions change in the future. As noted in Chapter IV, Section 1.2, the proposed project lands account for a very small portion (0.07 percent) of the lands on Oahu that are classified as Prime Agriculture lands and approximately 0.34 percent of the lands classified as Other Important Agricultural Lands.

- (d) (3) "Encourage public and private investment to increase water supply and to improve transmission, storage and irrigation facilities in support of diversified agriculture."

Comment: As indicated in Chapter IV, Section 5.2 of this EIS, the developer is negotiating with the Board of Water Supply to develop additional water supplies for the Waianae Coast area and will be improving the transmission system to the project site. It is highly unlikely that, if the Maili Kai property were to be used for agricultural activities, the farmers of the land would be able to economically participate in the development of those water supplies. That is, based on the analyses performed (see Appendix H), the development and costs of new water supplies would most likely render farming operations uneconomical. The participation that the developer of Maili Kai will be providing will, however, indirectly benefit existing farmers and others on other lands in the area that are more suitable for agricultural activities.

- (e) "Priority guidelines for water use and development:"

- (e) (2) "Encourage the improvement of irrigation technology and promote the use of non-potable water for agriculture and landscaping purposes."

Comment: Although the developer will not be involved in actions that attempt to improve irrigation technology, he will be involved in the development of non-potable water sources for landscaping use. As noted in Chapter IV, Section 5.2.2, groundwater sources will be developed to provide water for the golf course and landscape areas.

- (f) "Priority guidelines for energy use and development:"

- (f) (3) "Provide incentives to encourage the use of energy conserving technology in residential, industrial and other buildings."

Comment: As noted in Chapter IV, Section 5.5, during the final design stages of the proposed project, engineering and economic analyses of the use of electrical, gas and solar systems for cooking and/or water heating will be conducted to assure that the energy source used is the most efficient and cost effective as well as provides the greatest conservation measures economically available.

- (226-104) "Population growth and land resources priority guidelines.

- (a) (1) "Encourage planning and resource management to insure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawaii's people."

Comment: As indicated in Chapter IV, Section 4.3, the increased population of the Maili area that the proposed project would cause is within planned, projected and policed guidelines. Appropriate city and state agencies are presently taking or planning to take actions to improve public facilities and services to accommodate the forecast population growth.



- (a) (3) "Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the state."

Comment: As noted above, city and state agencies are presently taking or planning to take appropriate actions to ensure that public facilities and services are available to accommodate the forecast growth of the Maili area.

- (b) "Priority guidelines for regional growth distribution and land resource utilization:"
- (b) (1) "Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles:"
- (b) (2) "Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district."
- (b) (4) "Encourage restriction of new urban development in areas where water is insufficient from any source for both agricultural and domestic use."
- (b) (12) "Utilize Hawaii's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline, conservation lands and other limited resources for future generations."

Comment: The proposed project is consistent with the priority guidelines listed above: adequate public facilities and services are either already available or are planned; there are better suited agricultural lands in the immediate vicinity of the project site lands; the proposed project will add to the existing lifestyles of the present residents of the area; the project site lands are marginal agricultural lands that could be made

available for urban use; sufficient water supplies are being developed for the area; and use of the project site lands for urban purposes would be a wise use of the lands while protecting nearby and adjacent conservation lands and improving the environment of the area for future generations.

(226-106) Affordable housing.

- (1) "Seek to use marginal or non-essential agricultural land and public land to meet housing needs of low and moderate-income and gap group households."
- (4) "Create incentives for development which would increase home ownership and rental opportunities for Hawaii's low and moderate-income households, gap group households and residents with special needs."

Comment: As noted in Chapters I and II, 90 percent of the proposed project residential units would be priced for gap group households while 10 percent of those units would be priced for low to moderate-income households. The remainder of the homes, a portion of which would be affordable to gap group households, would be priced at market. Further, the project site lands are marginal agricultural lands.

**2. STATE FUNCTIONAL PLANS**

Twelve Functional Plans have been developed to act in concert and coordination with the County General Plans and Development Plans toward implementing the Hawaii State Plan. Although the Functional Plans work as the primary guide posts for implementation of the State Plan, at times competing policy interests are found within the Functional Plans and County General and Development Plans. For example, areas designated Urban in the State Plan and by the State Land Use Commission may also be designated Agriculture by the County Plans. Such is the case with the Maili Kai property. The Functional Plans pertinent

to the proposed Maili Kai project are the Housing Plan and Agriculture Plan, as discussed below.

## 2.1 STATE HOUSING FUNCTIONAL PLAN

A. OBJECTIVE: Develop greater opportunities for Hawaii's people to secure reasonably priced, safe, sanitary, livable homes located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals.

A(2). Policy: Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income and gap group households.

A(3). Policy: Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style and size of housing.

A(4). Policy: Promote appropriate development of additional housing and improvement, rehabilitation and maintenance of existing housing.

Comment: The proposed Maili Kai housing project meets the above objective and policies of the State Housing Functional Plan. New homes, of varying prices, densities and size would be provided; homes priced for low-, moderate- and gap income groups would be provided; and it is expected that the development of the Maili Kai project would provide the impetus and encourage adjacent and nearby residential areas to maintain and/or rehabilitate their homes in keeping with the character and quality of the new Maili Kai homes.

B. OBJECTIVE: Assist the orderly development of residential areas sensitive to community needs and other land uses.

B(1). Policy: Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, employment and other concerns of existing communities and surrounding areas.

B(2). Policy: Facilitate the use of available urban lands to accommodate the housing needs in various communities.

Comment: The planning for the Maili Kai project has included meetings with selected individual residents of the immediate area. Additional meetings will take place with the Waianae Neighborhood Board and farmer's groups to address concerns of the area residents and businesses. Further, the proposed project is located close to existing public facilities and services and would not require the construction of new public facilities or services to accommodate the project. Lastly, with respect to this particular State Housing Functional Plan objective, all of the lands that would be developed for housing are presently designated Urban by the State Land Use Commission and those lands that would be developed for the proposed golf course are designated Agriculture wherein golf courses are a permitted use. Lands designated Conservation would be retained as Conservation lands. The proposed project does not require the reclassification of any State Land Use designations.

## 2.2 STATE AGRICULTURAL FUNCTIONAL PLAN (LAND)

B. OBJECTIVE: Achievement of productive agricultural use of lands most suitable and needed for agriculture. Land is a non-replaceable, fundamental resource for agricultural production. The continued availability of suitable land is essential to realization of the aims established in the Hawaii State Plan toward increasing the overall level of agricultural development in Hawaii. Needs relating to agricultural lands cover

four principal areas. Those two that most appropriately apply to the Maili Kai project are: (1) Use of Suitable Lands and (2) Protection of Agricultural Lands. Much of the land which is potentially suitable and zoned for agricultural use is not being utilized for agricultural purposes. Additional incentives are necessary to encourage productive agricultural use of suitable lands.

The loss of prime agricultural lands to other, irrevocable uses is a continuing concern. Among other measures, timely response is needed to the Constitutional mandate to provide and implement legislated standards and criteria to conserve and protect important agricultural lands and ensure the availability of agriculturally suitable lands.

B(4). Policy: Encourage productive agricultural use of the most suitable agricultural lands.

B(5). Policy: Provide greater protection to agricultural lands in accordance with the Hawaii State Constitution.

Comment: The planning for the Maili Kai project has been accomplished with the full knowledge of the present state and county land use designations. The State Land Use designation for the majority of the property is Urban with smaller portions being designated Conservation and Agriculture. All of the Agriculture and Conservation designated land areas would be retained, with the Agriculture area being used for golf course purposes. County land use designations for the property, as shown on the Waianae Development Plan Land Use Map (Figure II-6), are Agriculture and Preservation. All of the Preservation lands would be retained and approximately 112 acres of the Agriculture designation retained.

As noted in Chapter IV, Section 1.2.1, the State Department of Agriculture designates the property as "Prime Agricultural Land" and "Other Important Agricultural Land". Prime Agricultural land encompasses about 10 percent of the property while Other Important Agricultural Land encompasses about 25 percent of the property. These designations are general in nature and do not reveal how the Department of Agriculture values the land. However, as also noted in Chapter IV, Section 1.2.1, the soils of the property have been classified as poor to very poor, thereby indicating that they are not well suited for crop type agricultural activities. Poultry, swine or dairy operations might be appropriate for the property. However, the lack of reasonably priced long-term leases and/or water supplies for the area indicate that agricultural activities might not be economically attractive. Similarly, agricultural activities on-site do not appear to be compatible with adjacent residential land uses. The establishment of a golf course on the mauka boundary of the property will provide a buffer between existing agricultural activities and yet retain the open space character of that portion of the property. It also appears that although there is a difference between the State and County land use designations, given the present adjacent residential land uses and the need for additional housing in the Waianae area as well as the poor quality of the soils of the property for agricultural purposes; the lack of productivity of the land for any purpose at this time; and the lack of agricultural related proposals for the property, the redesignation of the property at the county level to Residential and Low Density Apartment would be in the best interests of the public at large.

3. CITY AND COUNTY GENERAL PLAN

The proposed project implements the objectives and policies of the County General Plan in the areas of population, economic activity, natural environment, housing and physical development and urban design. The specific applicable General Plan objectives and policies and their applicability to the proposed Maili Kai project are discussed below.

Population, Objective B - To Plan for Future Population Growth.

Comment: Maili Kai housing project will offer a wide range of residential units to meet the existing and future housing needs of Oahu's in general, and particularly, the Waianae Coast's growing population. The project will provide housing aimed at a range of markets in a planned and minimally controlled environment close to existing and growing numbers of employment centers resulting in an improved quality of life for leeward coast residents.

Population, Objective B, Policy 1: Allocate efficiently the money and resources of the City and County in order to meet the needs of Oahu's anticipated future population.

Comment: Because the developer will install the required project infrastructure, City funds will not be diverted from the existing capital improvements program.

Population, Objective C - To establish a pattern of population distribution that will allow the people of Oahu to live and work in harmony.

Comment: The proposed project is in keeping with the population distribution policy as delineated in the Waianae Development Plan as described later in this section.

Population, Objective C, Policy 2: Encourage the gradual development of a secondary urban center in the West Beach-Makakilo area to relieve developmental pressures in the urban-fringe and rural areas.

Comment: The proposed project will indirectly affect the preceding policy by providing homes for employees of businesses and other economic activities occurring in the secondary urban center.

Population, Objective C, Policy 3: Manage physical growth and development in the urban-fringe and rural areas so that:

a. An undesirable spreading of development is prevented; and

b. Their proportion of islandwide resident population remains unchanged.

Comment: The proposed project complies with the above policy in that (1) development would be concentrated in one small area and (2) the numbers of residential units planned would accommodate a population level that is within the Waianae Development Plan population level policy as described below.

Population, Objective C, Policy 4: Seek a year 2000 distribution of Oahu's residential population which would be in accord with the following:

Waianae 4.2 to 4.6 percent of Year 2000 islandwide population.

Comment: The proposed Maili Kai housing project is expected to have a total population at build out in 1995 of about 4,400 persons (assuming approximately 1,500 residential units and a household size of 2.9 persons). The projected year 2000 population capacity of the Waianae area ranges from 40,100 to 43,900 persons or an additional 6,500 to 10,300 persons above present population levels.



Economic Activity, Objective A - To promote employment opportunities that will enable all the people of Oahu to attain a decent standard of living.

Economic Activity, Objective A, Policy 1: Encourage the growth and diversification of Oahu's economic base.

Comment: The proposed Maili Kai project will provide economic opportunities in many fields, including construction and businesses that provide goods and services to residential areas.

Economic Activity, Objective G, Policy 2: Permit the moderate growth of business centers in the urban-fringe areas.

Comment: The Maili Kai project will allow both new and established businesses in existing Waianae area business centers to develop and expand to serve the residents of Maili Kai and surrounding areas.

Natural Environment, Objective A - To protect and preserve the natural environment of Oahu.

Shorelines

Natural Environment, Objective A, Policy 1: Protect Oahu's natural environment, especially the shoreline, valleys and ridges, from incompatible development.

Comment: The proposed Maili Kai project will not affect the shoreline, valleys or ridges in the area.

Natural Environment, Objective B - To preserve and enhance the natural monuments and scenic views of Oahu for the benefit of both residents and visitors.

Natural Environment, Objective B, Policy 2: Protect Oahu's scenic views, especially those seen from highly developed and heavily travelled areas.

Comment: The proposed project will not affect the scenic views of the Waianae mountain range or Puu O Hulu Kai ridgeline from either Farrington Highway or from within the project itself.

Housing, Objective A - To provide decent housing for all the people of Oahu at prices they can afford.

Housing, Objective A, Policy 3: Encourage innovative residential development which will result in lower costs, added convenience and privacy and the more efficient use of streets and utilities.

Comment: The proposed project will include a range of housing opportunities and thereby reduce the overall lot development costs for all units, resulting in the ability to offer housing at prices people can afford, while providing those homes in the location desired and maintaining the privacy of individuals. Further, the proposed project will allow existing utilities to operate at designed levels, thereby increasing the efficiency at which they operate.

Housing, Objective A, Policy 10: Promote the construction of affordable dwellings which take advantage of Oahu's year-round moderate climate.

Comment: The typical weather pattern in the Maili area includes mild year-round temperatures, low rainfall, infrequent storms and generally northeasterly trade winds that prevail most of the year. The homes in Maili Kai will be designed to take advantage of these climatic conditions.

Housing, Objective C - To provide the people of Oahu with a choice of living environments which are reasonably close to employment, recreation and commercial centers which are adequately served by public utilities.

Housing, Objective C, Policy 1: Encourage residential developments that offer a variety of homes to people of different income levels and to families of various sizes.

Comment: The proposed Maili Kai project will include homes priced for all income groups and family sizes.

Housing, Objective C, Policy 2: Encourage the fair distribution of low- and moderate income housing throughout the island.

Comment: The Maili Kai project will include homes priced for the low- and moderate-income groups that comprise the majority of families in the Waianae Coast area.

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

Comment: The timeliness of any new development is measured by market acceptance. In this instance, the market study conducted for the proposed Maili Kai project indicates that all of the planned units, at all cost levels, would be absorbed within a reasonable time period as they are developed. This indicates a pent-up demand in the Maili area for housing units at all cost levels. Further, the proposed project has been planned to be compatible with the surrounding area as well as provide an open space (golf course) buffer between the residential units and existing and future agricultural activities that may occur on adjacent lands.

Physical Development and Urban Design, Objective A, Policy 2: Coordinate the location and timing of new development with the availability of adequate water supply, sewage treatment, drainage, transportation and public safety facilities.

Comment: The Waianae Wastewater Treatment Plant is presently being expanded to handle the forecast increase in population growth in the Waianae Coast area, including that which would be attributable to the Maili Kai project; the Board of Water Supply

is presently developing new sources of water to serve the area; existing and planned drainage structures would adequately handle surface water runoff and not require new expenditures of public funds; existing and planned transportation facilities and systems have been designed to accommodate future population growth in the area; and existing public safety facilities (police and fire stations) are adequate to serve the forecast population growth of the area.

Physical Development and Urban Design, Objective A, Policy 4: Require new developments to provide or pay the cost of all essential community services, including roads, utilities, schools, parks and emergency facilities that are intended to directly serve the development.

Comment: The developer will continue to comply with this policy in the development of Maili Kai.

Physical Development and Urban Design, Objective A, Policy 8: Locate community facilities on sites that will be convenient to the people they are intended to serve.

Comment: The proposed project includes both a public park and golf course that are intended to serve not only the residents of Maili Kai but also the Waianae Coast area. The planned location of these facilities is convenient for both intended user groups.

#### 4. WAIANAЕ DEVELOPMENT PLAN

As noted in Chapter I, this EIS supports a formal request submitted to the City and County of Honolulu, Department of General Planning in November 1987 and subsequently modified in January 1988 to amend the Waianae Development Plan Land Use Map. Development Plans (DP), according to the City Charter, are relatively detailed guidelines for the physical development of the island. They must implement and accomplish the objectives of

the General Plan. The Development Plans include two parts: text and maps. The text portion also contains two portions: Common Provisions that are common to all eight Oahu development plans and Special Provisions that are specific planning area descriptions, urban design principles and controls for the particular planning area and development priorities for each planning area. There are also two map elements of the DP's: Land Use Maps which define the DP area and distribute the various DP land uses in a manner that implements the General Plan objectives and policies; and Public Facilities Maps that identify planned public and private facilities and infrastructure. Those sections of the Development Plan Common Provisions and Special Divisions that are applicable to the proposed Maili Kai project are discussed below.

#### 4.1 COMMON PROVISIONS

##### Section 4. General Urban Design Principles and Controls

##### 1. Public Views

Comment: The proposed Maili Kai project will not affect public views of the Waianae mountain range or Puu O Hulu Kai ridgeline from outside the project boundaries or from within the project boundaries. Similarly, views of the ocean and Waianae coastline that are available from within the project boundaries will be retained. The developer will comply with appropriate Land Use Ordinance (LUO) provisions to ensure that the above noted view planes are maintained. Further, utilities that normally use overhead wires and poles will be placed underground, thereby negating the possibility that overhead utility wires and poles could obstruct significant view planes.

## 2. Open Space

Comment: The Maili Kai project will include the provision for open spaces that will serve two purposes. First, the open spaces will assist in preserving view planes and, secondly, the open spaces will serve as physical boundaries between existing and proposed residential units and possible future agricultural activities.

## 3. Vehicular and Pedestrian Routes

Comment: The Maili Kai project will, in compliance with the DP Common Provisions, include landscaping along the major access roadways and streets within the project boundaries; include appropriate signing and lighting; and include adequate sidewalks and pedestrian corridors to enhance the safety and convenience of pedestrians and minimize conflicts between people and vehicular movements.

## 4. General Height Controls

Comment: All structures within the Maili Kai project will conform to maximum allowable heights as defined in the Special Provisions and LUO.

## 5. Energy Efficiency in Developments

Comment: As noted in Chapter IV, Section 5.6, the possible use of solar water heating will be investigated during the detailed design stages of the project.

## 6. Mixed Use Areas

Comment: In compliance with the provisions of subsections a. 3., 4. and 5., the Maili Kai project will include design features that (1) promote structure designs and land use arrangements that save energy; (2) provide greater opportunities for variety in

urban experiences for pedestrians; and (3) encourage greater social interactions within the development itself as well as adjacent and surrounding developments. Further, in compliance with subsection b. 1.(a), the Maili Kai project will be limited to residential units only with appropriate recreational amenities.

#### 7. Rural Areas

Comment: Because the Maili Kai project is located in an urban-fringe area, major efforts will be made during the design stages to retain the visual attractiveness and rural character that distinguishes the surrounding area.

### Section 5. General Principles and Controls for Parks, Recreation and Preservation Areas

#### 1. Parks and Recreation Areas

Comment: As noted in Chapter II, Section 3.2, the proposed Maili Kai project includes provisions for a public park and a golf course that will be open to the public. These amenities will be designed and located to be suitable for the Maili Kai and surrounding neighborhoods and will be available to all residents of Oahu. The park design will follow the standards set forth by the City and County of Honolulu Department of Parks and Recreation.

#### 2. Preservation Areas

Comment: The presently designated Preservation area within the project property boundaries will be retained as Preservation.

Section 10. Social Impact of Development

1. Social Impact Factors

Comment: The potential social impacts that could result from the proposed Maili Kai project are described in Chapter IV, Section 4. As indicated therein, the majority of the social impacts are expected to be positive and/or mitigation measures taken to minimize potential adverse social impacts.

4.2 SPECIAL PROVISIONS

Section 1. Area Description

The Special Provisions of the Waianae Development Plan note that physical growth and development in the urban-fringe area should be managed so that:

- a. An undesirable spreading of development is prevented, and
- b. Their proportion of the islandwide resident population remains unchanged.

Further, the Special Provisions note that "It is the intent of the Waianae Development Plan that the pattern of the urban development in Waianae generally remain linear along Farrington Highway, with relatively low building heights. The overall agricultural and open space setting is to be retained.

Section 2. Urban Design Principles and Controls for Waianae

1. Specific Urban Design Considerations

a. Open Space

Comment: In compliance with this section of the Special Provisions, the visibility, preservation, enhancement and accessibility of open space areas, as defined in Section 4 of the



Common Provisions, will be given high priority in the design of the Maili Kai project and specifically, Puu O Hulu Kai and views of the Waianae mountain range will be retained.

b. Public Views

Comment: As noted previously in this Chapter and in Chapter IV, Section 1.8, view planes of the Waianae mountain range and Puu O Hulu Kai from both outside and within the project boundaries will be retained.

c. Height Controls

Comment: The general height limits of all structures within the project will be in compliance with the Special and Common Provisions of the Development Plan. Detached single family and multifamily residential units will be limited to a 25-foot height limit and low-density apartments will be limited to 30-foot heights.

d. Density Controls

Comment: The guidelines for densities as defined in this subsection will be followed in the design and layout of the various housing units. Specific densities will be determined following approval of the requested DP amendment and at the time zoning applications are submitted by the developer.

Section 3. Development Priorities

Comment: There are no specific development priorities listed for Waianae. However, planning for the proposed Maili Kai project has been performed in consonance with the policies set forth in Section 9 of the DP Common Provisions.

5. LAND USE MAP

The proposed amendment to the Waianae Development Plan Land Use Map is shown on Figure II-6. As shown, it is requested that ±136 acres be redesignated Residential and that 32.5 acres be redesignated Low Density Apartment. The existing Preservation area will be retained as will approximately 112 acres of Agriculture lands.

6. PUBLIC FACILITIES MAP

The Waianae Development Plan Public Facilities Map will be unaffected by the proposed Maili Kai project.

7. ZONING

The developer will apply for zoning changes at the appropriate time in the development process.

8. COASTAL ZONE MANAGEMENT ACT (CHAPTER 205-A, HRS)

The proposed Maili Kai project is outside special management and coastal zone management areas and, therefore, is not required to submit permit applications.

9. ENVIRONMENTAL IMPACT STATEMENTS (CHAPTER 343, HRS)

Section 343-5 (a)(6) of Chapter 343 HRS states "Any amendment to existing County general plans where the amendment would result in designations other than agriculture, conservation or preservation ..." requires an environmental impact statement. Accordingly, an Environmental Assessment for the project was prepared and submitted to the Department of General Planning in November 1987.

On November 18, 1987 DGP notified the developer that an EIS would be required pursuant to the provisions of Chapter 343. This EIS is intended to serve that purpose.

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

THE UNIVERSITY OF CHICAGO  
LIBRARY  
540 EAST 57TH STREET  
CHICAGO, ILL. 60637

CHAPTER VI  
RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE  
ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT  
OF LONG-TERM PRODUCTIVITY

The principal long-term benefits of the proposed Development Plan amendment and project include the productive use of the property at a higher density than that presently permitted. Increased housing opportunities for all socioeconomic levels would be provided along with increased recreational facilities and activities. Clustering residential development at the site would facilitate provision of public services such as refuse collection, police and fire protection and sewerage collection and transmission. In addition, open spaces surrounding the project and vistas of the Waianae mountain range and Puu O Hulu ridgeline would be retained for the long-term benefit of the immediate area residents as well as all others. Private funding of the necessary infrastructure improvements and hook-ups may also be viewed as a long-term benefits as it avoids the expenditure of public funds. Both long- and short-term benefits in the form of increased job and economic opportunities would result from the proposed project.

The land will be committed to long-term uses for residential and recreational facilities and the proposed project would involve the transformation of an urban fringe and potential agricultural area into an urban area. As indicated elsewhere in this EIS, the property does not appear to be suitable for crop type agricultural activities with the possible exception of hydroponics or nursery operations that use imported soils. Crop type agricultural activities would require major investments in

irrigation systems and the removal of rocks from the soils of the project site. Livestock or poultry agricultural operations could be performed on the property with resultant lower tax revenues than the proposed project would generate, potential increased demands on water supplies and incompatibility with existing residential subdivisions.

Development of the proposed project is not expected to pose any long-term risks to health or safety. To provide a desirable, attractive and competitive residential community with improved public recreational facilities and to be a good neighbor, the land owner is particularly mindful of the need to eliminate any potential risk to the development's residents and visitors.

As noted in the discussion of Alternatives to the proposed project (Chapter III), one short-term use of the property would be to retain the present vacant status of the property. This appears to be less than the optimum use of the property and would result in maintenance of the current housing shortage in the area as well as reduced tax revenues.

VII  
INDEX AND DIRECTORY  
CONTENTS

## CHAPTER VII

### IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The development of the Maili Kai housing project and resultant construction of detached single family and multifamily units would result in the irreversible and irretrievable commitment of certain natural and fiscal resources. Major resource commitments include the land on which the project is located and on which the facilities would be constructed, as well as money, construction materials, manpower and energy. The impacts of using these resources should be weighed against the expected positive socioeconomic benefits to be derived from the project versus the consequences of taking no action or adopting another less beneficial use of the property.

A major portion of the property would remain as open space (golf course and park - approximately 125 acres or 30 percent of the total land area) and include landscaping planted around the residential units and along the streets that would add to the aesthetic character of the area.

The commitment of resources required to accomplish the project includes building materials and labor, both of which are generally non-renewable and irretrievable. Construction of and resultant travel to/from the project by residents and visitors, would require the consumption of petroleum products and petroleum based electrical generation. This, too, represents an irretrievable commitment of resources.



The proposed project does not call for a substantial commitment of government supplied services or facilities that would not be required without the proposed project. The project would add to the cultural and recreational facilities available to the residents of the project and the Maili/Waianae area in general. Similarly, the project would add to the tax revenues of the county and state.

UNIVERSITY OF CALIFORNIA  
DEPARTMENT OF ELECTRICAL  
AND ELECTRONIC ENGINEERING

CHAPTER VIII

CONSIDERATION OF OFFSETTING GOVERNMENTAL POLICIES

By the very existence of a complex system of land use policies, plans, goals, objectives and controls at both the state and county levels of government, development proposals requiring land reclassification are often faced with inherent contradictions and conflicts within the land use regulatory system. As such, the Maili Kai housing project must be reconciled against those planned elements that most appropriately apply. As indicated in Chapter V, the proposed project is generally consistent with the applicable Oahu General Plan and Waianae Development Plan goals, policies and standards relating to the future growth of the Waianae area. Adoption of the requested Development Plan amendment would enable the project to meet the initial land use regulatory requirements. Future actions, including application for and acceptance of zoning and subdivision requests would enable the project to meet all land use regulatory requirements. It appears that one of the principal policy decisions that must be made relative to the proposed project is whether a substantial portion of the presently policed population growth for the Waianae Coast should be concentrated in one community, or should population growth be allowed to expand linearly along Farrington Highway? Mauka lands would be retained for agricultural activities. These activities may or may not be compatible with residential development. As noted previously in this EIS, the soils of the project property are unsuited for crop type agricultural activities but could support nursery activities that use hydroponics or imported soils. Additionally, livestock and poultry farming could be accomplished on the property. However, the costs of land and water for such operations may make them

uneconomical, in which case the land would not be employed in its highest and best use with the resultant decreased state and county tax revenues.

Significant adverse physical, natural or socioeconomic environmental impacts are not expected to result from the proposed project. Potentially there may be minor adverse environmental impacts, but these are thought to be offset by the benefits that would accrue from the project and the mitigation measures that would be taken to minimize potential adverse impacts (see Chapter I, Section 6 and Chapter IV, Sections 1 through 6).

State and County policies and plans have encouraged the development of housing for gap group and low- moderate income groups, especially in the areas where they are most needed, such as the leeward coast area in general. The infrastructure that would be required to serve the project is mostly in place and/or would be put in place by the developer.

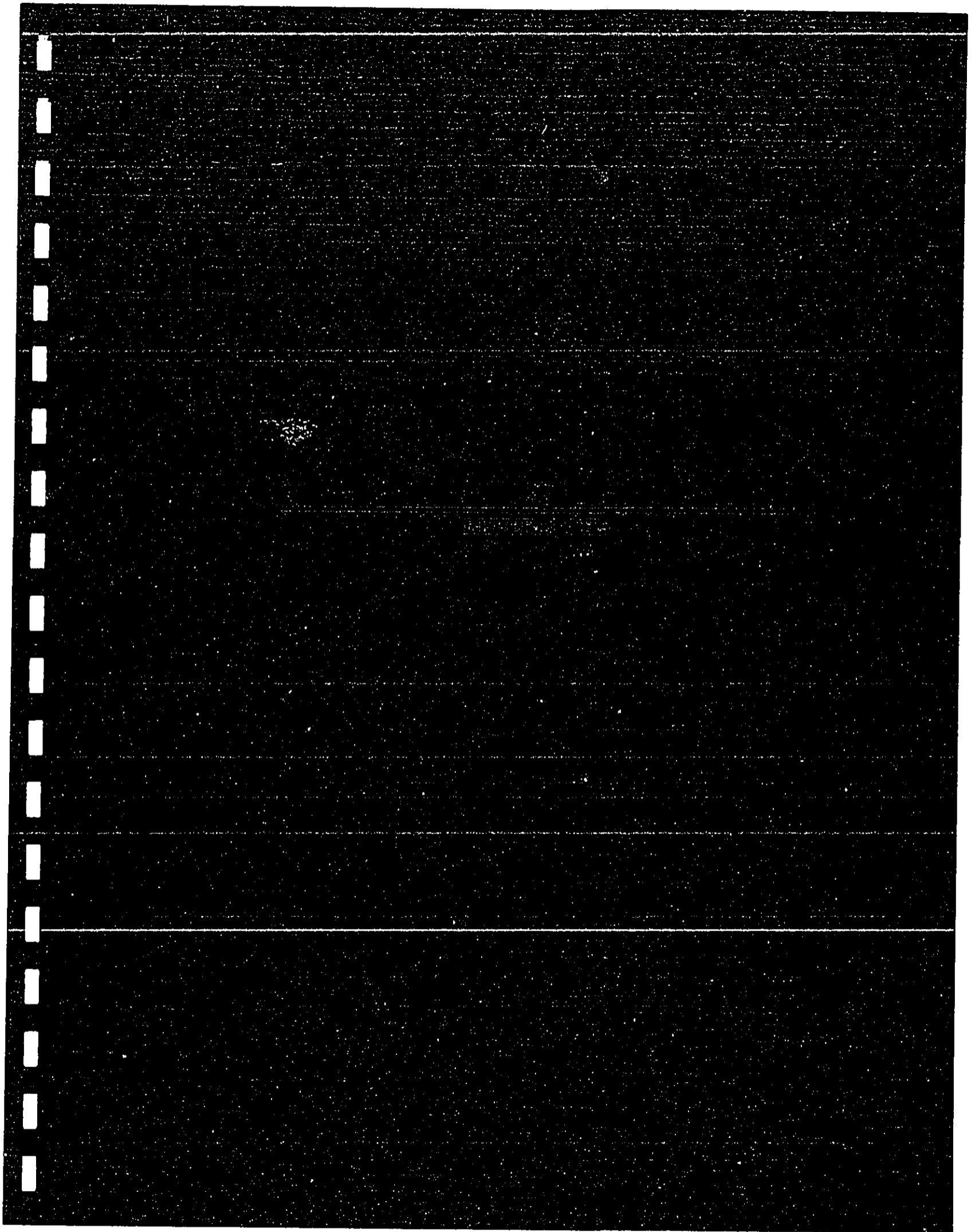
UNRESOLVED REFERENCES

CHAPTER IX  
UNRESOLVED ISSUES

The land owner is aware of concerns regarding the proposed project, as expressed during meetings with Waianae Neighborhood Board members, selected residents of the area and discussions with elected and City administration personnel. Some of these concerns have been echoed in the EISPN and Draft EIS comment letters included in Chapters XI and XII, respectively, of this EIS. In general, the majority of concerns expressed are related to the planned unit density and types of units that would be included in the proposed project; traffic impacts; odors and vector control problems caused by nearby agricultural activities; and general feelings regarding the type of development that is appropriate for the area.

The developer has been and will continue to work with the residents and businessmen of the area, as well as administrative and elected officials to assure that the final development plans meet the developer's project objectives and satisfactorily address the concerns that have been raised to date.

Other issues that remain unresolved at this time are permitting and procedural issues that this EIS is designed to help resolve. It is believed that these issues can be resolved without undue difficulty.



CHAPTER X

REFERENCES

Aloha United Way. April 1987. Decisions 87: Strategies for a Stronger Community. A collection of five sources of public opinion surveys, feeling of topics and issues by Hawaii residents. Honolulu, Hawaii.

City and County of Honolulu, Department of General Planning. August 1985. Residential Development Implications of the Development Plans. Honolulu, Hawaii.

City and County of Honolulu, Department of General Planning. March 1987. Development Plan Status Review: Fiscal Year 1986. Honolulu, Hawaii.

Community Resources, Inc. September 1987. Socio-Economic Impact Assessment for the Proposed West Loch Estates Project. Prepared for R. M. Towill Corporation. Honolulu, Hawaii.

Gallimore, R., and Howard A. 1968. "Hawaiian Lifestyle". In R. Gallimore and A. Howard (eds.), Studies in a Hawaiian Community: Namakamaka O Nanakuli. Pacific Anthropological Records No. 1. Bishop Museum Press. Honolulu, Hawaii.

Hawaii State Department of Agriculture. 1977. Agricultural Lands of Importance to the State of Hawaii (Revised).

Hawaii State Department of Agriculture. 1985. State Agricultural Functional Plan. Prep. By Department of Agriculture.

Hawaii State Department of Hawaiian Home Lands. Planning Department. 1986. 'Aina Ho 'opulapula. Annual Report, FY 1986. Honolulu, Hawaii.

Hawaii State Department of Planning and Economic Development, Research and Economic Analysis Division. July 1984. Hawaii Population and Economic Projection and Simulation Model: Updated State and County Forecasts. Honolulu, Hawaii.

Hawaii State Department of Planning and Economic Development. 1986. The Hawaii State Plan Revised. Hawaii State Plan Policy Council.



- Hawaii State Department of Social Services and Housing. 1984. State Housing Functional Plan. Prep. By Hawaii Housing Authority.
- Hawaii State Department of Transportation. 1982. Urban Transportation Planning Package. Unpublished 1980 Census printout and tables. Honolulu, Hawaii.
- Institute of Transportation Engineers. Trip Generation, Third Edition.
- Krauss, B., with E. J. McGrath, Jr. and K. M. Brewer. 1973. Historic Waianae. Island Heritage, Ltd. Honolulu, Hawaii.
- Land Study Bureau, University of Hawaii. 1969. Detailed Land Classification, Island of Oahu.
- PBR HAWAII. 1988. Punalu'u Resort Final Environmental Impact Statement. Prep. for C. Brewer Properties, Inc.
- U.S. Department of Transportation, Federal Highway Administration. 1978. Manual on Uniform Traffic Control Devices for Streets and Highways.
- Walter Lum & Associates. 1974. Soils Investigations, Maili Kai Property.
- Willinger, K., and Sine L. F. 1982. A Socio-Ecological Study With Human Service Implications for the Waianae Coast. Prepared for the Hawaii State Department of Health, Mental Health Division. Honolulu, Hawaii.
- U.S. Bureau of the Census. June 1973. 1970 Census of Population and Housing -- Census Tracts -- Honolulu, Hawaii. PHC(1)-88. Washington D.C. U.S. Bureau of the Census. 1980 Summary Tape File 3-A. Available on microfiche at the Hawaii State Department of Business and Economic Development library.

THE NATIONAL DEFENSE ACADEMY  
RESPONSIBLE OFFICIALS

CHAPTER XI  
CONSULTED PARTIES, COMMENTS AND RESPONSES  
DURING CONSULTATION PERIOD

1. CONSULTED PARTIES

The notice of availability of the Environmental Impact Statement Preparation Notice (EISPN) for Maili Kai Property was published in the OEOC Bulletin by the Office of Environmental Quality Control on December 8, 1987 and December 23, 1987. Because of a modification to the Development Plan Amendment application in late December 1987, the deadline for requests to be a consulted party and comments was extended to January 22, 1988 from January 8, 1988. The agencies, organizations and individuals listed below were sent copies of the EISPN and were requested to comment on the proposed project. A sample copy of the letter and EISPN are included herein. Everyone believed to have an interest in the project or who requested consulted party status was included in the mailing. Those who responded within the comment period (45 days) to the request for comments are marked with an asterisk (\*) and copies of the correspondence with them is included in this Chapter.

Federal Agencies

- \* Department of Agriculture, Soil Conservation Service  
Department of Army, Corps of Engineers Division
- \* Department of Interior, Fish and Wildlife Service  
(F.L.P.) Commander, Maintenance and Logistics Command  
Mr. Peter Herbert, Director, Office of Real Estate Sales  
G.S.A.

State Agencies

- Department of Accounting and General Services
- \* Department of Agriculture
- \* Department of Defense
- \* Department of Education
- \* Department of Health
- Department of Land and Natural Resources
- \* Department of Business and Economic Development
- Department of Transportation
- Office of Environmental Quality Control
- University of Hawaii -
- \* Environmental Center
- Water Resources Research Center

County Agencies

- Department of Finance Real Property Assessment Division
- Department of General Planning
- \* Department of Housing and Community Development
- \* Department of Land Utilization
- \* Department of Parks and Recreation
- \* Department of Public Works
- \* Department of Transportation Services
- Department of Building
- Fire Department
- \* Police Department
- \* Board of Water Supply

Public Utilities

- \* Hawaiian Electric Company, Inc.
- \* Hawaiian Telephone Company

Private and Community Organizations

Waianae Coast Neighborhood Board No. 24

Waianae District Neighborhood Area Association

Maili Community Association

Nanakuli Advisory Council

Nanakuli Hawaiian Homesteaders Association, Inc.

Office of Hawaiian Affairs

Waianae Farm Bureau

December 15, 1987

**SAMPLE LETTER**

**SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE  
(EISPN) MAILI, OAHU, HAWAII TMKS: 8-7-10:02, 04**

Dear :

Kaiser Cement Corporation is requesting the Department of General Planning (DGP) to consider an amendment to the Waianae Development Plan (D.P.) during the FY 1988 annual review to change the D.P. designation of approximately 180 acres of land situated in Maili, accessed from Kaukama road. Specifically, the amendment requests a redesignation from the current Agriculture designation to Residential and Low Density Apartment. Our firm has been retained to represent Kaiser Cement Corporation in this process.

As the accepting agency, DGP has determined that the DP amendment request will require the preparation of an Environmental Impact Statement (EIS) pursuant to Chapter 343, Hawaii Revised Statutes. Notice of this determination was published in the December 8, 1987 issue of the OEQC Bulletin. The publication of this determination begins a 30-day public review period wherein anyone can request to be consulted during the preparation of the EIS. All requests must be postmarked by January 8, 1988.

To facilitate your review of the proposed development, we have enclosed an expanded version of the EISPN published in the OEQC Bulletin. We would greatly appreciate your assistance in this process by either responding with written comments to the enclosed EISPN or by identifying an individual within your organization whom we may contact to discuss the project in greater detail.

Thank you for your cooperation in this matter.

Sincerely,

PBR HAWAII

Matthew E. Grady  
Project Manager

Enclosures

CHAPTER 343, HRS

ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN)

MAILI KAI PROPERTY

HOUSING PROJECT

MAILI, OAHU

I. DEVELOPMENT SUMMARY

**Applicant:** Kaiser Cement Corporation  
c/o PBR HAWAII  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813  
Attention: Mr. Wm. Frank Brandt  
(808) 521-5631

**Accepting Agency:** Department of General Planning  
650 South King Street  
Honolulu, Hawaii 96813

**Landowner:** Kaiser Cement Corporation

**Location:** Approximately 2,000 feet east of Farrington Highway, Maili, Waianae District, Oahu, Hawaii

**Acreage:** 415 Acres

**TMK:** 8-7-10:02 and 14

**Proposed Use:** Single Family and Multifamily Housing Units

**Existing Use:** Vacant Land

**State Land Use:** Urban, Agriculture, Preservation

**Development Plan Designations:** Residential, Agriculture, Public Facilities and Preservation

**Zoning:** R-5, AG-2 and P-1

**Request:** Change 180 Acres of D.P. Agriculture designation to Residential and Low Density Apartment

## II. LOCATION

The property is located approximately 2,000 feet east of Farrington Highway in Maili in the Waianae Coast area of Oahu. Maili is about 27 miles from downtown Honolulu and 22 miles from Honolulu International Airport (Figure 1). The towns of Nanakuli and Waianae are approximately 3.5 miles southeasterly and northwesterly respectively from the property site. Access to the property site is via Kaukama Road which intersects with Farrington Highway.

## III. PROPOSED ACTION

The proposed action (project) is the development of a housing subdivision of single family and multifamily housing units complete with necessary infrastructural amenities such as sewer, water, electrical, telephone and cable TV systems. A public park, open spaces, paved streets with curbs, gutters, storm drains and sidewalks would also be included in the proposed project. Figure 2 shows the preliminary proposed development concept for the Maili Kai property as well as existing surrounding uses.

## IV. EXISTING CONDITIONS

The project site is presently vacant and contains no structures. Abandoned vehicles and miscellaneous debris are scattered throughout the property. The property is irregularly shaped and slopes gently upward from the northern boundary at about +25 feet Mean Sea Level (MSL) to approximately +200 feet MSL and then rises sharply to the top of Puu O Hulu Ridge at a maximum elevation of about +850 feet MSL. The property is covered with scrub vegetation (Koa haole, Kiawe and various grasses) and serves as habitat for various introduced birds as well as rats, mice, mongoose, feral cats and feral dogs.

## V. DEVELOPMENT TIMETABLE AND APPROXIMATE COST

The implementation of the proposed project depends upon three regulatory approvals: The Waianae Development Plan Land Use Map amendment; Change of Zoning; and Subdivision approval. Approval for such regulatory requests is projected to take approximately two and one-half years, based upon maximum processing times and acceptance at each step. Actual construction of utility improvements could begin in early 1990, followed by phased residential construction. Total project development (build-out) would be completed by 1995, given timely receipt of the regulatory approvals noted.



Total development costs have been estimated to be approximately \$85,000,000, which includes utility construction, water connections and construction of the single family and multifamily housing units.

#### VI. NEED FOR THE PROPOSED PROJECT

The need for appropriate housing for all socioeconomic groups is a constant concern of both public and private agencies charged with assisting potential homeowners in finding suitable housing. This issue is especially critical to low- to moderate-income groups as housing costs generally tend to be above their borrowing capabilities. The proposed project would fill part of that need by providing affordable housing in the geographic area in which it appears to be needed most. Given the recent rapid sales of other affordable housing projects in the leeward Oahu area, it appears that the proposed project would be rapidly absorbed in the market.

#### VII. LAND USE CONTROLS

The entire site lies within the State Urban District. The Waianae Development Plan Land Use Map (Figure 3) presently designates the property as follows:

Residential	+ 46 Acres
Agriculture	+ 206 Acres
Preservation	+ 87 Acres
Public Facility	+ 2 Acres
	-----
	+ 415 Acres

On the Waianae Development Plan Public Facilities Map (Figure 4), an Elementary School designation encroaches on the property.

Present zoning of the property is as follows:

Residential (R-5)	+ 34 Acres
Agriculture (Ag-2)	+ 294 Acres
Preservation (P-1)	+ 87 Acres
	-----
	+ 415 Acres

## VIII. IMPACTS

### A. Demographic Impacts

1. Residential population: The residential population of the immediate area would increase by about 5,000 persons, based on an average household size of 3.9 persons.
2. Visitor population: The visitor population of the area would not be significantly affected by the proposed project.
3. Character or culture of the neighborhood: The character and culture of the neighborhood would be improved as a result of the proposed project.
4. Displacement: The proposed project would not cause the displacement of any existing residential, commercial or industrial activity.
5. Other social impacts: The proposed project is expected to result in positive social impacts by providing additional low-cost affordable housing opportunities in the area. A socioeconomic analysis of the proposed project will be performed.

### B. Economic Impacts

1. Economic growth: The proposed project is expected to provide positive economic growth in the area by increasing the market size for goods and services sold in the area and increasing land values in the immediate area.
2. Employment: The proposed project is expected to increase the availability of construction related jobs in the immediate area and provide secondary increases in the availability of service related job opportunities in those businesses serving the area.
3. Government revenues: State revenues through the General Excise Tax are expected to increase through increased sales of goods and services in the area. City and County revenues are also expected to increase through increased land values and the redesignation of the property from Agriculture to Residential.
4. Location vis-a-vis intended market: The location of the proposed project is in concert with the intended market given an apparent pent-up demand for affordable housing in the leeward Oahu area and given the expected increase in job opportunities in the West Beach and Ewa areas.

C. Housing Impacts

1. Increase supply: The proposed project will increase the supply of housing.
2. Affordable units: All of the proposed housing units in the project will be affordable units.

D. Public Service

1. Access and Transportation: Access to the proposed project will be via existing improved roadways or roadways that will be improved at the developer's expense. Existing public transportation to the area is not expected to be significantly affected by the proposed project. A traffic analysis will be prepared for the proposed project.
2. Water: The Board of Water Supply (BWS) is attempting to find new sources in Waianae to relieve pressure on the Pearl Harbor water basin. To date, the BWS has confirmed that water is available in the Waianae and Makaha Valleys, however, these sources will not be "on-line" until at least 1990. The proposed project will require the development of private resources and storage facilities. It is estimated that the proposed project will require approximately .51 million gallons per day, which appear to be developable within the project area. BWS water mains presently serve the project site but may require upgrading to provide the required level of flow for fire protection purposes.
3. Wastewater: Wastewater from the proposed project would be fed into the existing City and County collection system that serves the project site. On-going improvements to the Waianae Sewage Treatment Plant will accommodate the increased flow expected from the proposed project.
4. Drainage: Existing City and County drainage structures serving the property and those that would be constructed at the developer's expense will serve the proposed project. Additional drainage structure improvements by the City and County would not be required.
5. Solid Waste: Solid waste generated by the proposed project would require collection by City and County refuse workers. It is expected that the proposed project would generate approximately 12 tons of refuse per day. Disposal would presumably be at the new H-POWER facility under construction in Campbell Industrial Park.

6. Schools: Based on information provided by the State Department of Education, existing area schools have sufficient capacity to handle any increases that would be caused by the proposed project. It is estimated that the proposed project would generate 300 to 450 elementary students; 100 to 140 intermediate school students; and 160 to 220 high school students.
7. Parks: It is expected that existing recreational facilities, Ulehawa and Maili Beach Parks, as well as Maili Playground and Nanakaipono Playground, can accommodate the proposed project. Additionally, the project includes an 8-acre park for public use, thus expanding the area's recreational capacity.
8. Police: It is expected that the existing compliment of police forces, stationed at the Waianae Substation would be adequate to serve the proposed project.
9. Fire: It is expected that the existing compliment of fire protection forces, stationed at the Waianae and Nanakuli Fire Stations, would be adequate to serve the proposed project.
10. Utilities:
  - a. Electric: Existing Hawaiian Electric Company transmission and distribution lines serving the area are adequate to accommodate the proposed project. The project may eventually require a new substation that would be constructed at the developer's expense. Project electrical service will be via underground lines.
  - b. Gas: Gas service to the proposed project will not be required.
  - c. Telephone: Existing Hawaiian Telephone Company lines are adequate to serve the proposed project. New underground lines would be run into the project site.
  - d. Other: Cable TV service will be provided to the proposed project.

E. Environmental Impacts

1. Noise: Noise levels generated by the proposed project are expected to be typical of rural area housing subdivisions and in the 45 to 60 decibel range.
2. Air Quality: Air quality of the project area would be affected by increased vehicular traffic in the project

area. It is expected, based on experiences at similar projects, that all Federal and State Air Quality standards in the area would be maintained. An air quality impact analysis will be conducted for the proposed project.

3. Compatibility with surrounding environment (size, design, materials and siting of structures): The proposed project would be designed and sized to be compatible with and improve the surrounding environment. Structures would be one- and two-story units that would not intrude on mauka views from or toward shoreline areas. Mountain and ridgeline vistas from within the project would be maintained. Increased vegetation within the project would improve and provide a more varied wildlife habitat. Construction materials would be compatible with the surrounding environment and would be selected to provide long-term service.
4. Historic and archaeological resources: Based on discussions with State Department of Land and Natural Resources, Historic Preservation Office personnel, there are no known historic or archaeological resources on the property. Prior to construction an archaeological reconnaissance survey will be conducted by a qualified archaeologist. Should historic or archaeological resources be found on the property, appropriate preservation measures will be taken.
5. Natural Features:
  - a. Water resources: Water resources in the project area would be utilized to provide potable water to the project. The exact nature and quantity of these resources is to be determined.
  - b. Flood plain management: The present flood plain designation is Zone D, which is defined as "Areas of undetermined, but possible flood hazards". Existing drainage structures and those to be installed as part of the proposed project are expected to minimize potential flood hazards.
  - c. Wetlands protection: There are no wetlands in the project area.
  - d. Coastal Zone Management: The proposed project is outside the Coastal Zone Management Area.
  - e. Unique features: The southerly boundary of the property contains slopes greater than 20 percent which will be retained in Preservation. Puu O Hulu ridge-

line will be unaffected by the proposed project. The soils of the project area have been classified as poor(ly) to very poor(ly) suitable for agricultural purposes. Mountain vistas will be maintained.

- f. Vegetation and animal life (flora and fauna): The vegetation of the project site is typical of dry leeward Oahu areas and is dominated by stands of Kiawe, Koa haole and various introduced grasses. There are no known threatened or endangered plants in the project area. Residential landscaping is expected to improve the quality and quantity of vegetation in the area. The wildlife of the project area is dominated by native and introduced bird species, mongoose, rats and mice. Feral dogs and cats presumably roam the project site also. There are no known threatened or endangered species of wildlife in the project area. Increased landscaping is expected to provide additional and improved wildlife habitat, especially for the birds that frequent the area. A flora and fauna survey of the property will be conducted for the proposed project.
- g. Agricultural lands: The majority of the site is zoned Agriculture (Ag-2), a portion of which will be lost. The area is suitable for dairy, swine and poultry farming, but the soils of the area are unsuitable for crop farming. The lack of water and long-term leases at reasonable costs constrain increased agricultural development of the area.
- h. Open space: The proposed project site is presently vacant and, as such, totally open space. The project will remove a major portion of this open space but will retain adequate open and park space to allow mountain and mauka views to be maintained. Present Preservation lands will also be retained.

6. Hazards:

- a. Nuisances and site safety: There are no nuisances of elements that would adversely affect the safety of the site in the immediate vicinity of the site. A dormant quarrying operation is adjacent to the northern boundary of the project, which could adversely affect the project area during times of calm or unusual wind patterns. Nearby poultry and swine farming operations could also adversely affect the air quality of the area but do not appear to be significant causes of odors in the project area.
- b. Thermal explosive: The US Navy Lualualei Naval Magazine is located south and east of the project

site. The proposed project is outside the nearest Explosive Safety Quantity Distance (ESQD), thereby effectively removing any hazards associated with the Naval Magazine.

- c. Airport clear zone: The proposed project is outside all airport clear zones.

#### IX. AGENCIES TO BE CONSULTED DURING PREPARATION OF EIS

The following agencies and organizations will be consulted during the preparation of the EIS.

##### Federal Agencies

Department of Agriculture, Soil Conservation Service  
Department of Army, Corps of Engineers Division  
Department of Interior, Fish and Wildlife Service  
(F.L.P.) Commander, Maintenance and Logistics Command  
Mr. Peter Herbert, Director, Office of Realestate Sales G.S.A.

##### State Agencies

Department of Accounting and General Services  
Department of Agriculture  
Department of Defense  
Department of Education  
Department of Health  
Department of Land and Natural Resources  
Department of Business and Economic Development  
Department of Transportation  
Office of Environmental Quality Control  
University of Hawaii -  
    Environmental Center  
    Water Resources Research Center

##### County Agencies

Department of Finance Real Property Assessment Division  
Department of General Planning  
Department of Housing and Community Development  
Department of Land Utilization  
Department of Parks and Recreation  
Department of Public Works  
Department of Transportation Services  
Department of Building  
Fire Department  
Police Department  
Board of Water Supply

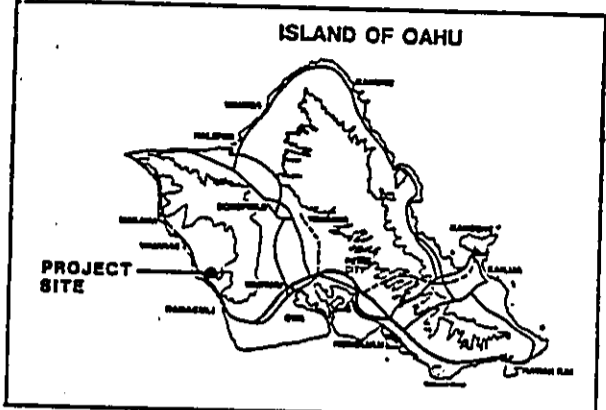
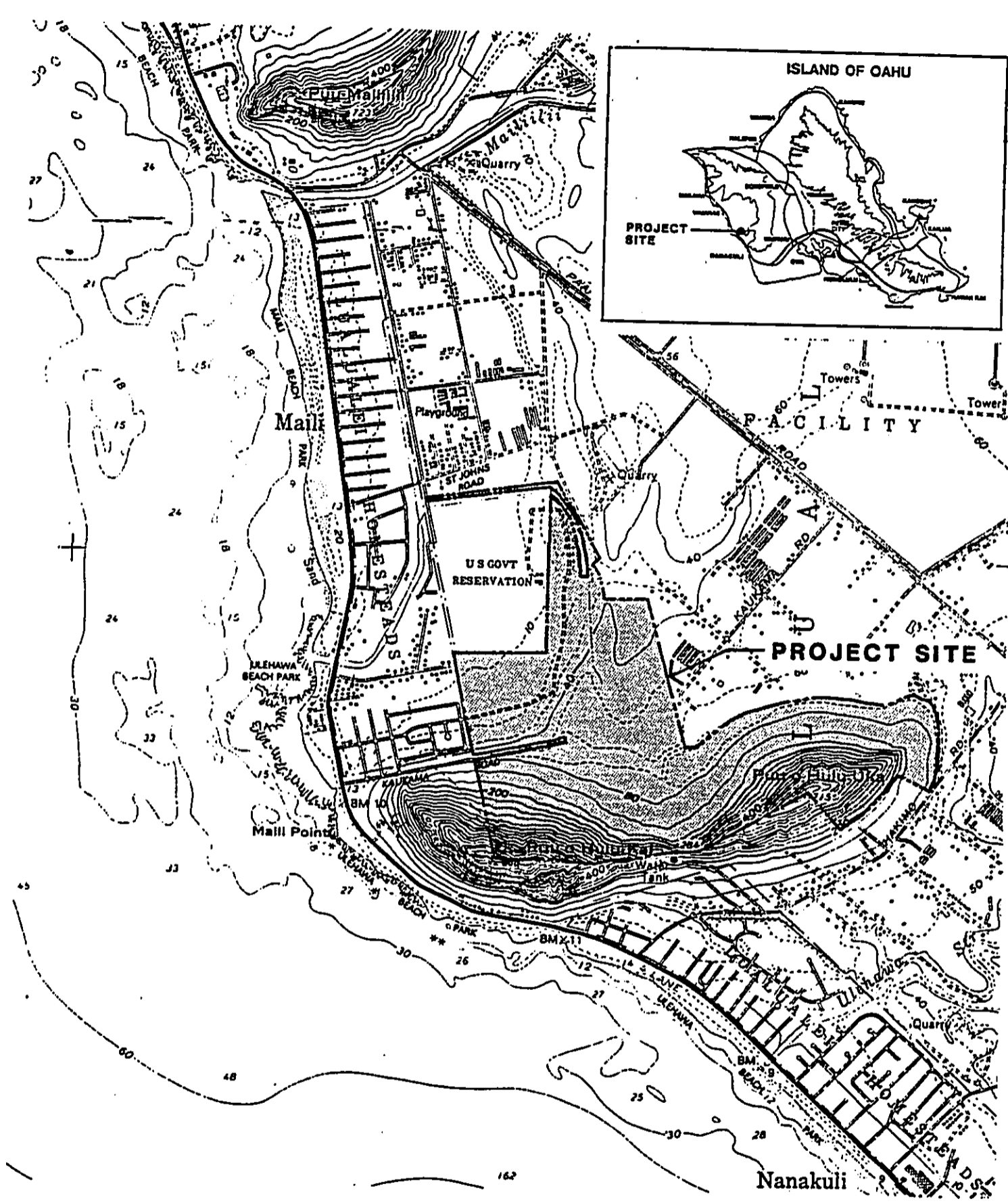
Public Utilities

Hawaiian Electric Company, Inc.  
Hawaiian Telephone Company

Private and Community Organizations

Waianae Coast Neighborhood Board No. 24  
Waianae District Neighborhood Area Association  
Maili Community Association  
Nanakuli Advisory Council  
Nanakuli Hawaiian Homesteaders Association, Inc.  
Office of Hawaiian Affairs  
Waianae Farm Bureau






**LOCATION MAP**  
 SOURCE: U.S.G.S. QUAD, 1888

**FIGURE 1**  
**MAILI KAI PROPERTY**

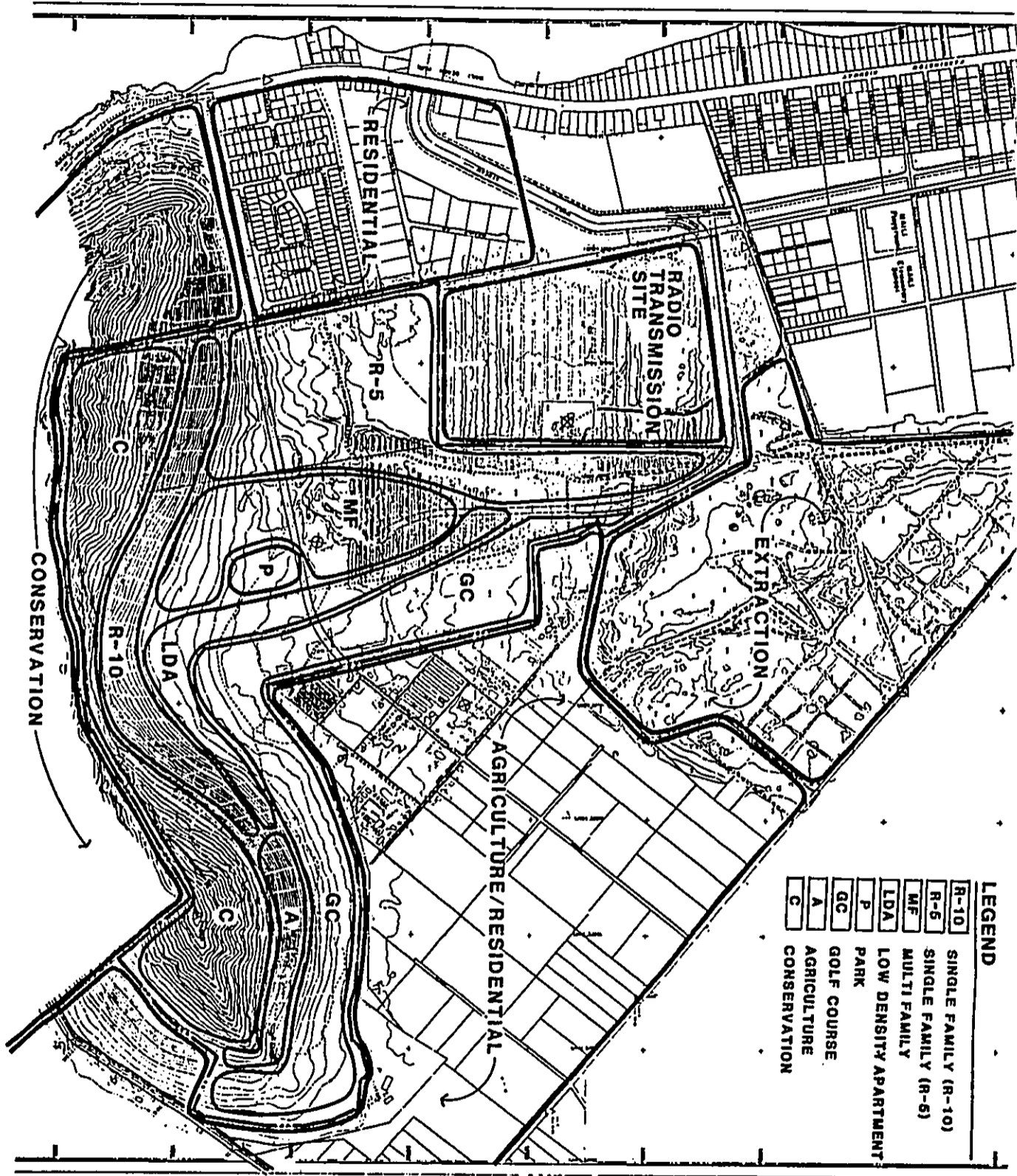
XI-15

**NORTH** 

**LINEAL SCALE (FEET)**  
 2000 1000 0 2000

**MAILI, OAHU**

**FIGURE HAWAII**

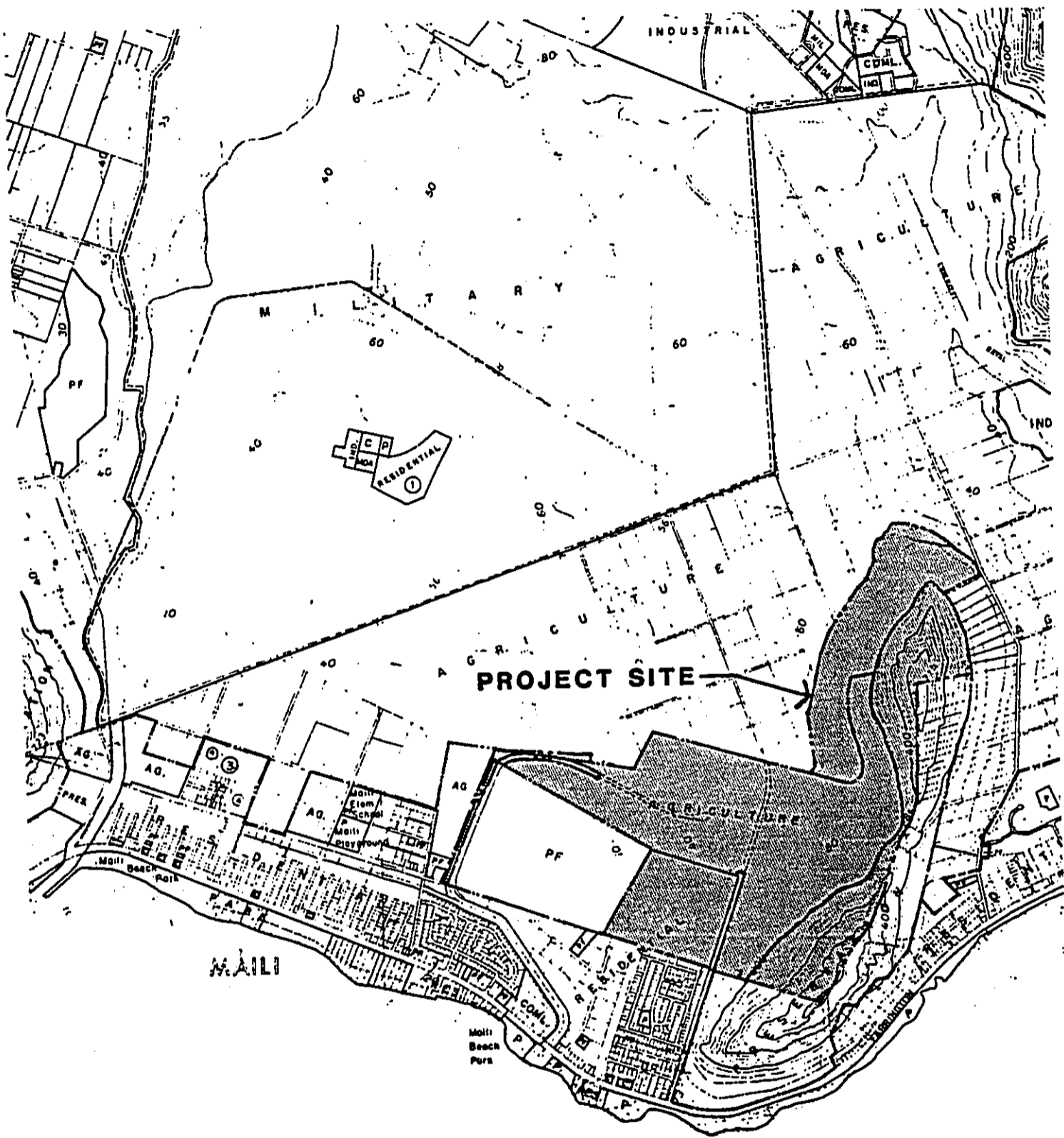


DEVELOPMENT CONCEPT

XI-16

FIGURE 2  
MAILI KAI PROPERTY





**WAIANAE DEVELOPMENT  
PLAN LAND USE**

SOURCE: DEPARTMENT OF GENERAL PLANNING  
CITY & COUNTY OF HONOLULU

**FIGURE 3  
MAILI KAI PROPERTY**

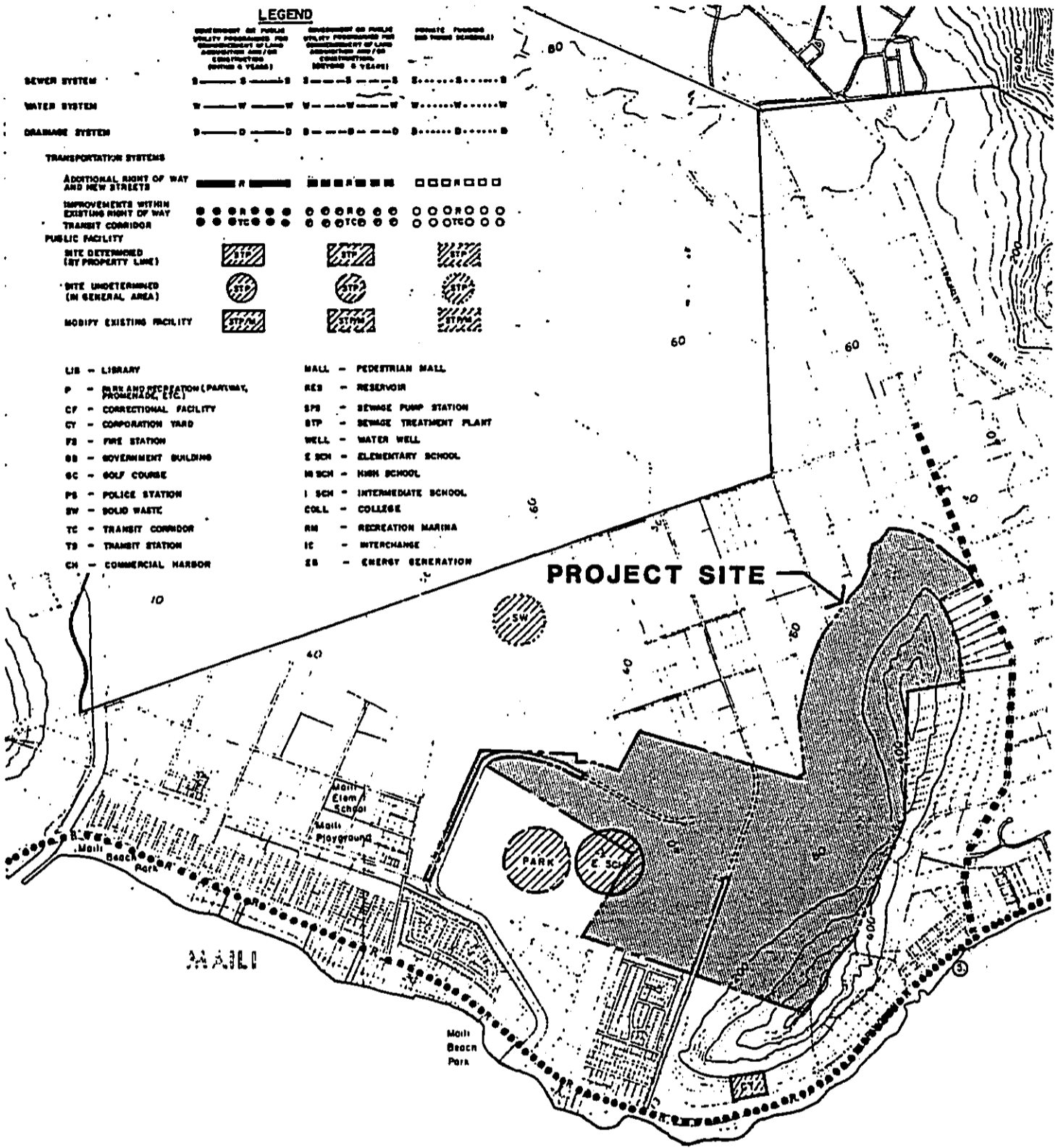
MAILI, OAHU



LINEAL SCALE (FEET)  
2000 1000 0 2000



XI-17



**WAIANAE DEVELOPMENT  
PLAN PUBLIC FACILITIES**

SOURCE: DEPARTMENT OF GENERAL PLANNING  
CITY & COUNTY OF HONOLULU

XI-18

**FIGURE 4  
MAILI KAI PROPERTY**



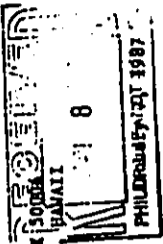
**PBR**  
HAWAII

LANDSCAPE ARCHITECTURE      PLANNING      ENVIRONMENTAL STUDIES

UNITED STATES  
DEPARTMENT OF  
AGRICULTURE

SOIL  
CONSERVATION  
SERVICE

P. O. BOX 15088A  
HONOLULU, HAWAII  
96830



January 11, 1988

Mr. Richard M. Duncan  
State Conservationist  
Soil Conservation Service  
P. O. Box 50004  
Honolulu, Hawaii 96850

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANA'E, OAHU, HAWAII  
THK: 8-7-10:2, 4

Dear Mr. Duncan:

Thank you for your letter of January 7, 1988 regarding the EIS Preparation Notice for the proposed residential project.

Your response is appreciated and we shall include you in the review process of the Draft EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

Mr. Matthew E. Grady, Project Manager  
PBR Hawaii  
Financial Plaza of the Pacific  
130 Merchant Street, Suite 1111  
Honolulu, HI 96813

Dear Mr. Grady:

Subject: Environmental Impact Statement Preparation Notice,  
(EISPN), Maili, Oahu, Hawaii - THK: 8-7-10:02, 04  
Maili Kai Housing Project

We have no further comments to offer concerning your letter of December 17, 1987 regarding the above subject matter but would like the opportunity to review the draft EIS if possible.

Sincerely,

*Richard H. Duncan*  
RICHARD H. DUNCAN  
State Conservationist

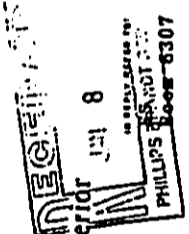
cc: Donald A. Clegg, Chief Planning Officer, Dept. of General  
Planning, CAC, 630 South King Street, Honolulu, HI 96813  
Harvin T. Miura, Interim Director, Office of Environmental  
Quality Control, 465 South King Street, Room 104,  
Honolulu, HI 96813



United States Department of the Interior

FISH AND WILDLIFE SERVICE

100 ALA MOANA BOULEVARD  
P.O. BOX 50147  
HONOLULU, HAWAII 96810



PBR Hawaii  
Matthew K. Grady, Project Manager  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

8 JAN 1988

Re: Environmental Impact Statement Preparation Notice, Mailli,  
Oahu

Dear Mr. Grady:

We have reviewed the referenced document and offer the following comments for your consideration.

The purpose of the Environmental Impact Statement (EIS) is to support an amendment to the Waianae Development Plan to redesignate approximately 180 acres of land near Mailli from Agriculture to Residential and Low Density Apartment.

There appear to be several wetlands in the vicinity of the proposed housing project; however, these wetlands may lie outside of the project boundary (Enclosure 1). The Draft EIS should clarify the location of the project boundary in relation to these wetlands. The Draft EIS should determine the habitat value of these wetlands for endangered Hawaiian waterbirds and migratory birds and discuss the impact of the proposed housing project on these wildlife resources and wetland habitats. If the proposed project involves any dredging or filling activities in the wetland, we recommend that you contact the U.S. Army Corps of Engineers for permit requirements.

We appreciate this opportunity to comment.

Sincerely,

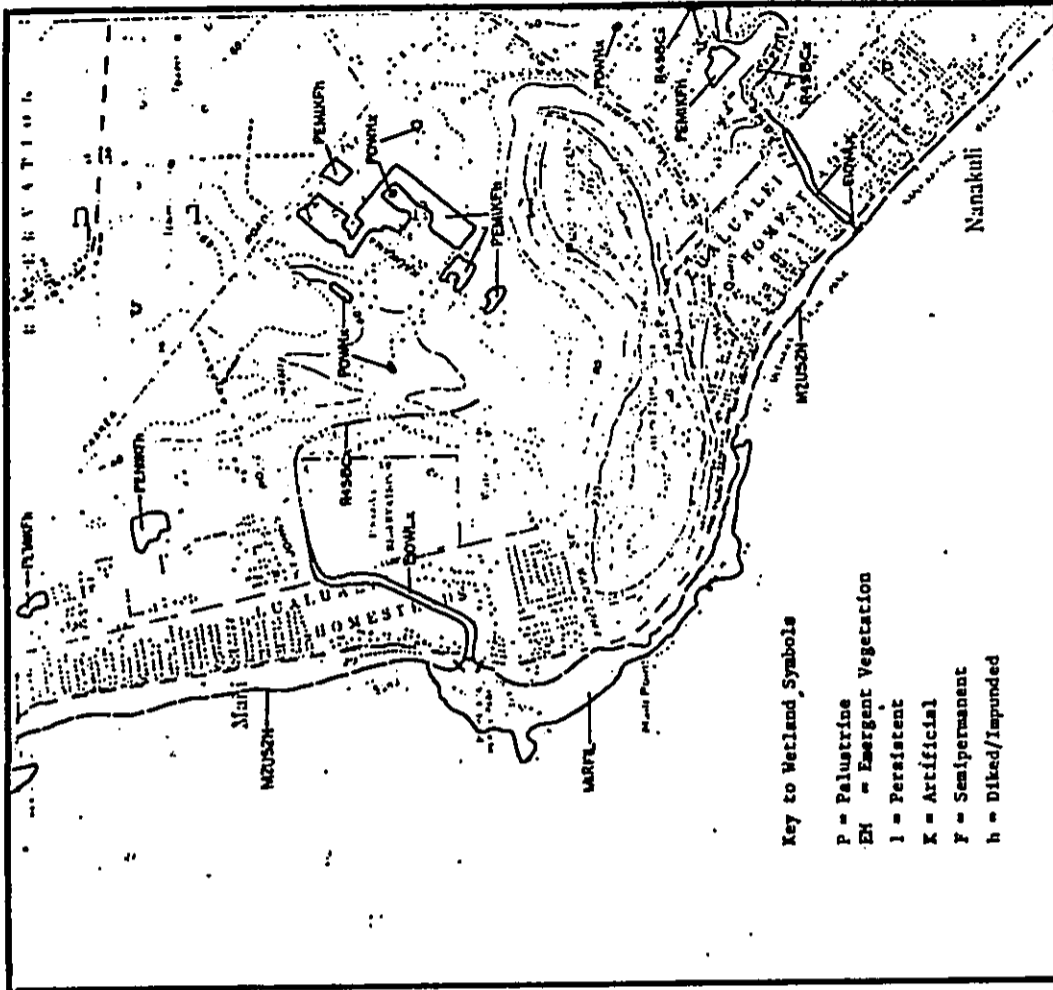
Ernest Kosaka, Field Supervisor  
Environmental Services  
Pacific Islands Office

Enclosure

cc: DLU  
CE



Save Energy and You Serve America!



Key to Wetland Symbols

- P = Palustrine
- EM = Emergent Vegetation
- I = Persistent
- K = Artificial
- F = Semipermanent
- h = Diked/Impounded

Source of map: National Wetlands Inventory, U.S. Fish and Wildlife Service.

Enclosure

**PBR**  
HAWAII

LANDSCAPE ARCHITECTURE    PLANNING    ENVIRONMENTAL STUDIES

January 11, 1988

Mr. Ernest Kosaka  
Field Supervisor, Environmental Studies  
Fish and Wildlife Service  
P. O. Box 80167  
Honolulu, Hawaii 96880

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAI, OAHU, HAWAII  
TMS: 8-7-10:2, 4

Dear Mr. Kosaka:

Thank you for your letter regarding the EIS Preparation Notice for the proposed residential project.

The proposed project site does not contain any wetlands as identified on the National Wetlands Inventory. Based on the avifauna and wildlife survey conducted for the proposed project, it appears that the project would not impact the habitat value of nearby wetlands and/or the waterbirds frequenting those wetlands. The results of the avifauna and wildlife survey will be included in the Draft EIS.

Your comments are appreciated and will be incorporated into the Draft EIS.

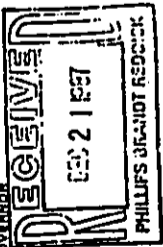
Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

FINANCIAL PLAZA OF THE PACIFIC    190 MERCHANT STREET, SUITE 1111    HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-3631    TELECOPIER: (808) 523-1402  
HONOLULU IRVINE DENVER

JOHN WAHNEE  
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

December 16, 1987

Mr. William Frank Brandt  
PBR Hawaii  
130 Merchant Street  
Suite 1111  
Honolulu, Hawaii 96813

Subject: Environmental Impact Statement Preparation Notice  
(EISP) for Maili Kai Property, Maili, Waianae, Oahu  
TMK: 8-7-10: 2 and 14  
Area: 415 acres

Dear Mr. Brandt:

The Department of Agriculture would like to be a consulted party to the subject matter. Please send materials to:

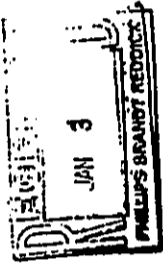
Ms. Suzanne D. Peterson, Chairperson  
Board of Agriculture  
P. O. Box 22159  
Honolulu, Hawaii 96822

Attention: Mr. Paul J. Schwind

Thank you in advance for your prompt response.

*Paul J. Schwind*  
PAUL J. SCHWIND  
Planning Program Administrator

JOHN WAHNEE  
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

December 30, 1987

Mr. Matthew E. Grady  
PBR Hawaii  
130 Merchant Street  
Suite 1111  
Honolulu, Hawaii 96813

Subject: Environmental Impact Statement Impact Notice (EISP) for Proposed Amendment to the Waianae Development Plan Maili Residential Project Kaiser Cement Corporation  
TMK: 8-7-10: 2, 4 Waianae, Oahu  
Area: 415 acres

Dear Mr. Grady:

The Department of Agriculture has reviewed the subject document and offers the following comments.

We understand that the proposed project requires an amendment to the Waianae Development Plan for about 180 acres of the total project area of 415 acres. There are also approximately 75 acres of State Agricultural District lands along the eastern boundary of the project site.

We would like to see the following issues addressed in the Draft EIS:

- a complete soils description with references to the Agricultural Lands of Importance to the State of Hawaii (ALISH) system, Land Study Bureau Overall Productivity Rating system and the Soil Conservation Service Soil Survey which indicate the suitability for agricultural use of the site;
- the impact of the proposal on existing agricultural uses to the east of the project site, which includes swine and poultry operations (The Hawaii Right-to-Farm Act, Chapter 165, HRS, limits the circumstances under which pre-existing farming activities may be deemed a nuisance);

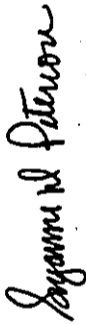


Mr. Matthew E. Grady  
December 30, 1987  
Page -2-

- conformity to the State Agriculture Functional Plan and its objectives and policies; and
- the relationship to the Hawaii State Plan priority guidelines.

Thank you for the opportunity to comment. We will provide further comment upon our receipt and review of the Draft Environmental Impact Statement.

Sincerely,



SUZANNE D. PETERSON  
Chairperson, Board of Agriculture

cc: OEQC  
DGP  
IJC  
OSP

**PBR**  
HAWAII

LANDSCAPE ARCHITECTURE      PLANNING      ENVIRONMENTAL STUDIES

January 6, 1988

Ms. Suzanne D. Peterson  
Chairperson, Board of Agriculture  
Department of Agriculture  
State of Hawaii  
P. O. Box 22159  
Honolulu, Hawaii 96822-0159

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
TNK: 8-7-10:2, 4

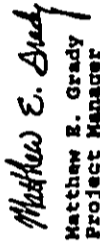
Dear Ms. Peterson:

Thank you for your letter of December 30, 1987 regarding the EIS Preparation Notice for the proposed residential project.

Your comments are appreciated and will be incorporated into the Draft EIS.

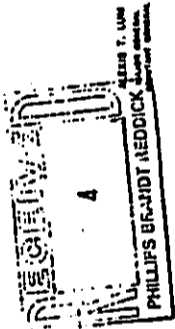
Sincerely,

PBR HAWAII



Matthew E. Grady  
Project Manager

FINANCIAL PLAZA OF THE PACIFIC    150 MERCHANT STREET, SUITE 1111    HONOLULU, HAWAII 96813  
TELEPHONE: (808) 531-9531    TELECOPIER: (808) 535-1402  
HONOLULU IRVINE DENVER



STATE OF HAWAII  
 DEPARTMENT OF DEFENSE  
 OFFICE OF THE ADJUTANT GENERAL  
 200 BUNNING ROAD, HONOLULU, HAWAII 96819-0000

DEC 31 1987

Engineering Office

Mr. Matthew E. Grady, Project Manager  
 FBR Hawaii  
 130 Merchant Street, Suite 1111  
 Honolulu, Hawaii 96813

Dear Mr. Grady:

Environmental Impact Statement Preparation  
 Notice (EISFN) Mail, Oahu, Hawaii  
 TRMS: 8-7-10:02, 04

We have received your letter of December 17, 1987 regarding the above subject project and have no comments to offer.

Yours truly,

Wayne R. Tosoyasu  
 Lieutenant Colonel, GS, Hawaii  
 Army National Guard  
 Facilities Management Officer

STATE OF HAWAII  
GOVERNMENT



STATE OF HAWAII  
DEPARTMENT OF EDUCATION  
P. O. BOX 209  
HONOLULU, HAWAII 96810

CHARLES T. TOGUCHI  
SUPERINTENDENT



Mr. Matthew E. Grady -2- January 5, 1988

It is critical that we be kept informed of the developer's construction timetable.

Should you have any questions, please call Wallace Okamura at 737-4743.

Sincerely,  
*Charles T. Toguchi*  
Charles T. Toguchi  
Superintendent

Mr. Matthew E. Grady  
Project Manager  
PBR Hawaii  
Financial Plaza of the Pacific  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

CTT:ey  
cc Leeward District Office  
OBS

January 5, 1988

Dear Mr. Grady:

Subject: EIS Preparation Notice  
(EISPH) Maui, Oahu, Hawaii THIS: 8-7-10:02, 04

Our review of the Kaiser Cement Corporation's development indicates that it may have the following enrollment impact on our area schools:

School	Grades	Projected Students
Maui Elementary	K-6	300 - 450
Waianae Intermediate	7-8	80 - 120
Waianae High	9-12	150 - 200

The projections are based on the planned 1,435 units which include single family, townhouse, and apartment units.

The above schools are operating at capacity. The Department of Education cannot assure the availability of classroom space at the impacted schools and will require legislative appropriations on a timely basis or assistance of the developer to accommodate the development.

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

January 26, 1988

Mr. Charles T. Toguchi  
Superintendent  
Department of Education  
State of Hawaii  
P.O. Box 2360  
Honolulu, HI 96813

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
THK: 8-7-10:2, 4

Dear Mr. Toguchi:

Thank you for your letter of January 5, 1988 regarding the EIS Preparation Notice for the proposed residential housing project.

We shall keep you informed of the developer's construction timetable and include you in the review process.

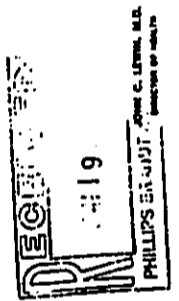
Your comments are appreciated and will be incorporated into the Draft EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

FINANCIAL PLAZA OF THE PACIFIC    150 MERCHANT STREET, SUITE 1111    HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-5631    TELECOPIER: (808) 523-1402  
HONOLULU IRVING BANK



STATE OF HAWAII  
DEPARTMENT OF HEALTH

P. O. BOX 327  
HONOLULU, HAWAII 96809  
January 13, 1988

Mr. Matthew E. Grady  
January 13, 1988  
Page 2

Mr. Matthew E. Grady  
Project Manager  
PBR Hawaii  
130 Merchant St., Suite 1111  
Honolulu, Hawaii 96813

Dear Mr. Grady:

Subject: Environmental Impact Statement Preparation Notice (EISP/N) for Development of Residential Uses (Mailli Kai Property Housing) in Mailli, Waianae

Thank you for allowing us to review and comment on the subject EISP/N. We provide the following comments:

Vector Control

The State Department of Health (DOH) has strong reservations for a development in this area. There are approximately five poultry farms and eight piggeries in the immediate vicinity of the proposed development. This will present a number of problems to future residents from the flies, mosquitoes, rodents, and odor of these farms.

The DOH's Vector Control Branch can only control these vectors at a "tolerable" level and not eradicate them entirely, so there will always be a constant number of these vectors interrupting the lives of residents and causing them physical and mental ailments and anguish.

Mailli Elementary School (with fly, mosquito, odor and dust problems), Makakilo (with mosquito and mice problems), and Milliani (with pineapple scaring bug problems) are prime examples of developments in agricultural areas which experience practically unsolvable problems. There will be numerous occasions when our control efforts will not satisfactorily control these vectors and residents will have to compromise their comfort for choosing to live there.

Noise

Noise problems are anticipated due to the integration of land uses within the proposed development. In preparation of the environmental impact statement, the following concerns and regulatory requirements must be addressed, including mitigative measures to control such potential noise impacts.

1. The proposed development concept includes portions of the property designated for recreational uses (golf course and park). Noise from activities associated with such facilities, including recreational and maintenance types, can have adverse effects, in terms of annoyances, on surrounding residential areas.
2. Noise from activities associated with the area designated for agricultural use can also result in negative impacts on adjacent residences.
3. Through facility design, noise from equipment such as air conditioning/ventilation units, generators, compressors, pumps and exhaust fans must be attenuated to meet the allowable noise levels of Administrative Rules Chapter 43, Community Noise Control for Oahu.
4. Should the proposed development utilize residential lots with structures in close proximity to each other, these homes should be designed so as to maximize the containment of noise.
5. Activities associated with the construction phase 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 from the construction activities 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.
6. 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, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.

*Bruce S. Anderson*  
BRUCE S. ANDERSON, Ph.D.

**PBR**  
HAWAII

LANDSCAPE ARCHITECTURE    PLANNING    ENVIRONMENTAL STUDIES

January 26, 1988

Mr. Bruce S. Anderson, Ph.D.  
Hawaii State Dept. of Health  
P.O. Box 3378  
Honolulu, HI 96801

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
MAJANAE, OAHU, HAWAII  
TMK: 8-7-10:2, 4

Dear Mr. Anderson:

Thank you for your letter of January 9, 1988 regarding the EIS Preparation Notice for the proposed residential housing project.

Perspective residents will be notified of such vector control issues prior to habitation within the project area. In addition, the draft EIS will address noise impact and mitigation measures conforming with provisions of Title 11, Administrative Rules Chapters 42 and 43.

Your comments are appreciated and will be incorporated into the Draft EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

FINANCIAL PLAZA OF THE PACIFIC    150 MERCHANT STREET, SUITE 1111    HONOLULU, HAWAII 96813  
TELEPHONE: (808) 551-5651    TELELOOPER: (808) 551-1462  
HONOLULU IRVINE DRIVER



**DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT**

150 MERCHANT STREET, SUITE 1111, HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-5631 TELECOPIER: (808) 525-1492

JOHN WAHLEE  
DIRECTOR  
ROGERA UYENAGA  
DEPUTY DIRECTOR  
MURRAY E. TOWELL  
DEPUTY DIRECTOR  
BARBARA KIM STANTON  
DEPUTY DIRECTOR

**PBR**  
HAWAII

LANDSCAPE ARCHITECTURE      PLANNING      ENVIRONMENTAL STUDIES

January 11, 1988

Mr. Abe E. Mitsuda  
Land Use Division  
Department of Business and  
Economic Development  
P. O. Box 2359  
Honolulu, Hawaii 96804

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
TMK: 8-7-10:2, 4

Dear Mr. Mitsuda:

Thank you for your letter of January 6, 1988 regarding the EIS Preparation Notice for the proposed residential project.

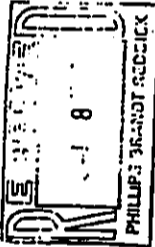
All proposed residential uses are to be within the State Urban District and a boundary interpretation shall be conducted to verify the precise limits.

Your comments are appreciated and will be incorporated into the Draft EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager



January 6, 1988

Mr. Matthew E. Grady, Project Manager  
PBR Hawaii  
Financial Plaza of the Pacific  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

Dear Mr. Grady:

SUBJECT: Environmental Impact Statement  
Preparation Notice (EISP)  
Maili, Oahu, Hawaii  
TMK: 8-7-10: 2, 4

Thank you for your letter dated December 17, 1987 transmitting the EISP for our review. It is our understanding from the EISP that the subject 415-acre site is within the State Urban District. If this is the case, a State land use boundary amendment would not be required. However, we suggest that a boundary interpretation be conducted by the Land Use Commission staff for the residential and other uses proposed on the slopes of Puu o Huhu Kai and Puu o Huhu Uka.

The Coastal Zone Management Program of the Department of Business and Economic Development may have some input regarding the proposed project. Please contact Mr. Douglas Tom at 548-3026.

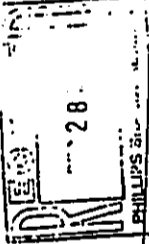
Sincerely,  
*Abe E. Mitsuda*  
Abe E. Mitsuda  
Land Use Division

FINANCIAL PLAZA OF THE PACIFIC      130 MERCHANT STREET, SUITE 1111      HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-5631 TELECOPIER: (808) 525-1492  
HONOLULU IRVINE DRIVE

STATE OF HAWAII  
DEPARTMENT OF BUSINESS  
AND ECONOMIC DEVELOPMENT

LAND USE COMMISSION

Room 104, One Federal Bldg., 335 Merchant Street  
Honolulu, Hawaii 96813 Telephone: 548-6811



JOHN WAIHEE  
Governor  
TEDDIEO PHIL TACHIAN  
Chairman  
FREDERICK P. WITTENBERG  
Vice Chairman  
PHILLIPS  
Commissioner

Commission members:  
Alford B.F. Owe  
Lawrence P. Owe  
Ernest L. Cushman  
Sharon A. Simpson  
The Honorable  
James H. King  
Honorable L. H. Wu  
Eldredge Wata  
Executive Officer

December 23, 1987

Mr. Matthew E. Grady, Project Manager  
PBR Hawaii  
Financial Plaza of the Pacific  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

Dear Mr. Grady:

Subject: Environmental Impact Statement Preparation Notice  
for the Maili Kai Housing Project, Maili, Oahu,  
Hawaii Tax Map Key No.: 8-7-10: 2, 4

We have no comments to offer except that the subject property is primarily designated within the State Land Use Urban District and the balance, which appears to be proposed for golf course use, designated within the State Land Use Agricultural District.

The Draft EIS should address whether portions of the proposed golf course designated within the Agricultural District involves lands rated Overall Master Productivity "A" or "B" by the Land Study Bureau.

Thank you for this opportunity to comment.

Sincerely,

*Raymond Young*  
RAYMOND YOUNG  
Staff Planner

RY:to

CC: Donald Clegg

PBR  
HAWAII

LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

January 6, 1988

Mr. Raymond Young  
Land Use Commission  
State of Hawaii  
Old Federal Building, Room #104  
335 Merchant Street  
Honolulu, Hawaii 96813

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) -  
MAILI KAI PROPERTY HOUSING PROJECT  
WALAMAE, OAHU, HAWAII  
TRK: 8-7-10:2, 4

Dear Mr. Young:

Thank you for your letter of December 23, 1987 regarding the EIS Preparation Notice for the proposed residential project.

Your comments are appreciated and will be incorporated into the Draft EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-5631 TELECOPIER: (808) 525-1402  
HONOLULU IRVING DENVER



STATE OF HAWAII  
DEPARTMENT OF BUSINESS  
AND ECONOMIC DEVELOPMENT



LAND USE COMMISSION

Room 104, One Palace of the Aiea, 335 North Street, Aiea, Hawaii 96813 Telephone 548-8111

SOE/11/87

DEC 16 1987

JOHN WAIHEE  
Governor  
TOPILO PHIL TACIAR  
Chairman  
FREDERICK P. WHITTENORZ  
Vice Chairman

Commission Members:  
Richard S. F. Doe  
Lawrence P. Chu  
Robert L. Lusk  
Shirley A. Wilson  
Robert S. J. J. J.  
Honolulu L.A. 119  
SHEILA UEDA  
Executive Officer

December 14, 1987

Mr. William Frank Brandt  
PBR Hawaii  
130 Merchant Street  
Suite 1111  
Honolulu, Hawaii 96813

Dear Mr. Brandt:

Subject: EISP for Maili Kai Property, Maili,  
Maianae, Oahu

This is to request to be a consulted party for the above  
subject matter.

XI-31

Sincerely,

*Esther Ueda*

ESTHER UEDA  
Executive Officer

EU:to

cc: OEQC  
DGP

PBR  
HAWAII

LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

January 8, 1988

Ms. Esther Ueda, Executive Officer  
Land Use Commission  
State of Hawaii  
Old Federal Building, Room 9104  
3338 Merchant Street  
Honolulu, Hawaii 96813

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
MAIANAE, OAHU, HAWAII  
TMK: 8-7-1012, 4

Dear Ms. Ueda:

Thank you for your letter of December 14, 1987 regarding the EIS  
Preparation Notice for the proposed residential project.

We not only will include you as a consulted party but have incor-  
porated comments from Mr. Raymond Young of your office into the  
draft EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

FINANCIAL PLAZA OF THE PACIFIC 150 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813  
TELEPHONE: (808) 531-3431 TELECOPIER: (808) 533-1402  
HONOLULU IRVINE BURVER



University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 946-7361

January 15, 1988
PH:0059

Mr. William Frank Brandt
PBR Hawaii
130 Merchant Street, Suite 1111
Honolulu, Hawaii 96813

Dear Mr. Brandt:

Preparation Notice
Environmental Impact Statement
Maui Kai Housing Project
Maui, Oahu

This document proposes the development of single and multiple family housing units and the necessary infrastructure such as sewer, water, electrical, telephone and cable television systems on land situated approximately 2,000 feet east of Farrington Highway in Maui. Our review was prepared with the assistance of P. Bion Griffin, Anthropology; Yu-Si Fok, Henry Gee and Edwin Murabayashi, Water Resources Research Center; and Steven Armann, Environmental Center.

Land Use

The development concept as shown in Figure 2 should be reviewed, and the rationale for certain land use zonings fully discussed in the Environmental Impact Statement (EIS). It is unclear why the steep land on the far side of Puu o Huhu Uka is zoned for agricultural use, when in the agricultural section it states that the land is unsuitable for such use. Furthermore, the steepness of the slopes and the rocky terrain will inhibit mechanized agriculture. It appears that a Conservation/Preservation designation for this specific parcel may be more appropriate.

Similarly, the parcel zoned R-10 needs discussion. The steep slopes and expanding soils are conducive to soil slippage. Recent experience with unstable slopes in Manoa and elsewhere calls attention to the need for careful siting of structures. The potential instability in parcel R-10 may preclude its use for structures. It would seem more appropriate to limit use of this parcel to non-structural development. These issues need to be addressed in the EIS.

A Unit of Water Resources Research Center

AN EQUAL OPPORTUNITY EMPLOYER

Mr. William Frank Brandt

-2-

January 15, 1988

Archaeology

On page 7, Section 4, it states "[p]rior to construction an archaeological reconnaissance survey will be conducted by a qualified archaeologist". In accordance with the EIS content requirements (EIS Rules 11-200-17) the historic perspective must be addressed in the EIS. Therefore, an archaeological survey must be conducted before the preparation of the EIS and a complete archaeological report must be presented in the Draft EIS. (We call your attention to the recent Declaratory Ruling No. 87-1 of the Environmental Council, (OEQC) Bulletin, July 8, 1987, where in the use of preliminary or incomplete reports at the Draft EIS review stage was declared unacceptable.) The Draft EIS would not be complete without a comprehensive review of the archaeological impacts. Furthermore, it is our belief that this area has a high potential for significant archaeological remains.

Thank you for the opportunity to comment on this EIS Preparation Notice. We hope our comments will be helpful in preparing the Draft EIS.

Yours truly,

Jacquelin N. Miller
Associate Environmental Coordinator

cc: L. Stephen Lau
Henry Gee
P. Bion Griffin
Edwin Murabayashi
Steven Armann

X-1-32



January 26, 1988

Ms. Jacqueline M. Miller  
Associate Environmental Coordinator  
University of Hawaii at Manoa  
Water Resources Research Center  
Holmes Hall 283  
2530 Dole Street  
Honolulu, HI 96822

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) -  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
TMK: 8-7-10:2, 4

Dear Ms. Miller:

Thank you for your letter of January 15, 1988 regarding the EIS Preparation Notice for the proposed residential housing project.

The Land Use Ordinance Zoning designations appear to conform with State Land Use (SLU) classifications with the exception that the SLU Urban classification is overlapped by A-2 Zoning. Land use designations are established by the State Land Use Commission and the City and County of Honolulu Department of Land Utilization.

As for the proposed R-10 area, dwellings will conform to engineering recommendations, as well as, all building code standards imposed by the City and County. Further, a complete final archaeological reconnaissance survey will be included in the Draft EIS.

Your comments are appreciated and will be incorporated into the Draft EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager



PHILLIPS ASSAULT 202  
MIKE MOON  
DIRECTOR  
PROPERTY DIVISION  
PROPERTY DIRECTOR

January 26, 1988

January 8, 1988

Mr. Matthew E. Grady  
Project Manager  
PBR Hawaii  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

Mr. Mike Moon  
Director  
Department of Housing and Community Development  
City and County of Honolulu  
650 S. King Street  
Honolulu, HI 96813

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) -  
MAI'I KAI PROPERTY HOUSING PROJECT  
WAIANA'E, OAHU, HAWAII  
TMK: 8-7-10-2, 4

Dear Mr. Grady:

Subject: Environmental Impact Statement  
Preparation Notice for Development of Residential Uses in  
Ma'i, Waiana'e  
TMK: 8-7-10: 2 and 14  
Area: 415 Acres  
Development Plan: Vacant Land  
Residential, Agriculture, Public Facilities and Preservation  
R-5, AG-2 and P-1  
Zoning: Urban, Agriculture and Preservation  
State Land Use: To amend 180 acres designated agriculture  
Request: to residential and low density apartment.

Dear Mr. Moon:

Thank you for your letter of January 8, 1988 regarding the EIS Preparation Notice for the proposed residential housing project. Your comments are appreciated and will be incorporated into the Draft EIS.

Sincerely,  
PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

Thank you for the opportunity to review and comment on the EIS preparation notice for the Ma'i Kai project in Waiana'e, Oahu. We understand that the proposed project will fill part of the need to meet affordable housing in the Waiana'e district.

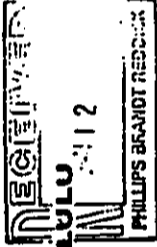
We note that the proposed project will require an eventual rezoning action in addition to the Development Plan amendment presently being requested. Current City policy has been to impose a set-aside of affordable housing units in residential projects for which rezoning actions are requested. Whereas this policy has up to now only affected residential projects, all developments requesting rezoning actions would be subject to some kind of requirement under a bill for a Community Benefit Assessment ordinance currently before the City Council. Therefore, the proposed project could be affected by the change in policy. The Department will inform the developer of any requirements should the Community Benefit Assessment bill be enacted.

Thank you for the opportunity to provide these comments.

Sincerely,  
*Robert Mygants*  
for MIKE MOON, Director

cc: Department of General Planning

DEPARTMENT OF LAND UTILIZATION  
**CITY AND COUNTY OF HONOLULU**  
450 SOUTH KING STREET  
HONOLULU, HAWAII 96813 & 96819



Mr. Matthew E. Grady  
Page -2-

FRANK F. ZAJAC  
DIRECTOR



LU12/87-7154 (AC)

January 7, 1987

Mr. Matthew E. Grady, Project Manager  
PBR Hawaii  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

Dear Mr. Grady:

Kaiser Cement Corporation--Environmental Impact  
Statement Preparation Notice (EISPN),  
Maui, Oahu, TMK B-7-10: 02 & 04

Thank you for providing the Department of Land Utilization (DLU) the opportunity to review the above-referenced preparation notice. We offer the following comments for your consideration.

1. Project Need

The Environmental Impact Statement (EIS) should contain a socio-economic analysis which demonstrates the need for the proposed project and specifically describes the target groups which will benefit from the project.

2. Compatibility with Surrounding Environment

The EIS should examine the potential impact of the project on surrounding land uses. Will existing agricultural uses such as the nearby poultry and swine farms be displaced as a result of project implementation? Will the project result in other requests for land use changes in the immediate area or complaints from residents disturbed by the adjacent incompatible uses?

3. Natural Features

The EISPN states that the proposed project is outside the Special Management Area (SMA). A review of the SMA boundary maps indicates that a portion of the property, as depicted in Figure 2, may be within the SMA. Figure 1, however, depicts different property boundaries that are not within the SMA. It is presumed that Figure 2 is an overall concept plan which includes surrounding land uses as well as those proposed for the project. If this is so, Figure 2 should clarify the property boundaries by including additional graphic information.

4. Hazards

The EIS should assess the potential radiation effects from the Luaiualei transmitters.

We hope these comments will be helpful in the preparation of the EIS. If you have any questions or if we may be of further assistance, please contact Art Challacombe of our staff at 523-4648.

Very truly yours,

*John P. Whalen*  
JOHN P. WHALEN  
Director of Land Utilization

JPM:ap  
0231H

January 26, 1988

Mr. John P. Whalen  
Director  
Department of Land Utilization  
City and County of Honolulu  
630 S. King Street  
Honolulu, HI 96813

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
TMK: 8-1-10:2, 4

Dear Mr. Whalen:

Thank you for your letter of January 7, 1988 regarding the EIS Preparation Notice for the proposed residential housing project.

The EIS will contain a socio-economic analysis, address the compatibility with the surrounding environment and potential hazards from the Luahalei transmitters. In addition, the property boundaries are not within the limits of the Special Management Area.

Your comments are appreciated and will be incorporated into the Draft EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

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



FRANK F. YAM  
DIRECTOR



PHILLIPS BRAND REDDICK

IRVING KAMATA  
DIRECTOR

WALTER M. OLSON  
DEPUTY DIRECTOR

January 7, 1988

Mr. Matthew E. Grady  
Project Manager  
PBR Hawaii

Financial Plaza of the Pacific  
130 Merchant Street, Suite 111  
Honolulu, Hawaii 96813

Dear Mr. Grady:

Subject: Environmental Impact Statement Preparation Notice (EISP)  
Maui Kai Development - Maianae  
Tax Map Key 8-7-10: 2 & 4  
Proj. Ref. No. DGP 11/87-3799

We have reviewed the Environmental Impact Statement Preparation Notice (EISP) for the development of residential uses in Maui and make the following comments and recommendations.

The EISP does not provide sufficient information to adequately comment on the recreational needs of the proposed Maui Kai project.

Although an eight-acre park has been included on the Maui Kai conceptual plan, further assessment of the project will be necessary to establish a recreational plan to meet the General Plan, City standards and park dedication requirements.

Please contact Mr. Jason Yuen of our Advance Planning Section at 527-6315 to discuss the project's park requirements.

Thank you for the opportunity to comment on the EISP.

Sincerely,

HIRAM K. KAWAKA, Director

HKK:el

cc: Department of General Planning

**PBR**  
HAWAII

LANDSCAPE ARCHITECTURE

PLANNING

ENVIRONMENTAL STUDIES

January 26, 1988

Mr. Hiram K. Kawaka  
Director  
City and County of Honolulu  
650 S. King Street  
Honolulu, HI 96813

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAUI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
TMK: 8-7-10:2, 4

Dear Mr. Kawaka:

Thank you for your letter of January 7, 1988 regarding the EIS Preparation Notice for the proposed residential housing project.

We have allocated 11.5 acres for park use. Additional information has been sent to Mr. Jason Yuen to determine if the park location meets your standards.

Your comments are appreciated and will be incorporated into the Draft EIS.

Sincerely,

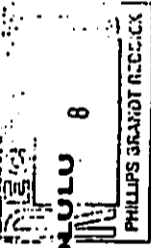
PBR HAWAII

Matthew E. Grady  
Project Manager

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 111 HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-3831 TELECOPY: (808) 521-4102  
HONOLULU IRVING OLSON

DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU

850 SOUTH KING STREET  
HONOLULU, HAWAII 96813



FORM 9748  
1-7-80

ALFRED J. THIEDE  
DIRECTOR AND CHIEF ENGINEER

PRO 88-4

January 6, 1988

Mr. Matthew E. Grady  
Project Manager  
PBR Hawaii  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

Dear Mr. Grady:

Subject: Environmental Impact Statement Preparation  
Notice (EISP/N) for Maili Kai Property Housing Project  
Maili, Oahu (Tax Map Keys: 8-7-10: 02 and 14)

We have reviewed the subject EISP/N and have the following comments:

1. A drainage report and drainage master plan should be submitted to the Drainage Section, Division of Engineering, for review and approval.
2. The proposed development should be connected to the existing 18-inch sewer line in Maipaloa Road. The modification to the existing Maianae Sewage Treatment Plant will be completed in June 1988 and will be able to accommodate flows from the development.

Very truly yours,

*Alfred J. Thiede*  
ALFRED J. THIEDE  
Director and Chief Engineer

cc: Department of General Planning

PBR  
HAWAII

LANDSCAPE ARCHITECTURE      PLANNING      ENVIRONMENTAL STUDIES

January 11, 1988

Mr. Alfred J. Thiede  
Director and Chief Engineer  
City and County of Honolulu  
Department of Public Works  
650 South King Street  
Honolulu, Hawaii 96813

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAЕ, OAHU, HAWAII  
TMK: 8-7-10:2, 4

Dear Mr. Thiede:

Thank you for your letter of January 6, 1988 (PRO. 88-4) regarding the EIS Preparation Notice for the proposed residential project.

The drainage master plan will be submitted prior to construction plan preparation. Furthermore, the proposed project is anticipated to connect to the existing 18 inch sewerline in Maipaloa Road.

Your comments are appreciated and will be incorporated into the Draft EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

FINANCIAL PLAZA OF THE PACIFIC      130 MERCHANT STREET, SUITE 1111      HONOLULU, HAWAII 96813  
TELEPHONE: (808) 331-5631      TELECOPIER: (808) 333-1407  
HONOLULU IRVINE DENVER

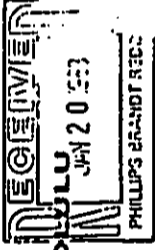
X-1-38



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



FRANK P. FAR  
DIRECTOR



JOHN E. HIRTEN  
DIRECTOR

JOSEPH M. MAGALON, JR.  
DEPUTY DIRECTOR

PL1-0940  
TE-10316

January 19, 1988

MEMORANDUM

TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER  
DEPARTMENT OF GENERAL PLANNING

FROM: JOHN E. HIRTEN, DIRECTOR

SUBJECT: EIS PREPARATION NOTICE (EISPN)  
MAILI, OAHU, HAWAII  
TMK: 8-7-10: 02, 14

This is in response to a letter by PBR Hawaii dated December 17, 1987 requesting a review of the EISPN documents.

The following items should be addressed in the forthcoming EIS:

1. The amount of traffic that will be generated by the proposed projects, its impact on the surrounding street system, and any mitigative measures planned.
2. The possibility/feasibility of joining the two unconnected sections of Kaukama Road to improve the circulation pattern.

All questions may be referred to Kenneth Hirata of my staff at Local 5009.

(for)

JOHN E. HIRTEN

cc: PBR Hawaii

PBR  
HAWAII

LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

January 26, 1988

Mr. John E. Hirten  
Director  
City and County of Honolulu  
Department of Transportation Services  
650 S. King Street  
Honolulu, HI 96813

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAHE, OAHU, HAWAII  
TMK: 8-7-10:2, 4

Dear Mr. Hirten:

Thank you for your letter of January 19, 1988 regarding the EIS Preparation Notice for the proposed residential housing project.

The Draft EIS will include a traffic assessment describing trip generations, impacts to the surrounding street systems and planned mitigation measures. Preliminary engineering studies have indicated the connection of Kaukama Road to be unfeasible at this time.

Your comments are appreciated and will be incorporated into the Draft EIS.

Sincerely,

PBR HAWAII

Matthew E. Grady  
Project Manager

FINANCIAL PLAZA OF THE PACIFIC 150 MERCHANT STREET, SUITE 110 HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-5631 TELECOPY: (808) 525-1102  
HONOLULU IRVINE DEXTER

PH - 100

POLICE DEPARTMENT CITY AND COUNTY OF HONOLULU 1015 SOUTH BERETANIA STREET HONOLULU, HAWAII 96813 AREA CODE (808) 935-1111 PHILLIPS SPANTRY FEEDBACK DOUGLAS G. GIBB CHIEF WARREN FERREIRA DEPUTY CHIEF

FRANK P. PAN MAYOR

OUR REFERENCE SS-1K

January 4, 1988

Mr. Matthew E. Grady Project Manager PBR Hawaii

Financial Plaza of the Pacific 130 Merchant Street, Suite 1111 Honolulu, Hawaii 96813

Dear Mr. Grady:

Subject: Environmental Impact Statement Preparation Notice (EISP) Maili, Oahu, Hawaii, TMS: 8-7-10:02, 04

We have reviewed the EISP for the above project and have no comments to offer at this time.

We would appreciate receiving a copy of the completed Environmental Impact Statement.

Sincerely, Douglas G. Gibb Chief of Police

January 11, 1988

Mr. Douglas G. Gibb Police Department City and County of Honolulu 1455 S. Beretania Street Honolulu, Hawaii 96814

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) MAILI KAI PROPERTY HOUSING PROJECT WAIANAE, OAHU, HAWAII TMS: 8-7-10:2, 4

Dear Mr. Gibb:

Thank you for your letter of January 4, 1988 regarding the EIS Preparation Notice for the proposed residential project.

Your response is appreciated and we shall include you in the review process of the Draft EIS.

Sincerely, PBR HAWAII

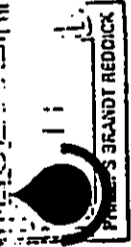
Matthew E. Grady Project Manager

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

600 SOUTH BERETAMA STREET

HONOLULU, HAWAII 96813



FRANK F. FASI, Mayor

DOMA B. GOTH, Chairman  
ERNEST A. WATARI, Vice Chairman  
LAWTON J. AGAOSER  
SISTER M. DAVEN AH CHOCK, O.S.F.  
EDWARD Y. HEALTA  
ALFRED J. THEDE  
JOHN K. TSUI

KAZU HAYASHIDA  
Manager and Chief Engineer

Mr. Matthew E. Grady  
Page 2

January 7, 1988

January 7, 1988

Mr. Matthew E. Grady  
PBR Hawaii  
130 Merchant Street,  
Suite 1111  
Honolulu, Hawaii 96813

Dear Mr. Grady:

Subject: Your Letter of December 17, 1987 on the  
Environmental Impact Statement Preparation Notice  
(EISP/N) for the Haliu Kai Property Development Plan  
Amendment, TMK: 8-7-10: 2, 14

Thank you for the opportunity to review and comment on the  
EISP/N for your proposed development.

The proposed development is not anticipated to have an adverse  
impact on potable groundwater resources in the area. We have  
the following comments on the proposed residential and low  
density apartment development:

1. A water master plan for the proposed development  
should be submitted for our review and approval.
2. We have no objections to the proposal by the  
developer to install a new water source for the  
project. However, if a source cannot be developed,  
the developer should contact us to determine if the  
developer can participate in the development of the  
sources which we are currently developing in Makaha  
Valley.

3. The developer will be required to install the  
necessary off-site transmission main and storage  
facilities.

If you have any questions regarding the availability of water  
and the facility requirements for the proposed development,  
please contact Albert Koga at 527-6123.

Very truly yours,

KAZU HAYASHIDA  
Manager and Chief Engineer

January 11, 1988

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

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
TMK: 8-7-10:2, 4

Dear Mr. Hayashida:

Thank you for your letter of January 7, 1988 regarding the EIS Preparation Notice for the proposed residential housing project.

The water master plan will be submitted prior to construction plan preparation of the proposed project. Currently, the land owner has inquired as to the steps required to participate in water development for the existing R-5 zoned residential lands.

Your comments are appreciated and will be incorporated into the Draft EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager



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

Mr. Matthew E. Grady  
Project Manager  
PBR Hawaii  
Financial Plaza of the Pacific  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

January 8, 1988

January 26, 1988

Dr. Brenner Mungler, Ph.D., P.E.  
Manager  
Environmental Department  
Hawaiian Electric Co., Inc.  
P.O. Box 2750  
Honolulu, HI 96840-0001

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
TME: 8-7-10:2, 4

Dear Mr. Mungler:

Thank you for your letter of January 8, 1988 regarding the EIS Preparation Notice for the proposed residential housing project. Your comments are appreciated and will be incorporated into the Draft EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

Dear Mr. Grady:

Subject: Environmental Impact Statement Preparation Notice  
(EISPN) Maili, Oahu, Hawaii

We have reviewed the above document and have the following comment:

1. There are no existing or planned transmission facilities in this area.

Sincerely,

*Brenner Mungler*  
Brenner Mungler

An HEI Company

**HAWAIIAN TEL** **GIS**

Hawaiian Telephone Company  
P.O. Box 2200  
Honolulu, Hawaii 96811

Telephone: (808) 546-3511

January 8, 1988

Mr. Matthew E. Grady, Project Manager  
PBR Hawaii  
Financial Plaza of the Pacific  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

Dear Mr. Grady:


Environmental Impact Statement Preparation  
Notice (EISP), Maili, Oahu, Hawaii  
Tax Map Key 8-7-10:2, 4

This is in response to your letter dated December 17, 1987 regarding the above-referenced subject.

Hawaiian Telephone would definitely be interested in being informed and consulted on all phases of the EIS and the proposed project (development of single-family and multi-family housing units). Please address all communications and inquiries to:

Nelson Yrizarry, Supervising Engineer  
GTE Hawaiian Telephone Company Incorporated  
P. O. Box 2200  
Honolulu, Hawaii 96841  
Telephone: 834-6222

Sincerely,

  
Walter Matsumoto  
Oahu Engineering &  
Construction Manager

WM/LK/CF/zhs

**PBR**  
HAWAII

LANDSCAPE ARCHITECTURE      PLANNING      ENVIRONMENTAL STUDIES

January 26, 1988

Mr. Nelson Yrizarry  
Supervising Engineer  
Hawaiian Telephone Company  
P.O. Box 2200  
Honolulu, HI 96840-0001

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAHE, OAHU, HAWAII  
TMK: 8-7-10:2, 4

Dear Mr. Yrizarry:

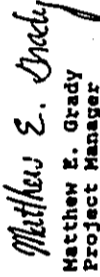
We received a letter from Mr. Walter Matsumoto on January 8, 1988 regarding the EIS Preparation Notice for the proposed residential housing project.

Mr. Matsumoto informed us that Hawaiian Telephone Company incorporated, requests to be included in the EIS review process and that all communications are to be addressed to you.

We shall include you in the review process and look forward to your comments.

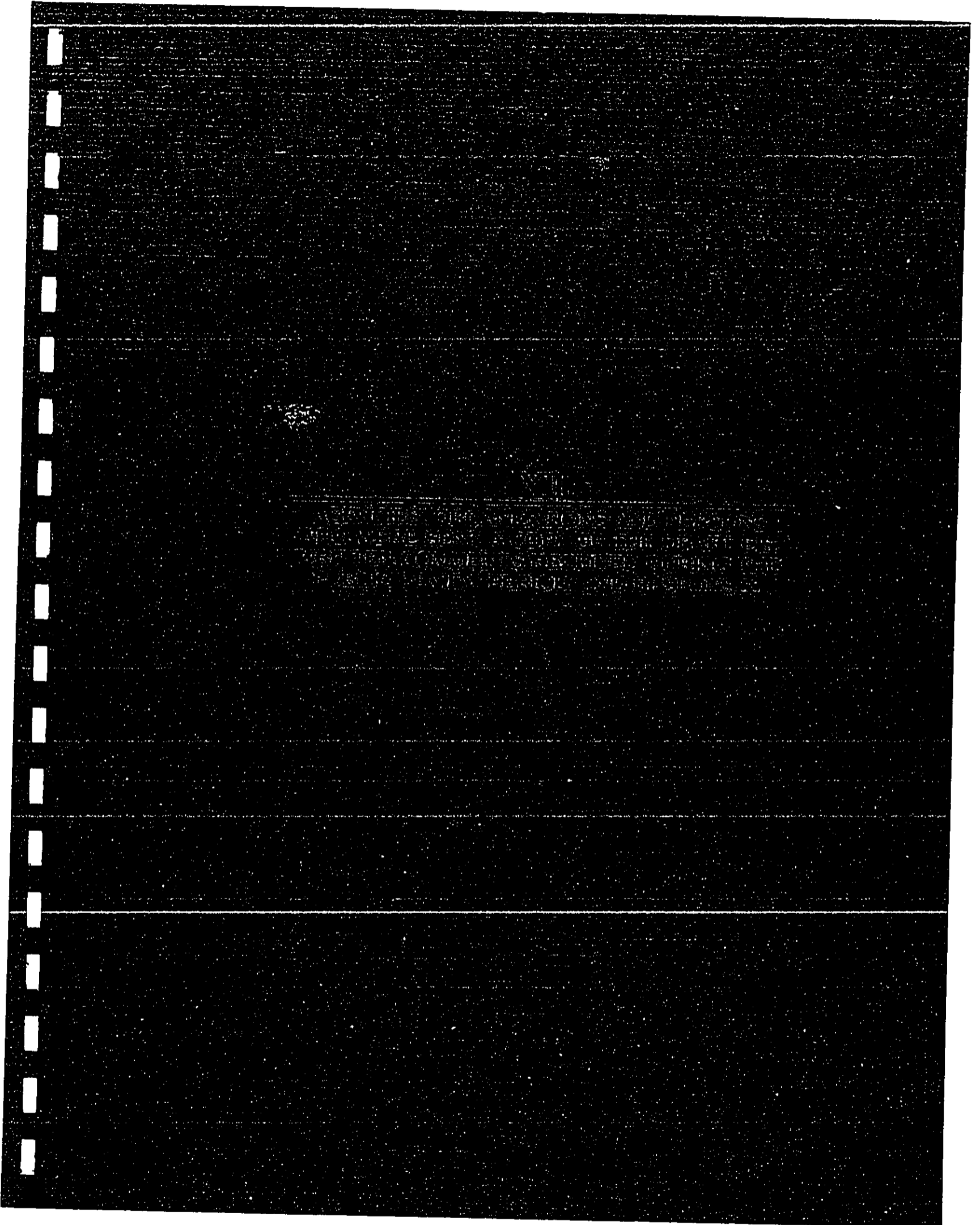
Sincerely,

PBR HAWAII

  
Matthew E. Grady  
Project Manager

FINANCIAL PLAZA OF THE PACIFIC      130 MERCHANT STREET, SUITE 1111      HONOLULU, HAWAII 96813  
TELEPHONE: (808) 551-9631      TELETYPE: (808) 553-1102  
HONOLULU IRVING DRIVER







CHAPTER XII

**AGENCIES, ORGANIZATIONS AND PERSONS WHO  
WERE SENT A COPY OF THE DRAFT EIS; WRITTEN COMMENTS  
RECEIVED DURING THE PUBLIC REVIEW PERIOD; AND RESPONSES**

The Draft EIS (DEIS) was officially filed with the City and County of Honolulu Department of General Planning and the Office of Environmental Quality Control (OEQC) on February 5, 1988 and notice of its availability was published in the OEQC Bulletin on February 8 and 23, 1988 and March 8, 1988. The Draft EIS was distributed to the federal, state, county and private groups and agencies listed on the Distribution List immediately following this page. The deadline for comments and the end of the 45-day review period was March 24, 1988.

RECEIVED

L E T T E R O F T R A N S M I T T E D FEB 15 1988

TO: Mr. Donald A. Clegg                      DATE: February 5, 1988  
Chief Planning Officer  
Department of General Planning  
650 South King Street  
Honolulu, Hawaii 96813

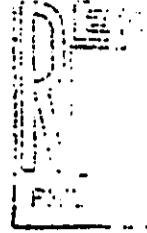
FROM: Wm. Frank Brandt *WB*  
President

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT  
MAILI KAI PROPERTY  
MAILI, WAIANAE, OAHU

Pursuant to Chapter 200 of Title 11, Administrative Rules, entitled "Environmental Impact Statement Rules" and Chapter 343 H.R.S. as amended, the original (signed) Draft EIS and 1 copy are enclosed herewithin to be filed with the accepting authority. Simultaneously, sixty (60) copies of the Draft EIS are being filed with the Office of Environmental Quality Control for distribution.

cc: ~~Office of Environmental Quality Control (60 copies)~~

JOHN WAIHEE  
GOVERNOR



MARVIN T. MIURA, Ph.D.  
DIRECTOR

TELEPHONE NO.  
548-6915

STATE OF HAWAII  
OFFICE OF ENVIRONMENTAL QUALITY CONTROL  
465 SOUTH KING STREET, ROOM 104  
HONOLULU, HAWAII 96813

February 10, 1988

Mr. Matthew E. Grady, Project Manager  
PBR HAWAII  
130 Merchant St., Suite 1111  
Honolulu, HI 96813

Dear Mr. Grady:

Subject: Draft Environmental Impact Statement for the  
Maili Kai Property, Maili, Waianae, Oahu

The Draft EIS was officially received by the Office of Environmental Quality Control on February 5, 1988 and was published in the February 8, 1988 OEOC Bulletin. The deadline for comments and the end of the 45-day public review period is March 24, 1988. We have requested all written comments be directed to the City and County of Honolulu Department of General Planning with copies to you.

Copies of the statement have been sent to the agencies, libraries, and organizations on the attached distribution list.

Should you have any questions regarding this EIS, please do not hesitate to contact Faith Miyamoto at 548-6915.

Sincerely,

A handwritten signature in cursive script that reads "Marvin T. Miura".

Marvin T. Miura, Ph.D.  
Interim Director

A handwritten signature in cursive script that reads "Faith Miyamoto".

Faith Miyamoto  
Planner

Attachment  
cc: DGP (w/attachment)

XII-3

OHN WAIHEE  
GOVERNOR



MARVIN T. MIURA, Ph.D.  
DIRECTOR

TELEPHONE NO.  
548-6915

STATE OF HAWAII  
OFFICE OF ENVIRONMENTAL QUALITY CONTROL  
465 SOUTH KING STREET, ROOM 104  
HONOLULU, HAWAII 96813

February 8, 1988

Dear Reviewer:

Attached for your review is an Environmental Impact Statement (EIS) that was prepared pursuant to Chapter 343, Hawaii Revised Statutes and Chapter 11-200, Administrative Rules, EIS Rules:

TITLE: Maili Kai Property  
\_\_\_\_\_  
\_\_\_\_\_  
LOCATION: Maili, Waianae, Oahu  
\_\_\_\_\_  
CLASSIFICATION: Applicant Action  
\_\_\_\_\_

Your comments or acknowledgments of no comments on the EIS are welcomed. Please submit your reply to the accepting authority or approving agency:

Mr. Donald A. Clegg  
\_\_\_\_\_  
Chief Planning Officer  
\_\_\_\_\_  
City and County of Honolulu Dept. of General Planning  
\_\_\_\_\_  
650 South King Street  
\_\_\_\_\_  
Honolulu, Hawaii 96813  
\_\_\_\_\_

Please send a copy of your reply to the proposing party:

Mr. Matthew E. Grady, Project Manager  
\_\_\_\_\_  
PBR HAWAII  
\_\_\_\_\_  
130 Merchant Street, Suite 1111  
\_\_\_\_\_  
Honolulu, Hawaii 96813  
\_\_\_\_\_

Your comments must be received or postmarked by: March 24, 1988.

If you have no further use for this EIS, please return it to the Office of Environmental Quality Control.

Thank you for your participation in the EIS process.

**DISTRIBUTION LIST**

( ) E.A.  
 ( ) APPLICANT ACTION  
 ( ) AGENCY ACTION

(x) EIS  
 (x) APPLICANT ACTION  
 ( ) AGENCY ACTION

Title: Maili Kai Property

Location: Maili, Waianae, Oahu

Proposing Agency/Applicant: Kaiser Cement Corp.

Accepting Authority/  
 Approving Agency: City & County of Honolulu Dept. of General Planning

Deadline for Comments: March 24, 1988

Date Sent/By: February 8, 1988

**STATE AGENCIES** NO. COPIES REMARKS

OEOC	1	
Dept. of Agriculture	1	
Dept. of Accounting & General Services	1	
Dept. of Defense	1	
Dept. of Education (a)*	1	
Dept. of Hawaiian Home Lands (a)*	1	
Dept. of Health	1	
Dept. of Land and Natural Resources	3	
DLNR State Historic Preservation Officer	1	
Dept. of Business and Economic Development	1	
DBED Library	1	
Housing Finance and Development Corp.	1	
Dept. of Transportation	3	
Office of Hawaiian Affairs	1	
State Archives	1	
State Energy Office	1	
State Land Use Commission	1	

**UNIVERSITY OF HAWAII**

Environmental Center	4	
Marine Programs (a)*		
Water Resources Research Center	1	

**FEDERAL**

Army-DAFE (Facilities Eng.-USASCH)	1	
Environmental Protection Agency (a)*		
Navy	1	
Soil Conservation Service	1	
U.S. Army Corps of Engineers	1	
U.S. Coast Guard	1	
U.S. Fish and Wildlife Service	1	
U.S. Geological Survey (a)*		

Library Copy:	<u>1</u>	Copy of Distribution List Sent to:
Total Received:	<u>60</u>	<u>DGP; DBR HAWAII</u>
Total Distributed:	<u>60</u>	
File Copy:	<u>1</u>	Date Sent: <u>February 12, 1988</u>

(a)\* Copy desired only if project involves the agency's responsibilities.

**NEWS MEDIA****NO. COPIES****REMARKS**Honolulu Star-Bulletin

1

Honolulu Advertiser

1

Sun Press

1

Hawaii Tribune Herald (b)\*\*West Hawaii Today - Kona (b)\*\*The Garden Island Newspaper - Kauai (b)\*\*Maui News (b)\*\*Ka Molokai (b)\*\***CITY AND COUNTY OF HONOLULU (b)\*\***Board of Water Supply

1

Building Dept.

1

Dept. of Housing and Community Development

1

Dept. of General PlanningDept. of Land Utilization

1

Dept. of Parks and Recreation

1

Dept. of Public Works

1

Dept. of Transportation Services

1

Fire Dept.

1

Municipal Reference & Records Center (Oahu Only)

1

Police Dept.

1

**COUNTY OF HAWAII (b)\*\***Planning Dept.Dept. of Parks and RecreationDept. of Public WorksDept. of Research and DevelopmentDept. of Water SupplyUniversity of Hawaii - Hilo Campus Library**COUNTY OF MAUI (b)\*\***Planning Dept.Dept. of Parks and RecreationDept. of Public WorksDept. of Water SupplyEconomic Development AgencyMaui Community College Library**COUNTY OF KAUAI (b)\*\***Planning Dept.Dept. of Public WorksDept. of Water SupplyKauai Community College Library**NON-GOVERNMENTAL AGENCIES**American Lung Association

1

Hawaiian Electric Company

1

**LIBRARIES**U.H. Hamilton Library, Hawaiian Collection

1

Legislative Reference Bureau

1

(b)\*\* Copy desired only if project is in respective county.

**LIBRARIES****NO. COPIES****REMARKS**

State Main Library

2

**REGIONALS:**

Kaimuki Regional Library

1

Kaneohe Regional Library

1

Pearl City Regional Library

1

Hilo Regional Library

1

Wailuku Regional Library

1

Lihue Regional Library

1

**OAHU:**

Aiea Library

Aina Haina Library

Ewa Beach Community-School Library

Hawaii Kai Library

Kahuku Community-School Library

Kailua Library

Kalihi-Palama Library

Liliha Library

Manoa Library

McCully-Moiliili Library

Mililani Library

Wahiawa Library

Waialua Library

Waianae Library

1

Waikiki-Kapahulu Library

Waimanalo Community-School Library

Waipahu Library

**HAWAII:**

Bond Memorial (Kohala) Library

Holualoa Library

Honokaa Library

Kailua-Kona Library

Keaau Community-School Library

Kealahou Library

Laupahoehoe Community-School Library

Mountain View Community-School Library

Pahala Community-School Library

Pahoa Community-School Library

Thelma Parker Memorial Library/Waimea Area Library

**COUNTY OF MAUI (b)\*\***

Kahului Library

Lahaina Library

Makawao Library

**MOLOKAI:**

Molokai Library

**LANAI:**

Lanai Community-School Library

**KAUAI:**

Hanapepe Library

Kapaa Library

Koloa Community-School Library

Waimea Library

Waianae Coast Neighborhood Board No. 24  
c/o W-CAP  
85-555 Farrington Hwy.  
Waianae, HI 96792

Mr. Nelson Yrizarry  
Supervising Engineer  
GTE Hawaiian Telephone Co., Inc.  
P.O. Box 2200  
Honolulu, HI 96841



**PBR**  
HAWAII

LANDSCAPE ARCHITECTURE      PLANNING      ENVIRONMENTAL STUDIES

March 30, 1988

Major Jerry M. Matsuda  
Hawaii Air National Guard  
Department of Defense  
3949 Diamond Head Road  
Honolulu, Hawaii 96816-4495

**SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)**  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
TMK: 8-7-10: 02,14

Dear Major Matsuda:

This is to acknowledge receipt of the copy of your letter of February 16, 1988 to Mr. Donald A. Clegg, Director, Department of General Planning regarding the subject Draft EIS. Thank you for participating in the Draft EIS review process.

Sincerely,

PBR HAWAII

*Matthew E. Grady*

Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning

271\61\_8\_.wp

FINANCIAL PLAZA OF THE PACIFIC    150 MERCHANT STREET, SUITE 1111    HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-7671    TELECOPY: (808) 525-1102  
HONOLULU IRVING CENTER

Engineering Office

Mr. Donald A. Clegg  
Chief Planning Officer  
Department of General Planning  
City & County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Maili Kai Property  
Maili, Waianae, 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. Matthew E. Grady



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

5090 (248)  
 Ser NSB/480  
 28 FEB 1983

Mr. Donald A. Clegg  
 Chief Planning Officer  
 Department of General Planning  
 City and County of Honolulu  
 650 S King Street  
 Honolulu, HI 96813

Dear Mr. Clegg:

DRAFT ENVIRONMENTAL IMPACT STATEMENT  
 MAILE KAI PROPERTY

The Draft Environmental Impact Statement for the Maile Kai Property

has been reviewed and we have no comments to offer. Since we have no further use for the EIS, it is being returned to the Office of Environmental Quality Control.

Thank you for the opportunity to review the Draft.

Sincerely,

*Matthew E. Grady*

Enclosure

Copy to:  
 Mr. Matthew E. Grady, Project Manager  
 PBR HAWAII  
 130 Merchant Street, Suite 1111  
 Honolulu, HI 96813

Office of Environmental Quality Control

PBR  
 HAWAII

LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

March 30, 1988

Mr. W. K. Liu  
 Assistant Base Civil Engineer  
 Department of the Navy  
 Commander, Naval Base Pearl Harbor  
 P.O. Box 110  
 Pearl Harbor, Hawaii 96860-5020

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
 MAILE KAI PROPERTY HOUSING PROJECT  
 WAIANAE, OAHU, HAWAII  
 TRK: 8-7-10: 02, 14

Dear Mr. Liu:

This is to acknowledge receipt of your letter of February 23, 1988 regarding the subject Draft EIS. Thank you for participating in the Draft EIS review process.

Sincerely,

PBR HAWAII

*Matthew E. Grady*

Matthew E. Grady  
 Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
 Department of General Planning

271\PL\_8 .WP

FINANCIAL PLAZA OF THE PACIFIC 150 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813  
 TELEPHONE: (808) 521-3650 TELEFAX: (808) 523-1102  
 HONOLULU IRVING DENVER

March 21, 1988

Mr. James Nakasone  
Acting Chief, Engineering Division  
Department of the Army  
U.S. Army Engineer District, Honolulu  
Building 230  
Fort Shafter, Hawaii 96858-5440

**SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
MAIANAE, OAHU, HAWAII  
TMK: 8-7-10: 02, 14**

Dear Mr. Nakasone:

Thank you for the copy of your letter of February 24, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, City and County of Honolulu regarding the subject Draft EIS. The following is provided in response to your letter.

- a. The proposed project does not include the construction of drainage structures below the MHML of tidal waters. All project related drainage structures modifications would be related to surface drainage structures and/or storm drains that would be above sea level.
- b. Your comments regarding the accuracy of the Draft EIS discussion of flood hazards are appreciated.

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer  
City and County of Honolulu

D:\271\FL\_2\_.WP

FINANCIAL PLAZA OF THE PACIFIC    150 MERCHANT STREET, SUITE 1111    HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-5631    TELECOPIER: (808) 525-1402  
HONOLULU IRVINE DENVER



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

REPLY TO  
ATTENTION OF:

February 24, 1988

Planning Branch

Mr. Donald A. Clegg  
Chief, Planning Officer  
City and County of Honolulu  
Department of General Planning  
658 South King Street  
Honolulu, HI 96813

Dear Mr. Clegg:

Thank you for the opportunity to review the Draft Environmental Impact Statement (DEIS) for Maili Kai Property, Maali, Maianae, Oahu. The following comments are offered.

- a. A Department of the Army permit will be required for the construction of the drainage structures below the MHML of tidal waters. Please contact Operations Branch at 438-9258.
- b. The discussion regarding flood hazards on page IV-9, section 1.4.1 of the DEIS appears to be accurate.

Sincerely,

James Nakasone  
Acting Chief  
Engineering Division

Copy Furnished:

Mr. Matthew E. Grady, Project Manager  
PBR Hawaii  
138 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

UNITED STATES  
DEPARTMENT OF  
AGRICULTURE

SOIL  
CONSERVATION  
SERVICE

P. O. BOX 5000A  
HONOLULU, HAWAII  
96850

Mr. Donald A. Clegg, Chief Planning Officer  
City and County of Honolulu  
Dept. of General Planning  
650 S. King Street  
Honolulu, HI 96813

March 15, 1988

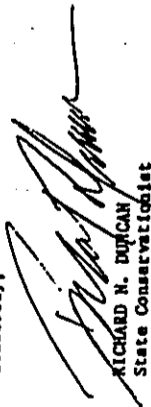
Dear Donald:

Subject: Environmental Impact Statement (EIS) -  
Mailli Kai Property, Mailli, Waianae, Oahu

The soils and agricultural concerns have been adequately addressed and we  
have no further comments regarding the above-referenced matter.

Thank you for the opportunity in letting us review the above EIS.

Sincerely,



RICHARD N. DUNCAN  
State Conservationist

cc: Mr. Matthew E. Grady, Project Manager, PBR Hawaii, 130 Marchant Street,  
Suite 1111, Honolulu, HI 96813

**PBR**  
HAWAII

LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

March 30, 1988

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

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILLI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
THK: 8-7-10: 02,14

Dear Mr. Duncan:

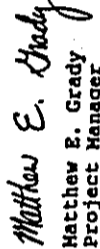
Thank you for the copy of your letter of March 15, 1988 to Mr.  
Donald A. Clegg, Chief Planning Officer, City and County of  
Honolulu, Department of General Planning regarding the subject  
Draft EIS. The following is provided in response to your letter.

We appreciate your confirmation that the soils and agricultural  
concerns of the proposed project have been adequately addressed  
in the Draft EIS.

Thank you for your comments and participation in the Draft EIS  
review process. Your letter and this response will be appended  
to the Final EIS.

Sincerely,

PBR HAWAII



Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning

271\PL12.WP

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-5631 TELECOPIER: (808) 523-1402  
HONOLULU IRVING BINDER

**PBR**  
HAWAII

LANDSCAPE ARCHITECTURE      PLANNING      ENVIRONMENTAL STUDIES

April 6, 1988

(P)1249.8

MAR 28 1988

Mr. Donald A. Clegg  
Chief Planning Officer  
Department of General Planning  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Subject: Draft Environmental Impact Statement  
Maui Kai Property

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

Very truly yours,

*Teuane Tomimaga*  
TEUANE TOMINAGA  
State Public Works Engineer

MY:jk  
cc: Mr. Matthew E. Grady

Mr. Teuane Tomimaga  
State Public Works Engineer  
State of Hawaii  
Department of Accounting and General Services  
P.O. Box 118  
Honolulu, Hawaii 96810

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAUI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
TMK: 8-7-10: 02,14

Dear Mr. Tomimaga:

This is to acknowledge receipt of your letter of March 28, 1988  
regarding the subject Draft EIS. Thank you for participating in  
the Draft EIS review process.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning

271FL17.WP

FINANCIAL PLAZA OF THE PACIFIC    190 MERCHANT STREET, SUITE 1111    HONOLULU, HAWAII 96813  
TELEPHONE: (808) 531-5631    TELECOPIER: (808) 523-1402  
HONOLULU IRVINE DENVER

**PBR**  
HAWAII

LANDSCAPE ARCHITECTURE      PLANNING      ENVIRONMENTAL STUDIES

March 21, 1988

Mr. 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

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
TMK: 8-7-10: 02,14

Dear Mr. Conant:

Thank you for the copy of your letter of March 14, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, City and County of Honolulu regarding the subject Draft EIS. The following is provided in response to your letter.

With the exclusion of the 120 view units, the percentage of housing units allocated for prevailing market price also falls within the range of the "gap group" market. It is intended to price 5 percent of the units to low income groups and another 5 percent to low-moderate income groups. The market analysis performed for this project included in its entirety in appendix A, identifies marketability for housing primarily to the gap group range of 80-120 percent of the median annual income.

Impacts imposed by the existing farm operations are a concern to all present and future residents. The proposed golf course provides a minimum 300 foot buffer zone as a primary mitigation measure. We are not only open to your suggestions of additional mitigation measures to be taken, but would be pleased to meet with your staff at the time engineering and design drawings are prepared for the proposed housing units to assure that proper mitigation measures are incorporated into the final designs.

FINANCIAL PLAZA OF THE PACIFIC      150 MERCHANT STREET, SUITE 1111      HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-5631      TELECOPIER: (808) 523-1402  
HONOLULU IRVINE DENVER



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

March 14, 1988

88:PLNG/1124JT

Mr. Donald A. Clegg, Chief Planning Officer  
City and County of Honolulu  
Department of General Planning  
650 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Re: Draft Environmental Impact Statement (dEIS) for  
the Maili Kai Property

Thank you for the opportunity to review the subject draft EIS. Our comments are as follows:

We found the document to be somewhat confusing on the issue of affordable housing. As outlined on page 1-3 of the dEIS, at least 5% of the units would be priced for the gap group market; another 5% would be priced for the low-moderate income group; and the remaining 90% would be at prevailing market prices. However, upon further review of the dEIS and after clarification by Matthew Grandy, Project Manager at PBR Hawaii, we are of the understanding that approximately 1,215, or 92% of the units proposed for development are estimated to be affordable to families earning 120% and below of the area median income. With this understanding, we believe that the project has the potential for making a major contribution towards providing affordable housing for Hawaii's residents.

We are concerned, however, with the adverse impact of the adjacent pigeries and poultry farms on the proposed development. In addition to making full disclosures to prospective homebuyers, we believe that other mitigating measures should be taken.

Sincerely,

JOSEPH K. CONANT  
Executive Director

cc: Mr. Matthew E. Grady

Mr. Joseph K. Conant  
DRAFT EIS FOR MAILI KAI PROPERTY  
March 21, 1988  
Page 2

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer  
City and County of Honolulu

D:\271\FL\_7\_.WP

JOHN WAINHEE  
GOVERNOR



SUZANNE D. PETERSON  
CHAIRPERSON, BOARD OF AGRICULTURE  
ROBERT Y. TSUYEMURA  
ACTING DEPUTY  
CHAIRPERSON  
PHILLIP'S PLACE 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

Mr. Donald Clegg  
March 24, 1988  
Page -2-

March 24, 1988

**COPY**

Mr. Donald A. Clegg  
Chief Planning Officer  
Department of General Planning  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Subject: Draft Environmental Impact Statement (DEIS)  
for Proposed Amendment to the Waianae Development Plan

Mailli Residential Project  
Kaiser Cement Corporation  
TMK: 8-7-10: 2 & 14 Waianae, Oahu  
Area: 415 acres

The Department of Agriculture has reviewed the DEIS and offers the following comments.

It is evident that the DEIS attempts to address the concerns expressed in our December 30, 1987, response to the Preparation Notice. However, we need to re-emphasize the importance of including discussion on the following areas:

- a. The impact of the proposal on existing agricultural uses to the east of the project site, which includes swine and poultry operations. The Hawaii Right-to-Farm Act, Chapter 165, HRS, limits the circumstances under which pre-existing farming activities may be deemed a nuisance; and
- b. The relationship to the Hawaii State Plan priority guidelines.



Thank you for the opportunity to comment on this document. A copy of the final EIS would be most appreciated.

Sincerely,

SUZANNE D. PETERSON  
Chairperson, Board of Agriculture

cc: OEQC  
Mr. Matthew E. Grady, Project Manager, PER Hawaii

U.S. DEPARTMENT OF AGRICULTURE



April 6, 1988

Ms. Suzanne D. Peterson, Chairperson  
State of Hawaii  
Department of Agriculture  
1428 South King Street  
Honolulu, Hawaii 96814-2512

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAHE, OAHU, HAWAII  
TKK: 8-7-10; 02,14

Dear Ms. Peterson:

Thank you for the copy of your letter of March 24, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, Department of General Planning. The following is provided in response to your letter.

- a. As indicated in your letter, we have attempted to address the concerns expressed in your December 30, 1987 EISPN letter. We also realize, and have noted in the Draft EIS (see Chapter IV, Section 1.6.2), that the residents of the Maili Kai project would be subjected to agriculturally generated odors. This section of the Final EIS will be strengthened by adding information relative to the Hawaii right-to-farm act and the possibility that sales documents for the residential units will contain language precluding future residents of Maili Kai from restricting or attempting to restrict farmer's rights. Additionally, information relative to existing and prevailing wind patterns will be included in the Final EIS as they relate to agricultural odors.
- b. Chapter V of the Final EIS will include a section on the relationship of the proposed project to Part III, Priority Guidelines, The Hawaii State Plan, Revised, 1986. In brief, the discussion will relate the proposed project to the priority guidelines to promote the growth and development of diversified agriculture and aquaculture; priority guidelines to effect desired statewide growth and distribution; and priority guidelines for the provision of affordable housing.

XII-17

Ms. Suzanne D. Peterson  
MAILI KAI DRAFT EIS  
April 6, 1988  
Page 2

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning

271FL18.WP

JOHN WARD  
ENGINEER



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
130 MERCHANT STREET  
HONOLULU, HAWAII 96813

March 8, 1988

STEP 8.2719

DIRECTOR  
EDWARD Y. HIRATA

DEPARTMENT OF TRANSPORTATION  
130 MERCHANT STREET  
HONOLULU, HAWAII 96813  
DAN T. KOOB

WIRELESS REFER TO

**PBR**  
HAWAII

LANDSCAPE ARCHITECTURE

PLANNING

ENVIRONMENTAL STUDIES

March 21, 1988

Mr. Edward Y. Hirata  
Director of Transportation  
State of Hawaii  
Department of Transportation  
869 Punchbowl Street  
Honolulu, Hawaii 96813

Mr. Matthew E. Grady, Project Manager  
PBR Hawaii  
Financial Plaza of the Pacific  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

Dear Mr. Grady:

Environmental Impact Statement Preparation Notice  
Single and Multi-Family Housing Units  
Maui, Oahu

The traffic impact analysis study should be included in the draft EIS and address the traffic impacts and identify any mitigation measures required. In addition, a drainage study must be prepared to determine its impact on our highway facilities.

In order to have transportation infrastructure improvements implemented in a timely manner, we will be assessing developer impact fees or other means to have developers fund the highway improvements, such as road widening, necessitated by the impacts of their development.

In addition to highway improvements, the developer should also consider implementing traffic management programs such as ridesharing, carpooling, subscription bus service, vanpools, carpool computer matching service, provision of park and ride and daycare facilities, etc., as appropriate.

We appreciate this opportunity to provide comments.

Very truly yours,

*Edward Y. Hirata*  
Edward Y. Hirata  
Director of Transportation

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAHE, OAHU, HAWAII  
THK: 8-7-10: 02,14

Dear Mr. Hirata:

Thank you for your letter of March 8, 1988 regarding the subject Draft EIS. The following is provided in response to your letter.

A complete traffic assessment has been included in the Draft EIS and is summarized in Chapter IV, Section 5.1 and included in its entirety in Appendix F. As indicated in the Draft EIS, when approximately 15 percent of the dwelling units are completed, traffic signals at the Farrington Highway/Kaukama Road intersection would be warranted. However, because Puu O Hulu Kai ridge creates a sight distance problem in the west bound direction, the signals would be installed earlier and advance warning signals for westbound traffic may be needed when the traffic signals are installed. The developer's engineers would continue to work with your department regarding the timing of the installation of the signals and the continued safe and efficient flow of traffic.

Based on the traffic assessment performed, it appears that the present eastbound left turn lane into Kaukama Road from Farrington Highway and the channelized westbound right turn lane from Farrington Highway onto Kaukama Road are adequate to serve the proposed project. Improvements will be made to Kaukama Road, including striping for two lanes in each direction with a left turn lane into Farrington Highway and an optional lane for left and right turns onto Farrington Highway. These improvements would be made at the developer's expense.

To the extent possible, the developer will encourage traffic management programs such as ride sharing, carpooling, subscription bus service, etc. as appropriate for the development.

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-5631 TELECOPIER: (808) 523-1402  
HONOLULU IRVINE DENVER

Mr. Edward Y. Hirata  
DRAFT EIS FOR MAIHI KAI PROPERTY  
March 21, 1988  
Page 2

Thank you for your comments and participation in the Draft EIS review process. Your comments and this response will be appended to the Final EIS.

Sincerely,

PER HAWAII

*Matthew E. Grady*

Matthew E. Grady,  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer  
City and County of Honolulu

D:\271\PL\_6\_.WP



STATE OF HAWAII  
DEPARTMENT OF EDUCATION  
P. O. BOX 2206  
HONOLULU, HAWAII 96813

February 22, 1988

OFFICE OF THE SUPERINTENDENT

CHARLES T. TOGUCHI  
SUPERINTENDENT

PBR  
HAWAII

LANDSCAPE ARCHITECTURE      PLANNING      ENVIRONMENTAL STUDIES

March 30, 1988

Mr. Charles T. Toguchi  
Superintendent  
State of Hawaii  
Department of Education  
P.O. Box 2360  
Honolulu, Hawaii 96804

Mr. Donald A. Clegg  
Chief Planning Officer  
Department of General Planning  
City and County of Honolulu  
650 S. King Street  
Honolulu, Hawaii 96813

Dear Mr. Clegg:

SUBJECT: MAILI KAI PROPERTY, THK: 8-7-10:02, 04  
Draft EIS

The information in the subject draft EIS is still current.  
In addition to the previous information, we will require a site for a new elementary school within the property.  
We would like to be involved in the siting of the school.  
Thank you for the opportunity to comment.

Sincerely,  
*Charles T. Toguchi*  
Charles T. Toguchi  
Superintendent

CTT:J1 (MO)  
cc E. Imai, OBS  
E. Makano, Leeward Dist.  
M. Grady, PBR Hawaii

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAHE, OAHU, HAWAII  
THK: 8-7-10: 02,14

Dear Mr. Toguchi:

Thank you for the copy of your letter of February 22, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, Department of General Planning. The following is provided in response to your letter.

At present, preliminary planning only for the proposed Maili Kai Property has been performed. As planning proceeds, siting of a new elementary school within the property will be coordinated with your department.

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,  
PBR HAWAII  
*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning

271\FL\_9\_.WP

FINANCIAL PLAZA OF THE PACIFIC      130 MERCHANT STREET, SUITE 1111      HONOLULU, HAWAII 96813  
TELEPHONE: (808)521-5631      TELECOPY: (808)525-1402  
HONOLULU IRVING DENVER

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

JOHN HANES  
DIRECTOR OF HEALTH



STATE OF HAWAII  
DEPARTMENT OF HEALTH

P. O. BOX 327  
HONOLULU, HAWAII 96809

March 28, 1988

PHILIP...  
JOHN C. STEWART, M.D.  
DIRECTOR OF HEALTH

in reply, please refer to:  
ENR88

Mr. Donald A. Clegg  
March 28, 1988  
Page 2

MEMORANDUM

To: Mr. Donald A. Clegg, Chief Planning Officer  
Department of General Planning, City & County of Honolulu

From: Deputy Director for Environmental Health

Subject: Draft Environmental Impact Statement (DEIS) for Maili Kai Property, Maili, Waianae, Oahu, Hawaii

Vector Control

Although we have expressed strong opposition to this project in the EIS Preparation Notice, the draft EIS still does not address the vector issues. The only reference is the habitation within the project area.

We are not opposed to the purpose or concept of the project, but have very serious reservations about the siting. Due to its close proximity to existing poultry and swine farms (see attached map), the potential future residents will be seriously impacted by vectors, especially flies, mosquitoes, cockroaches, rodents, and mongooses. In addition, there will be other problems associated with farm operations, including odor and fugitive dust.

From our past experiences in the area, the residents will be constantly plagued by various vectors and during certain wet seasons the problems are likely to reach intolerable levels. Conflicts between the farmers and tenants are inevitable despite notifications of preparing tenants to the reality of vector nuisances in a farming community. This will be especially true of residents who relocate from urban areas and have not experienced "country living" before.

We foresee the following major problems if the development is allowed to proceed:

1. Flies. The common housefly and blowfly are the prevalent species in the area. They occur year-round and breed in tremendous numbers on the animal farms. The housefly breeds mostly in chicken manure, especially in wet manure. To compound the problem, these flies are highly resistant to pesticides and are difficult to control.

A specific example is the situation involving the Maili Elementary School which is located adjacent to a poultry farm. There has been a number of occasions when uncontrollable fly breeding has occurred on the farm. The

resulting flies have invaded the school en masse, resulting in public outcry from staff, students, and parents alike. The only realistic alternative solution appears to be to either relocate the poultry farm or the school.

2. Mosquitoes. Numerous mosquito breeding sources abound in the area, including animal sewage lagoons, Luualaei reservoir, and artificial temporary pools. All of these sources are well within the flight range of the adult mosquitoes. Like the houseflies, the mosquitoes are also highly resistant to chemicals. We rely mostly on a larviciding oil for control. While the oil is effective, the residual effect is minimal. Frequent treatments are necessary and we are not able to maintain this constant service.

3. Rodents and Mongooses. These animals also abound in the area because of ample foodstuff. The rodents are especially difficult to control because of competing food. As their numbers increase, they are likely to disperse into the surrounding areas. Additionally, test results indicate that significant numbers of the rodents in the area are infected with murine typhus and leptospirosis.

These cited problems are real and we consider them serious enough for the developer to reconsider developing the project in the proposed area. We will continue to oppose all housing projects that are projected for these kinds of areas as we firmly believe that agricultural and residential land uses cannot co-exist without serious consequences.

Air Pollution

The DEIS does recognize that the existing poultry and swine farming operations are located in close proximity to the proposed project and will adversely impact the project site with strong odors. It further states that there are no practical methods of controlling the agricultural generated odors, and as such, the residents of Maili Kai will most likely be subjected to these odors constantly. With the odor problem recognized, the project should not be allowed to proceed as the residents will eventually object and complain and force the farmers out of existence.

Noise

Concerns previously listed to the EIS Preparation Notice (comments dated January 6, 1988) have been addressed. In addition, noise from renewed quarry operations could adversely affect future residents of the project. Please address this concern and include mitigative measures to control potential noise impacts.

*Bruce S. Anderson*  
BRUCE S. ANDERSON, Ph.D.

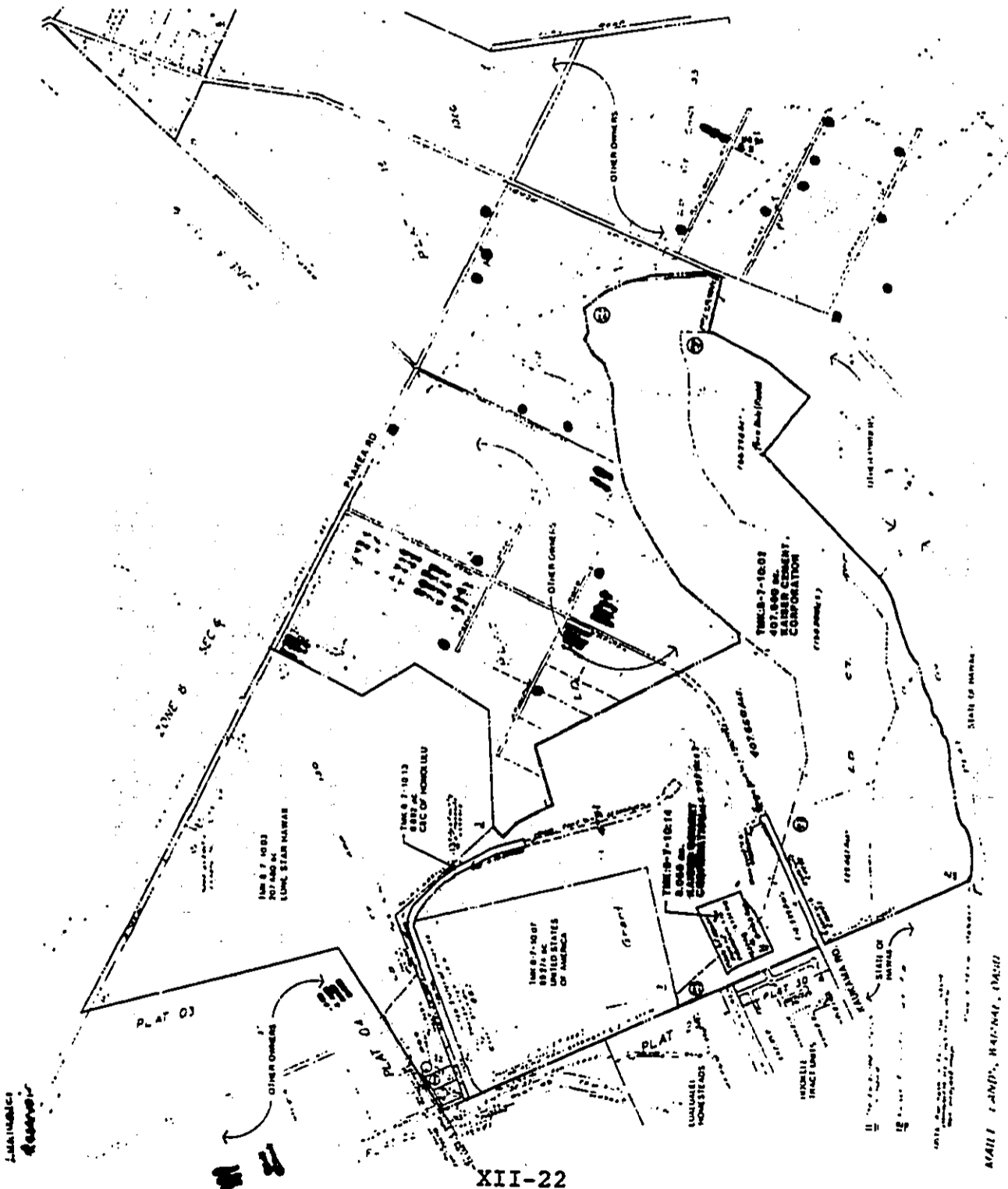
Attachment

cc: Mr. Matthew E. Grady, Project Manager ✓

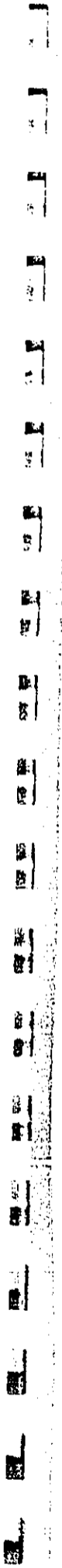
**FIGURE II-2**  
**MAILI KAI PROPERTY**  
 MAILI, OAHU

**TAX MAP KEYS/OWNERSHIP**

*P. H. Jones*  
*Survey*



AREA	SECTION
8	710
SHEET NO. 3	
SCALE: 1" = 100'	



April 8, 1988

Dr. Bruce S. Anderson,  
Deputy Director for Environmental Health  
State of Hawaii  
Department of Health  
P. O. Box 3378  
Honolulu, Hawaii 96801

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
MAIANAE, OAHU, HAWAII  
TMK: 8-7-10: 02,14

Dear Dr. Anderson:

Thank you for the copy of your Memorandum of March 28, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, Department of General Planning, City and County of Honolulu regarding the subject Draft EIS. The following is provided in response to your Memorandum.

**VECTOR CONTROL**

Please be assured that we share the concerns raised in your EIS Preparation Notice letter as well as those in the above referenced letter regarding vector control issues as they relate to the proposed Maili Kai Project. As indicated in the Draft EIS (see Chapter IV, Section 2.2.2, Page IV-27), vector control was discussed to the extent that the problem is recognized and that your department is doing all that can be done given the funding and staffing situation within which your department must work. We, along with other members of the community applaud your efforts and suggest that possibly there are other measures that could be taken to assist you in your work.

As noted in the Draft EIS (see Chapter II, Section 3.1), one of the project objectives is to provide a range of housing opportunities in the Waianae Coast area in general and specifically in the Maili area. The residential units that are planned are, for the most part, affordable units that would provide additional housing opportunities to all people of Oahu, especially those that have been identified as having the most trouble finding suitable housing. The objectives of the proposed project are in keeping with the Governor's stated goals of

Dr. Bruce S. Anderson  
MAILI KAI DRAFT EIS  
April 8, 1988  
Page 2

providing additional affordable housing in the State. Further, given the State's right-to-farm law it would appear that both the farmer's rights as well as the future homeowner's rights to suitable housing could be protected. This could, and most likely would be accomplished by having clauses in the residential unit sales documents to inform potential buyers that there are long-standing agricultural operations in close proximity to the proposed project and that, due to the State's right-to-farm laws, future actions by the homeowners to attempt to restrict or hinder agricultural operations that qualify under the right-to-farm laws, are expressly waived. We believe that such clauses would serve to warn prospective buyers of existing conditions as well as protect the farmer's rights. These clauses would be part of the covenants, conditions and restrictions (CC & R's) that are standard elements of residential unit sales documents.

With regard to possible positive steps that could be taken to control insects and other pests, we would suggest the following:

1. Strict enforcement of regulations that require the generator or cause of vector control problems to control those vectors and/or the establishment of regulations that would place the control responsibility with the cause of the problem. We would be pleased to work with your department in the establishment of new regulations should that be required.
2. The adoption of a long-term plan of action that would include the development and establishment of an area wide animal waste digester that would process animal wastes as well as possibly produce methane to be used to generate electricity for use by the farmers for farm operations and, possibly, to pump agriculturally acceptable water from basal groundwaters. Such a project might be jointly funded by the federal, state and county governments and private users of the system, thereby benefiting the farmers as well as their neighbors. Such a project could also benefit your department by allowing a more efficient use of limited staff and funds. We certainly realize that this suggestion is a long-term solution, but also believe that such a project could become a reality.

The preceding suggestions and information relative to the sales document clauses will be included in the Final EIS.

Dr. Bruce S. Anderson  
MAILI KAI DRAFT EIS  
April 8, 1988  
Page 3

Air Pollution

The clauses noted above regarding the State's right-to-farm laws would also be applicable to the potential air quality problems noted in your Memorandum. It is possible that many of the potential buyers of the residential units that would be provided by the proposed project would prefer to experience the "country living" atmosphere, including the odor and vector conditions that would exist. It appears to us that agricultural activities and residential land uses can co-exist, providing that appropriate measures are taken by both groups to accommodate each other. As with the vector control issue, the preceding information will be included in the Air Quality section of the Final EIS.

Noise

The potential noise effects from renewed quarry operations will be included in the Final EIS per your request. At this time, there are no known plans to renew those operations.

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*

Matthew E. Grady  
Project Manager

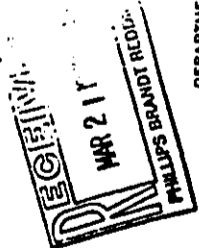
cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning

271\VL22\_.WP



JEP 3/18 9:32  
Received PSL 3-21-88

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



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 821  
HONOLULU, HAWAII 96809

MAR 4 1988

DOC. NO.: 2820E  
FILE NO.: 88-376

Honorable Donald A. Clegg 2 Doc. No: 2820E  
MAR 4 1988

Further, contrary to the statement in the report (p. IV-32), which says "...it has been determined and concurred with by state historic sites personnel that the proposed project would not have an adverse impact on any significant cultural resources," our Historic Sites Section staff has not previously reviewed this project. We were only briefed regarding findings. Our staff conducts no official reviews until a report is received, except in rare cases.

Section 1, the Introduction and Summary, will need to be revised to summarize significance and recommended mitigation. Following that, the statement should be made that as a result of the proposed mitigation, a "no effect" determination can be made.

Finally, the EIS should address the potential effects pesticides used on the golf course will have on migratory birds, such as the plover, attracted to the golf course as a feeding area.

Urban forestry is part of our program and our Division of Forestry and Wildlife is available, if assistance is needed, in planning tree and shrub plantings within the subdivision.

Thank you for the opportunity to comment on this project.

Very truly yours,

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

Honorable Donald A. Clegg  
Chief Planning Officer  
Department of General Planning  
City and County of Honolulu  
650 South King Street  
Honolulu, HI 96813

Dear Mr. Clegg:

SUBJECT: Maui Kai Draft EIS  
TRK: 8-7-10; 2 & 4

In response to your request, we have reviewed the document cited above and have the following comments to offer.

The historical and archaeological resources discussion in the EIS section on Historical and Archaeological Resources (Section IV, pages 28-33) summarizes and is in agreement with the consulting archaeologist's conclusions (Appendix E). We agree that the survey has found all historic sites, totalling 26 sites, and that 9 previously recorded sites have been destroyed. We also believe that enough information has been gathered to evaluate the significance of the historic sites. However, the significance evaluations offered in the EIS and in the consulting archaeologist's report are not acceptable, because they do not use the Hawaii and National Register of Historic Places criteria (the only legal criteria in state and federal historic preservation law) and because they do not clearly indicate if the sites are significant or not. This is a vital step in historic preservation review. For EIS documents it is vital that significant sites be clearly identified. Thus, it is our belief that the historic preservation review in this EIS must be revised, with significance assessments properly made.

Additionally, we cannot evaluate the mitigation plans for this project, until significance assessments are concluded. If all the sites are not significant, then no further mitigation would be needed. However, if some of the sites are significant, then an acceptable mitigation plan will probably be needed.

April 6, 1988

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

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
MAIANAE, OAHU, HAWAII  
TRK: 8-7-10: 02,14

Dear Mr. Paty:

The following is provided in response to your letter of March 4, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, Department of General Planning, City and County of Honolulu regarding the subject Draft EIS.

As noted in the consulting archaeologist's report (Appendix E of Draft EIS), the reconnaissance survey performed for the proposed Maili Kai project was carried out in accordance with the minimum requirements for reconnaissance-level survey recommended by the Society for Hawaiian Archaeology (SHA). These standards are currently being used by DLNR-HSS and the State Historic Preservation Officer (SHPO) as guidelines for the review and evaluation of archaeological reconnaissance survey reports submitted in conjunction with various development permit applications. Further, the consulting archaeologist's report notes that significance categories used in the evaluation process are based on the National Register criteria contained in the Code of Federal Regulations (36 CFR part 60). The State Department of Land and Natural Resources-Historic Sites Section (DLNR-HSS) uses these criteria to evaluate the eligibility for both the Hawaii State and National Register of Historic Places.

The preceding information will be included in the Final EIS to clarify the reconnaissance survey performance standards and the significance criteria used in evaluating the sites found on the property. We apologize for not including this information in the Draft EIS. It is our understanding that inclusion of the above information in the Final EIS will allow your department to evaluate the mitigation plans for the project.

FINANCIAL PLAZA OF THE PACIFIC      190 MERCHANT STREET, SUITE 1111      HONOLULU, HAWAII 96813  
TELEPHONE: (808) 531-5601      TELECOPIER: (808) 533-1402  
HONOLULU IRVINE DENVER

Mr. William W. Paty  
MAILI KAI DRAFT EIS  
April 6, 1988  
Page 2

The statement on page IV-32 of the Draft EIS will be revised in the Final EIS to reflect your department's review of the Historical and Archaeological Resources section of the EIS.

Chapter I, Introduction and Summary and Chapter IV, Section 3, Historical and Archaeological Resources of the Final EIS will be revised to summarize significance and recommended mitigation and to add the statement that as a result of the proposed mitigation, a "no effect" determination can be made.

Based on our experience with other projects in Hawaii and knowledge of the use of biocides and fertilizers on golf courses in Hawaii, it does not appear that there would be any adverse effects to the wildlife inhabiting or frequenting the proposed project site due to the application of biocides or fertilizers to the golf course or other landscaped areas. This is due in part to the relatively low dosages of biocides that are applied to golf courses; the application of biocides in accordance with manufacturer's recommendations; and the relatively rapid degradation of biocides by natural actions of the soil-sed interrelationships. Although specific details regarding which biocides or fertilizers would be used on the golf course are not available at this level of planning, it is presumed that the biocides would be in Toxicity Categories III and IV, indicating unrestricted use and fairly rapid degradation. We are aware that there are national concerns, as well as state-wide concerns regarding the uses of various chemicals on golf courses and landscape areas. However, the literature searches and analyses that we have conducted for other projects (for example see Chapter IV, Section 2.5.1.2 and Appendix G, Punalu'u Resort Final EIS, April 1988), indicate that there does not appear to be any significant impact on the terrestrial or aquatic biota inhabiting or frequenting golf courses, provided that the chemicals are applied in accordance with manufacturer's recommendations. We appreciate your concern regarding the issue of biocides and fertilizers and share that concern.

Thank you for your offer to assist in planning tree and shrub plantings. Please be assured that we will call upon the Division of Forestry and Wildlife should we require assistance.

Mr. William W. Paty  
MAILI KAI PROPERTY DRAFT EIS  
April 6, 1988  
Page 3

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the final EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning

271FL20\_.WP

JOHN HALLIDAY  
DEPARTMENT OF LAND AND NATURAL RESOURCES



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
DIVISION OF STATE PARKS  
P. O. BOX 131  
HONOLULU, HAWAII 96813

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

WILEY E. LINDGREN  
DIRECTOR

AGRICULTURE DEVELOPMENT  
ADULT EDUCATION  
ADULT RESOURCES  
CHILDREN AND YOUTH  
COMMUNITY AFFAIRS  
COUNSELING AND RECREATION  
COURT REPORTING  
CONTRACTS  
FOOD SERVICE  
GENERAL INVESTIGATIONS  
HUMAN RESOURCES  
INFORMATION SYSTEMS  
LABOR RELATIONS  
LAND MANAGEMENT  
PLANNING  
PUBLIC AFFAIRS  
RECORDS MANAGEMENT  
TRAINING  
WATER AND LAND DEVELOPMENT

March 21, 1988

Matthew E. Grady  
PBR Hawaii  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

Dear Mr. Grady:

SUBJECT: Environmental Assessment Review for proposed 18-Hole Golf Course  
Maui, Maianai, Oahu  
TKK: 8-7-10; 02, 14

Thank you for your letter of March 2 to Dr. Joyce Bath of our staff, requesting our comments on your Environmental Assessment and Conditional Use Permit for the proposed Maui Golf Course.

We have already reviewed your Draft EIS and assume our comments will be reaching you soon. However, in view of the time factor, we are attaching copies of one memo from our office and one letter from the Department which relate to your project.

The only problem with your Draft EIS from our perspective is that the text in the EIS does not accurately reflect the significance evaluations made by your consulting archaeologist. We recommended that your Draft EIS text be revised to use the evaluations and recommendations made by the archaeologist.

We do believe that if the recommendations of your consulting archaeologist are carried out, then your project will have "no adverse effect" on significant historic sites.

Sincerely yours,

RALSTON H. NAGATA  
State Parks Administrator and Deputy  
State Historic Preservation Officer

Attachments (2)

March 4, 1988

MEMORANDUM

TO: Roger C. Evans, UCEA  
FROM: Ralston H. Nagata, State Parks Administrator  
SUBJECT: Review of Maui Kai Draft EIS (88-376)  
Maui, Maianai, Oahu  
TKK: 8-7-10; 02 and 14

HISTORIC SITES SECTION CONCERNS:

The consulting archaeologist for the applicant called us regarding this project. This is to clarify our previous comments of February 29, 1988. The consulting archaeologist's report does evaluate significance according to National Register criteria in Table 2. However, our comments on the text of the EIS still stand, because Table 2, rather than Table 1, of the archaeological report should have been included in the EIS text. The EIS text should be modified to reflect this table. In particular, the text in the introduction and Summary, Section 1, needs to be revised, as noted in our previous letter.

/s/ RALSTON H. NAGATA

RALSTON H. NAGATA

JB:bf 3/4/88

718 10 10 10

STATE OF HAWAII  
 DEPARTMENT OF LAND AND NATURAL RESOURCES  
 P. O. BOX 481  
 HONOLULU, HAWAII 96808

MAR 4 1 58 PM '88

STATE OF HAWAII  
 DEPARTMENT OF LAND AND NATURAL RESOURCES  
 P. O. BOX 481  
 HONOLULU, HAWAII 96808

DOC. NO.: 2820E  
 FILE NO.: 88-376

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

CIVILIAN USE  
 STATE PARKS  
 FOREST & LANDS  
 DEPT.

PLANNING OFFICER  
 1/14/88  
 1/14/88  
 1/14/88

STATE OF HAWAII  
 DEPARTMENT OF LAND AND NATURAL RESOURCES  
 P. O. BOX 481  
 HONOLULU, HAWAII 96808

MAR 4 1988

DOC. NO.: 2820E  
 FILE NO.: 88-376

Honorable Donald A. Clegg 2. Doc. No: 2820E  
 MAR 4 1988

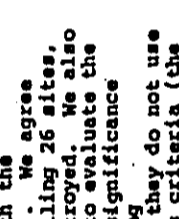
Further, contrary to the statement in the report (p. IV-32), which says "...it has been determined and concurred with by state historic sites personnel that the proposed project would not have an adverse impact on any significant cultural resources," our Historic Sites Section staff has not previously reviewed this project. We were only briefed regarding findings. Our staff conducts no official reviews until a report is received, except in rare cases.

Section 1, the Introduction and Summary, will need to be revised to summarize significance and recommended mitigation. Following that, the statement should be made that as a result of the proposed mitigation, a "no effect" determination can be made.

Finally, the EIS should address the potential effects pesticides used on the golf course will have on migratory birds, such as the plover, attracted to the golf course as a feeding area.

Urban forestry is part of our program and our Division of Forestry and Wildlife is available, if assistance is needed, in planning trees and shrub plantings within the subdivision.

Thank you for the opportunity to comment on this project.

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

Honorable Donald A. Clegg  
 Chief Planning Officer  
 Department of General Planning  
 City and County of Honolulu  
 650 South King Street  
 Honolulu, HI 96813

Dear Mr. Clegg:

SUBJECT: Maili Kai Draft EIS  
 TRK: 8-7-10: 2 & 4

In response to your request, we have reviewed the document cited above and have the following comments to offer.

The historical and archaeological resources discussion in the EIS section on Historical and Archaeological Resources (Section IV, pages 28-33) summarizes and is in agreement with the consulting archaeologist's conclusions (Appendix E). We agree that the survey has found all historic sites, totalling 26 sites, and that 9 previously recorded sites have been destroyed. We also believe that enough information has been gathered to evaluate the significance of the historic sites. However, the significance evaluations offered in the EIS and in the consulting archaeologist's report are not acceptable, because they do not use the Hawaii and National Register of Historic Places criteria (the only legal criteria in state and federal historic preservation law) and because they do not clearly indicate if the sites are significant or not. This is a vital step in historic preservation review. For EIS documents it is vital that significant sites be clearly identified. Thus, it is our belief that the historic preservation review in this EIS must be revised, with significance assessments properly made.

Additionally, we cannot evaluate the mitigation plans for this project, until significance assessments are concluded. If all the sites are not significant, then no further mitigation would be needed. However, if some of the sites are significant, then an acceptable mitigation plan will probably be needed.

April 6, 1988

Mr. Ralston H. Nagata  
State Parks Administrator and Deputy  
State Historic Preservation Officer  
State of Hawaii  
Department of Land and Natural Resources  
Division of State Parks  
P. O. Box 621  
Honolulu, Hawaii 96809

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
MAIANAE, OAHU, HAWAII  
TRK: 8-7-10: 02,14

Dear Mr. Nagata:

Thank you for your letter of March 21, 1988 regarding the subject Draft EIS. The following is provided in response to your letter.

Comments from the Department of Land and Natural Resources regarding the subject Draft EIS have been received and responded to via our letter of April 6, 1988, a copy of which is attached for your information. As noted in our letter, the Final EIS will be revised to include the archaeological reconnaissance survey performance criteria and the significance criteria used to evaluate the sites. In addition, Table 2 of the consulting archaeologist's report will be included in the Final EIS along with the present Draft EIS table (Table IV-6) to assure completeness of the Final EIS. Also as noted in our April 6, 1988 letter to Mr. William W. Paty, the Final EIS text will be revised to reflect the "no adverse effect" on significant historic sites statements contained in your letter and in Mr. Paty's letter of March 4, 1988.

Mr. Ralston H. Nagata  
MAILI KAI DRAFT EIS  
April 6, 1988  
Page 2

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning

271FL21.WP

March 30, 1988

Mr. Herbert K. Muraoka  
Director and Building Superintendent  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAHE, OAHU, HAWAII  
TKR: 8-7-10: 02,14

Dear Mr. Muraoka:

This is to acknowledge receipt of your Memorandum to Mr. Donald A. Clegg, Director, Department of General Planning of February 18, 1988 regarding the subject Draft EIS. Thank you for participating in the Draft EIS review process.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning

271\PL\_0\_.WP

PB 88-164

February 18, 1988

MEMO TO: MR. DONALD A. CLEGG, DIRECTOR  
DEPARTMENT OF GENERAL PLANNING

FROM: HERBERT K. MURAKA  
DIRECTOR AND BUILDING SUPERINTENDENT

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR  
MAILI KAI PROPERTY  
TKR: 8-7-10:02 AND 14

We have reviewed the draft EIS for the Maili Kai property and have no comments.

Thank you for the opportunity to review the draft EIS.

HERBERT K. MURAKA  
Director and Building Superintendent

TH:ly J. Harada  
cc: Mr. Matthew E. Grady  
PBR Hawaii

March 21, 1988

Mr. Alfred J. Thiede  
Director and Chief Engineer  
City and County of Honolulu  
Department of Public Works  
650 South King Street  
Honolulu, Hawaii 96813

**SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANA'E, OAHU, HAWAII  
TRK: 8-7-10: 02, 14**

Dear Mr. Thiede:

Thank you for the copy of your Memorandum of February 29, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, Department of General Planning regarding the subject Draft EIS. The following is provided in response to your Memorandum.

1. As noted in the Draft EIS (see Chapter IV, Section 5.3), the proposed housing units would be connected to the 18-inch sanitary sewer line in Maipalooa Road. We appreciate your confirmation that the line is adequate to serve the proposed project.
2. Also as noted in Chapter IV, Section 5.3, project generated wastewaters would be directed to the Waianae Wastewater Treatment Plant, which also are adequate to handle expected flows from the proposed project. We appreciate the assistance and guidance provided by your staff to our engineers in planning the proposed project wastewater collection and disposal.
3. During construction various methods would be used to control erosion and soil loss, including incremental grading and the construction of permanent and temporary swales and retention basins to direct and hold surface water runoff. The project developers view the property soils as a valuable and limited resource to be protected and retained on-site. As presently planned, following development, rainwater runoff would be directed toward drainage swales and structures and existing drainage channels. To the extent practical surface water runoff would be directed toward the golf course to prevent siltation of Maili Stream and channel.

FINANCIAL PLAZA OF THE PACIFIC      150 MERCHANT STREET, SUITE 1111      HONOLULU, HAWAII 96813  
TELEPHONE: (808) 531-5631      TELECOPIER: (808) 533-1402  
HONOLULU INVINE DENVER

2.

PHILLIPS

ENV 88-53

February 29, 1988

**MEMORANDUM**

**TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER  
DEPARTMENT OF GENERAL PLANNING**

**FROM: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER**

**SUBJECT: DRAFT EIS FOR MAILI KAI PROPERTY, MAILI, WAIANA'E, OAHU, HAWAII  
(TAX MAP KEY: 8-7-10:02 AND 14)**

The subject Draft EIS was reviewed and we have the following comments:

1. The existing 18-inch sanitary sewer in Maipalooa Road is adequate to serve the proposed development.
2. Wastewater treatment and disposal facilities are also adequate.
3. Best management practices should be employed to control erosion and soil loss at the project site during and after construction. We also recommend the retention of stormwater; e.g., at the proposed golf course so that after development, the quantity and rate of runoff leaving the site will be minimized to avoid the siltation of Maili stream and channel.
4. At the appropriate time, a drainage master plan should be submitted to the Drainage Section, Division of Engineering, for approval.

*Alfred J. Thiede*

ALFRED J. THIEDE  
Director and Chief Engineer

cc: PBR Hawaii



Mr. Alfred J. Thiede  
DRAFT EIS FOR MAILI KAI PROPERTY  
March 21, 1988  
Page 2

4. A drainage master plan will be developed and submitted to your department for approval at the time detailed engineering and design drawings are prepared.

Thank you for your comments and participation in the Draft EIS review process. Your comments and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady,  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer  
City and County of Honolulu

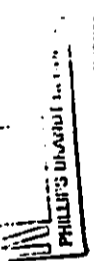
D:\271\PL\_4.WP

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT  
**CITY AND COUNTY OF HONOLULU**

630 SOUTH KING STREET  
HONOLULU, HAWAII 96813  
PHONE: 523-2161



FRANK F. J. JONES  
DIRECTOR



MIKE MOON  
DIRECTOR  
ROBERT MITSUDA  
DEPUTY DIRECTOR

March 7, 1988

MEMORANDUM

**TO:** Donald A. Clegg, Chief Planning Officer  
Department of General Planning

**FROM:** Mike Moon

**SUBJECT:** Draft Environmental Impact Statement  
Mailli Kai Property  
Mailli, Waianae, Oahu

We appreciate the opportunity to review and comment upon the Draft Environmental Impact Statement for the Mailli Kai property.

As noted in our original comments submitted in conjunction with the review of the EIS Preparation Notice for the project, the proposed development will be subject to City requirements for the provision of affordable housing. Staff from the Department is available to work with the developer to coordinate an appropriate affordable housing program.

Thank you for the opportunity to comment.

*Robert M. Jones*  
MIKE MOON  
Director

cc: Mr. Matthew E. Grady

**PBR**  
HAWAII

LANDSCAPE ARCHITECTURE      PLANNING      ENVIRONMENTAL STUDIES

March 21, 1988

Mr. Mike Moon, Director  
City and County of Honolulu  
Department of Housing and  
Community Development  
650 South King Street  
Honolulu, Hawaii 96813

**SUBJECT:** DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
Dear Mr. Moon:  
TMK: 8-7-10: 02, 14

Dear Mr. Moon:

Thank you for the copy of your Memorandum of March 7, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, Department of General Planning regarding the subject Draft EIS. The following is provided in response to your Memorandum.

As described in the Draft EIS (see Chapter II, Section 4.1.8), the majority of the proposed housing units would be priced between \$105,000 and \$55,000, thereby falling within the definition of affordable and gap group housing. In addition, a substantial portion of the "view units" would also be priced at "affordable" prices. The developer will continue to work with your staff to coordinate an appropriate affordable housing program at the time detailed engineering and design drawings are prepared.

Thank you for your comments and participation in the Draft EIS review process. Your comments and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady,  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer  
City and County of Honolulu

D:\271\PL\_5\_WP

FINANCIAL PLAZA OF THE PACIFIC      150 MERCHANT STREET, SUITE 1111      HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-5631      TELECOPIER: (808) 523-1402  
HONOLULU IRVINE DENVER

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



FRANK P. FAH  
DIRECTOR

JOHN E. HIRTEN  
DIRECTOR  
JOSEPH M. MAGALON, JR.  
DEPUTY DIRECTOR

PL1.1010  
TR-932

March 21, 1988

MEMORANDUM

TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER  
DEPARTMENT OF GENERAL PLANNING

FROM: JOHN E. HIRTEN, DIRECTOR

SUBJECT: MAILI KAI PROPERTY  
DRAFT ENVIRONMENTAL IMPACT STATEMENT  
TMK: 8-7-10: 2 AND 14

This is in response to the State Office of Environmental Quality Control's request of February 8, 1988 to review and comment on the subject project.

We offer the following comments:

1. All roadways should be designed in accordance with all applicable roadway design standards. Preliminary plans showing detailed roadway alignments should be submitted for review as soon as they are available.
2. Several alternatives indicate a direct access to Kulaupuni Street. The associated impacts to the affected street system due to this connection should also be addressed.

Questions may be referred to Kenneth Hirata of my staff at Local 5009.

/ cc: Matthew B. Grady  
PBR Hawaii

(for)   
JOHN E. HIRTEN

PBR  
HAWAII

LANDSCAPE ARCHITECTURE      PLANNING      ENVIRONMENTAL STUDIES

April 6, 1988

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

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
TMK: 8-7-10: 02,14

Dear Mr. Hirten:

Thank you for the copy of your Memorandum of March 21, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, Department of General Planning regarding the subject Draft EIS. The following is provided in response to your Memorandum.

1. All roadways within the proposed project will be designed to applicable roadway design standards. Preliminary plans showing roadway alignments and designs will be submitted to appropriate agencies as soon as they are available.
2. As presently planned, the primary ingress and egress to the proposed residential units would be via Kaula Road. Currently there is uncertainty as to the development of the adjoining parcel by others, and the project traffic is not dependent on its use. Should it be determined in the future that additional access via Kula Upuni Street is required, appropriate traffic and engineering analyses will be performed to determine the associated impacts.

FINANCIAL PLAZA OF THE PACIFIC      130 MERCHANT STREET, SUITE 1111      HONOLULU, HAWAII 96813  
TELEPHONE: (808) 531-5631      TELECOPIER: (808) 525-1402  
HONOLULU IRVING DENVER

XII-135

Mr. John E. Hirten  
MAILI KAI DRAFT EIS  
April 6, 1988  
Page 2

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning

271FL13.WP

U S G O P R I N T I N G O F F I C E

POLICE DEPARTMENT  
**CITY AND COUNTY OF HONOLULU**  
 1433 SOUTH KING STREET  
 HONOLULU, HAWAII 96814 - APT. 601H (808) 945-3111



FRANK E. FARR  
 MAYOR

OUR REFERENCE KH-LK

March 3, 1988

TO: DONALD A. CLEGG, CHIEF PLANNING DIRECTOR  
 DEPARTMENT OF GENERAL PLANNING

FROM: DOUGLAS G. GIBB, CHIEF OF POLICE  
 HONOLULU POLICE DEPARTMENT

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT  
 MAILI KAI PROPERTY. TMK: 8-7-10:02 AND 14

We have reviewed the draft environmental impact statement in support of the amendment to the Waianae Development Plan and wish to offer the following comments.

The construction of 287 units per year for a period of five years will result in extensive travel and occupation on Farrington Highway and Kaula Road by heavy machine vehicles. To minimize traffic congestion and safety hazards, we suggest that the development plan include effective communication with the community in that area, cooperative effort with the State Department of Transportation, and the service of special duty officers.

We would also urge that consideration be given to environmental security (e.g. deadbolts, window locks, adequate lighting, etc.) when both the residential units and public recreational facilities are designed.

We would appreciate being kept informed of the mitigation measures for the Farrington Highway/Kaula Road intersection and any further details of the Maili Kai Community design.

Thank you for the opportunity to comment.

*Douglas G. Gibb*  
 DOUGLAS G. GIBB  
 Chief of Police

CC: Mr. Matthew E. Grady



LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

March 30, 1988

Mr. Douglas G. Gibb  
 Chief of Police  
 Police Department  
 City and County of Honolulu  
 1455 South Beretania Street  
 Honolulu, Hawaii 96814

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
 MAILI KAI PROPERTY HOUSING PROJECT  
 WAIANAE, OAHU, HAWAII  
 TMK: 8-7-10: 02,14

Dear Chief Gibb:

Thank you for the copy of your letter of March 3, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, Department of General Planning regarding the subject Draft EIS. The following is provided in response to your letter.

As representatives of the developer of the proposed project we have had and will continue to have meetings with the Waianae Coast Neighborhood Board and residents in the immediate vicinity of the proposed project. We too share your concerns regarding the movement of heavy vehicles on Farrington Highway and surrounding streets and will take the appropriate measures to assure that such movements are kept to a minimum. As with most construction projects, it is likely that once equipment is moved on-site, it will stay there until the project is completed or that equipment is no longer needed. This generally means that equipment is on public roadways only twice, once when it is moved on-site and once when it is moved off-site.

Although detailed planning and design of the residential units planned for the proposed project has not taken place, your comments regarding environmental security measures will be forwarded to the architects and engineers at the appropriate time.

To determine the impacts of increased traffic on the Farrington Highway/Kaula Road intersection, a traffic analysis was performed and is included in the Draft EIS as Appendix F. Should the numbers and/or mix of planned residential units change significantly in the future this analysis will be re-performed and your department informed of the results.

FINANCIAL PLAZA OF THE PACIFIC 150 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813  
 TELEPHONE: (808) 521-5631 TELETYPE: (808) 521-1102  
 IRVING LEE IRVING DRIVE

X111-02

Mr. Douglas G. Gibb  
MAILI KAI DRAFT EIS  
March 30, 1988  
Page 2

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning

271\PL11\_.WP

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

Mr. William F. Brandt, President  
PBR Hawaii  
Page 2  
March 24, 1988



FRANK F. PASI  
MAYOR

DONALD A. CLEGG  
CHIEF PLANNING OFFICER  
GENE CONNELL  
DEPUTY CHIEF PLANNING OFFICER

CP/DGP 2/88-449

March 24, 1988

Mr. William F. Brandt, President  
PBR Hawaii  
Financial Plaza of the Pacific  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

Dear Mr. Brandt:

Draft Environmental Impact Statement (DEIS)  
Mali Kai Property, Mali, Maunaloa, Oahu

This is to provide our comments on your Draft EIS for the  
Mali Kai project.

As you know we are also reviewing your request for a  
Development Plan amendment (88/W-1) in the 1988 Annual  
Amendment Review of Development Plans. Our comments herein are  
not intended to preempt additional questions which we may raise  
during our Development Plan review. The comments below are in  
addition to those you may receive from other agencies.

1. In light of the Hawaii "right-to-farm" law, a  
discussion of the mitigating measures that will be  
developed and implemented to overcome the strong odors  
from the neighboring chicken and swine farms during  
calm and Kona wind periods should be included in the  
final EIS (PEIS). In this regard, the PEIS should  
address the possibility that Mali is one of the  
several Maunaloa coast areas subject to diurnal land  
and sea breezes. It is possible that the NWS Barbers  
Point wind regime does not characterize this coast  
accurately.
2. A large portion of your area No. 4 which you indicate  
to have slopes between 16 and 20 percent actually has  
slopes greater than 20 percent. The final EIS should  
correct this error and explain in more detail your  
proposal to develop these steep lands.

3. The PEIS should clarify the number of affordable units  
by type, size and estimated cost to be provided in  
your project. Since the DEIS does not appear to be  
consistent with the Development Plan application in  
this respect, please define the family income limits  
for affordable housing and indicate the percentage and  
number of affordable units being provided.
4. On page IV-4, you state that "slickensided" clay soils  
were noted in test pits and borings, and large  
portions of the slopes of the site have deep deposits  
of these soils. Clay soils on slopes have caused  
serious problems for homeowners on Oahu. In light of  
this, your final EIS should discuss fully the  
potential problems of soil slippage in your  
development. If soil slippage is determined to be a  
possibility, then mitigation measures should also be  
discussed.
5. With the exception of your statement concerning solar  
heating on page V-21, we note that the development  
proposes to exclusively use electric for cooking and  
water heating. The General Plan section on "Energy"  
contains a number of objectives and policies relating  
to energy conservation. Please include a discussion  
of the appropriateness of using other energy sources  
such as gas cooking and water heating.
6. For your information, this project may require  
processing of Development Plan Public Facilities Map  
amendments for road, sewer, and water facilities.

If you have any questions, please contact Mr. Randy Hara at  
523-4483.

Sincerely,

*Donald A. Clegg*  
DONALD A. CLEGG  
Chief Planning Officer

X H I W O

April 6, 1988

Mr. Donald A. Clegg  
Chief Planning Officer  
Department of General Planning  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
TMK: 8-7-10: 02,14

Dear Mr. Clegg:

Thank you for your letter of March 24, 1988 regarding the subject Draft EIS. The following is provided in response to your letter.

1. As noted in the Draft EIS (see Chapter IV, Section 1.6.2), it is probable that residents of Maili Kai will experience odors from nearby agricultural activities and that these effects will be most pronounced during calm wind and rainy periods. As you may be aware, calm and southerly wind conditions occur, on the average, about 30 percent of the time. Because the agricultural activities, the source of the odors, are not under the control of the developers of the proposed project and will not be under the control of the residents of Maili Kai, it would be difficult to exercise or implement cost effective measures that might reduce the odors. As implied in your letter, the Hawaii right-to-farm law will preclude the future residents from taking any action to restrict the present farming operations as well as those that may begin at least one year in advance of the proposed Maili Kai homes being built and occupied. There are no known practical methods of controlling agricultural odors, and as such, the residents of Maili Kai will be subjected to those odors. To assist in assuring that the farmer's rights are maintained, it is likely that the sales documents for the Maili Kai residences would have a clause stipulating that the farmer's have a right to farm, per the Hawaii right-to-farm law and that the residents forego the right to attempt to restrict farming operations and/or hinder present or possible future farming operations in the vicinity of the development.

FINANCIAL PLAZA OF THE PACIFIC      150 MERCHANT STREET, SUITE 1111      HONOLULU, HAWAII 96813  
TELEPHONE: (808) 551-5631      TELECOPIER: (808) 525-1402  
HONOLULU IRVINE DENVER

Mr. Donald A. Clegg  
MAILI KAI DRAFT EIS  
April 6, 1988  
Page 2

Maili Kai does experience diurnal land and sea breezes, and this information will be included in the Final EIS. However, it does not seem likely that much relief from farm odors would be provided by the diurnal wind shifts, due to the prevalence of the northeast trades and the close proximity of the farming operations to the proposed project. The Final EIS will be strengthened in regard to the potential farm odor questions to assure that decision makers are fully aware of the potential conflicts that may arise in the future.

2. Upon further review of Figure II-4, we have found that an error was made with reference to the designations of Areas 4 (slopes 16 to 20 percent) and 5 (slopes 20 percent and greater). The corrected drawing will be included in the Final EIS and Table II-1 revised to indicate that 13 percent ( $\pm$  54 acres) of the property (versus 19 percent  $\pm$  76 acres) will lie within Area 4 and 33 percent ( $\pm$  127 acres) of the property (versus 27 percent  $\pm$  103 acres) will lie within Area 5.

Lot sizes in Area 4 (slopes 16 to 20 percent) are nominally sized to be 10,000 square feet or more with buildings expected to be on the lower, flatter slopes. Should it be necessary at the time final planning and design efforts are performed, lot sizes could be increased and construction mitigation measures taken to reduce or eliminate the threat of slippage of the homes. The construction measures that might be taken could include construction of boulder abutment walls, removal and replacement of poor materials with good soil materials, construction of concrete ditches on the hillside above the new residences and extension of structure supports to more stable material. This information will be included in the Final EIS.

3. The attached table will be included in the Final EIS to clarify the number of affordable units by type, size and estimated costs. As indicated in the table, essentially all of the proposed units with the exception of some of the view lots, will be "affordable" units, depending on family size. Further, the inconsistencies between the Development Plan application and the Final EIS will be corrected.

4. The Final EIS will be revised to indicate that more detailed soils investigations and testing will be undertaken prior to the preparation of construction drawings. Additionally, as



Mr. Donald A. Clegg  
 MAILI KAI DRAFT EIS  
 April 6, 1988  
 Page 3

**DRAFT**

**TABLE**  
**MAILI KAI HOUSING PROVISIONS**

MAILI KAI PROJECT		Affordable Gap Group Units		Estimated Sales Price	
Unit Type	No. of Units	Unit Type	No. of Units	Unit Type	Estimated Sales Price
Single Family	411	Single Family	411	Single Family	\$95 - 120,000
Multi Family (Town House)	432	Multi Family (Town House)	432	Multi Family (Town House)	\$70 - 85,000
Low Density Apartment	472	Low Density Apartment	472	Low Density Apartment	\$55 - 65,000
<b>Total:</b>	<b>1,315</b>	<b>Total:</b>	<b>1,315</b>		
<b>Market Priced Units</b>					
Unit Type	No. of Units	Unit Type	No. of Units	Unit Type	Estimated Sales Price
Single Family	120	Single Family	120	Single Family	\$130 - 160,000
<b>TOTAL UNITS: 1,435</b>					

5. noted previously in response number 2 above, construction mitigation measures could be taken to reduce or eliminate the threat of slippage of the homes.

The proposed development would exclusively use electricity for cooking, water heating and lighting, with the possible exception of the possibility of installing solar water heaters, or possibly heat pumps, for water heating purposes. The use of gas for cooking purposes could increase the costs of development, i.e., would add to the costs by requiring that gas lines and/or tanks be installed, and possibly would not reduce energy consumption but merely transfer the use of one form of energy to another. However, during the final design stages of the project, engineering and economic analyses of both forms of energy for cooking and water heating purposes would be performed to assure that the homes are developed in a cost effective and efficient manner. Additional information regarding the energy source and the conservation measures to be employed relative to the state and County plans and policies will be included in the Final EIS.

6. The possibility that the proposed project may require processing of Development Plan Public Facilities Map amendments for road, sewer and water facilities will be included in the appropriate sections of the Final EIS.

We appreciate the assistance your Mr. Randy Hara has given during the preparation of the Draft EIS. Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
 Matthew E. Grady  
 Project Manager

Attachments

271FL16\_.WP2

**AFFORDABLE SALES PRICES OF GAP GROUP HOMES (1)**  
 City and County of Honolulu

Family Size	Income Range of Gap Group Families	Range of Available Monthly Mortgage Payments	Range of Affordable Home Sales Price
1	\$19,100 - 28,644	\$409 - 664	\$51,827 - 84,050
2	\$21,850 - 32,736	\$483 - 733	\$61,111 - 97,866
3	\$24,555 - 36,828	\$555 - 882	\$70,227 - 111,682
4	\$27,300 - 40,920	\$628 - 991	\$79,512 - 125,498
5	\$29,000 - 43,375	\$673 - 1,057	\$85,252 - 133,787

Source: (1) Bureau Definition of "Affordable Housing", BNA, June 15, 1987.

The hypothetically affordable home sales price was derived by performing the following arithmetic calculations, and was based on certain assumptions including a 30-year mortgage, a 10% interest rate, and a 10% downpayment.

The annual income was divided by 12 to arrive at a monthly income. This monthly income was then multiplied by 120 (representing the qualifying ratio). This amount subtracted from the product for estimated mortgage payments, and the estimate representing an amount available each month for principal and interest (P & I). Working backwards, the mortgage principal amount was calculated based on the amount available each month for P & I (principal and interest); the sales price was then calculated by dividing the mortgage principal amount by 10% (to take into consideration a 10% downpayment).

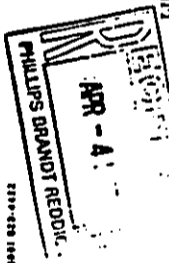
**Example:**

Annual Income	\$ 27,300 x 12
Monthly Income	\$ 2,275
Qualifying ratio	\$ 273,000
Amount available for housing payment	\$ 273,000
Less estimated mortgage	\$ (100)
Amount available for P & I	\$ 272,900
Mortgage principal amount	\$ 429
"Affordable" sales price	\$ 71,550 x 90
	\$ 79,500

16P 3/88-1292

DEPARTMENT OF LAND UTILIZATION  
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET  
HONOLULU, HAWAII 96813



FRANK P. PAUL  
DIRECTOR

April 6, 1988

LU2/88-822 (RF)

March 24, 1988

JOHN P. WHALEN  
DIRECTOR

MEMORANDUM

TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER  
DEPARTMENT OF GENERAL PLANNING

FROM: JOHN P. WHALEN, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR  
THE MAILI KAI PROPERTY, TAX MAP KEY 8-7-10: 02, 14

In general, the document appears quite thorough. The discussion of alternatives is particularly useful. We note two areas where potential impacts need further discussion.

1. The DEIS gives no evidence for the conclusion (p. IV, 9) that the Navy's Lualualei radio transmitters "do not emit hazardous radiation". More thorough study of this potential hazard is necessary. We understand that the State Department of Health (DOH) is preparing new regulations on this subject. Would the proposal conform with these regulations?
2. Neighboring swine and poultry operations emit strong odors which will be blown by prevailing winds directly into the proposed development. As noted in the letter from the State DOH (1/13/88), this and the vectors associated with the farms (flies, mosquitoes, rodents) are unsolvable problems. This factor should be given careful consideration in deciding on the proposed land use change.

*John P. Whalen*  
JOHN P. WHALEN  
Director of Land Utilization

JPH:s1  
17218

PBR  
HAWAII

LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

Mr. John P. Whalen, Director  
Department of Land Utilization  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
TKR: 8-7-10: 02, 14

Dear Mr. Whalen:

The following is provided in response to your Memorandum of March 24, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, Department of General Planning regarding the subject Draft EIS.

1. The attached information, provided to us by the Department of Navy regarding potential radiation hazards from the Navy's Lualualei radio transmitters, is provided for your information and files. As indicated, the transmitters pose no radiation hazards outside the naval base, and meet current Permissible Exposure Limits (PEL). As such, the Environmental Protection Agency notice published in the Federal Register Volume 51, Number 146, Wednesday, July 30, 1986 entitled "Federal Radiation Protection Guidance; Proposed Alternatives for Controlling Public Exposure to Radiofrequency Radiation; Notice of Proposed Recommendations" under consideration by the State Department of Health is not applicable to the proposed Maili Kai project. The attached information will also be included in the Final EIS.
2. As noted in the Draft EIS (see Chapter IV, Section 1.6.2), it is probable that residents of Maili Kai will experience odors from nearby agricultural operations and that these odors will be most pronounced during calm wind and rainy periods. Calm and southerly winds occur approximately 30 percent of the time and rainfall in the proposed project area averages about 20 inches per year, with the majority of the rainfall occurring in the winter months. Both the State Department of Agriculture and the City and County Department of General Planning have commented on the potential impacts

FINANCIAL PLAZA OF THE PACIFIC 130 MERCHANT STREET, SUITE 311 HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-5631 TELESCOPIER: (808) 523-1402  
HONOLULU IRVINE DENVER

Mr. John P. Whalen  
MAILI KAI PROPERTY DRAFT EIS  
April 6, 1988  
Page 2

resulting from agriculturally generated odors. Given the State's right-to-farm law, it is likely that the sales documents for the residences in Maili Kai would contain clauses that would preclude future residents of Maili Kai from restricting or attempting to restrict the farmer's rights to farm in the area. There are no known practical methods of controlling farm odors. As such, potential residents of Maili Kai would be made aware of the possibility of farm odors in the area and the requirement to forego their rights to restrict the farmer's rights to farm.

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning

Attachments

271FL19\_WP



DEPARTMENT OF THE NAVY  
PACIFIC DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND  
(HAWAIIAN ISLANDS)  
PEARL HARBOR, HAWAII 96807-7200

PHILLIPS GRANT RESIDICK

10550/1187M  
Ser 09A31/ 2283  
18 MAR 1988

Mr. Matthew E. Grady  
PBR Hawaii  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

Subj: POTENTIAL RADIATION EFFECTS, MAILI KAI HOUSING PROJECT  
MAIWAIE, OAHU, HAWAII, TM 8-7-10: 2,4

Dear Mr. Grady:

This in response to your letter of January 4, regarding potential radiation effects from the Ikaualae transmitters.

The transmitters and associated antennas are used to broadcast in the Very Low Frequency (VLF), Low Frequency (LF), High Frequency (HF) and the microwave bands. VLF covers the frequencies from 10 kHz to 30 kHz, LF covers frequencies from 30 kHz to 300 kHz and HF covers the frequencies from 2 MHz to 32 MHz. The microwave circuit transmission radiated energy is very low and is not radiated in the direction of your project site.

The effects of electromagnetic radiation (EMR) to personnel are caused by the absorption of the electromagnetic energy into the body or parts of the body. When the energy is absorbed, heat is produced. If the heat cannot be dissipated at the same rate at which it is being produced, the body temperature will rise. If the rise is to a sufficiently high temperature the body tissues will suffer damage.

The amount of absorption depends on the dimensions of the body and the wavelength of the EMR. The body acts as a receiving antenna and it must be the correct length to effectively pick up the radiated energy. The correct length is at least a tenth of the wavelength for any significant effect to occur. As a comparison, wavelengths in the VLF band are 6.2 - 18.6 miles. Wavelengths in the LF and HF bands respectively are 3280 - 32,800 feet and 30.75 - 492 feet.

The amount of absorption also depends on the amount of power radiated by the transmitting antenna. The energy reaching the person must be of sufficient strength to cause the heating effect.

Another potential effect is the possibility of Radio Frequency (RF) burns. A metallic object in the antennas field may act as an unintentional receive antenna. It absorbs electromagnetic energy, current and voltage are induced on the surface of the object. If a path to ground is established the energy will be discharged through the path. A person coming in contact with

10550/11877  
Ser 09A31/ 2255  
18 MAR 1988

Subj: POTENTIAL RADIATION EFFECTS, MAUI KAI HOUSING PROJECT  
WAIANA'E, OAHU, HAWAII, DSR 8-7-10: 2,14

The metallic object could become the path to ground resulting in an RF burn. The person does not have to physically contact the metal object. An arc can occur if the person gets close enough to the metal object which allows the energy to arc or jump across the space or gap. Again, the metallic object must be the right length and the transmitter output power must be of sufficient strength.

Arcs caused by the discharge of energy could cause the ignition of fuel vapors. For this to occur the following conditions must exist:

- a. The spark must contain a sufficient amount of energy.
- b. The spark gap must be of sufficient length.
- c. A flammable mixture of fuel and air must be present.

There are no areas outside the boundaries of the transmitter facility where exposure to EFR is a hazard. The conditions required for the effects described above do not exist off the facility.

Naval Electronics Engineering Activity, Pacific (NEEACT PAC) conducted a survey in May-June 1982 at the Radio Transmitting Facility, Lualualei. Measurements were taken at several points within the facility and along the facility boundary. Included were points along the boundary from Morse Street to the Southwest corner of the facility to the Main Gate. This is the boundary facing your proposed project site. All of the EFR levels along this boundary were well within safe limits. The numbers of transmitters and location of antennas have not significantly changed and should not significantly change the 1982 Survey results.

Readings taken along this southwestern boundary showed that electric field levels ranged from 15 V/m to 83 V/m. The magnetic field levels were too low to be measured. Current Permissible Exposure Limits (PEL) are 632.5 V/m for electric fields and 1.58 A/m for magnetic fields. These PELs apply for frequencies from 10kHz to 3MHz. The PEL's for HF, LF and microwave transmissions were also reviewed.

The measured field strength levels of HF, LF and microwave transmissions were also below their respective PELs and show that there are no areas of hazardous exposure outside of the facility boundaries. The LF, HF and microwave antennas are located in an area furthest from your project site.

Electromagnetic field strengths decrease with distance. The greater the distance from the antenna, the weaker the signal. The levels of electromagnetic energy in the proposed development will be lower than at the facility boundaries.

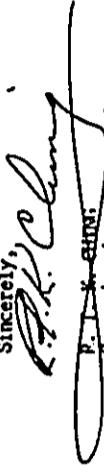
2

10550/11877 2288  
Ser 09A31/ 2288  
18 MAR 1988

Subj: POTENTIAL RADIATION EFFECTS, MAUI KAI HOUSING PROJECT  
WAIANA'E, OAHU, HAWAII, DSR 8-7-10: 2,14

NEEACT PAC is the Navy activity assigned the responsibility for detail analysis of Electromagnetic Radiation conditions and applications in the Pacific area. Their point of contact is Candice Y. Yasuda, phone no. (808) 474-7325.

Sincerely,



P. J. K. CHUNG  
Communications-Electronics Facilities  
Coordination Officer

Copy to:  
NEEACT PAC (Code 322CY)

3

FIRE DEPARTMENT  
CITY AND COUNTY OF HONOLULU  
1485 BENTLEY STREET, ROOM 308  
HONOLULU, HAWAII 96814



FRANK P. FAIN  
1987-88

FRANK K. KAHOOHANOHANO  
FIRE CHIEF

LIONEL E. CAMARA  
DEPUTY FIRE CHIEF

March 22, 1988


TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER  
DEPARTMENT OF GENERAL PLANNING

FROM: FRANK K. KAHOOHANOHANO, FIRE CHIEF

SUBJECT: MAILI KAI PROPERTY ENVIRONMENTAL IMPACT STATEMENT (EIS)

We have reviewed the EIS for the proposed Maili Kai Property. The proposed project will create additional demand on fire protection facilities and services now provided. We are planning a new station for the Campbell Industrial Park area, to be completed in 1992. This station will provide an additional engine and ladder company with 13 on-duty personnel. Existing and planned fire protection facilities and services are considered adequate.

Thank you for the opportunity to comment on this subject. Should you have any questions, please contact Battalion Chief Kenneth Word of our Administrative Services Bureau at local 3838.

  
FRANK K. KAHOOCHANOHANO  
Fire Chief

FKK/KAW:sb

cc: Matthew E. Grady, Project Manager  
PBR Hawaii

PBR  
HAWAII

LANDSCAPE ARCHITECTURE PLANNING ENVIRONMENTAL STUDIES

March 30, 1988

Mr. Frank K. Kahoochanohano, Fire Chief  
Fire Department  
City and County of Honolulu  
1455 South Beretania Street, Room 305  
Honolulu, Hawaii 96814

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAHE, OAHU, HAWAII  
TKR: 8-7-10: 02,14

Dear Chief Kahoochanohano:


Thank you for the copy of your letter of March 22, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, Department of General Planning regarding the subject Draft EIS. The following is provided in response to your letter.

We appreciate your confirmation that the existing and planned fire protection services and facilities in the Waianae and leeward coast area are adequate for the proposed Maili Kai residential project.

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

  
Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning

271\FL14\_.WP

FINANCIAL PLAZA OF THE PACIFIC 150 MERCHANT STREET, SUITE 1111 HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-5631 TELECOPIER: (808) 525-1472  
HONOLULU IRVING DRIVE

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



March 1, 1988

PHILIP S. FARNSWORTH  
DIRECTOR

PHILIP S. FARNSWORTH  
DIRECTOR  
650 SOUTH KING STREET  
HONOLULU, HAWAII 96813

**PBR**  
HAWAII

LANDSCAPE ARCHITECTURE      PLANNING      ENVIRONMENTAL STUDIES

March 30, 1988

Mr. Hiram K. Kamaka, Director  
Department of Parks and Recreation  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

**SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
THK: 8-7-10: 02, 14**

Dear Mr. Kamaka:

Thank you for the copy of your letter of March 1, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, Department of General Planning regarding the subject Draft EIS. The following is provided in response to your letter.

As the planning for the proposed Maili Kai property project progresses we will continue to coordinate the recreational requirements of the City with your department.

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning

271\PL10\_WP

FINANCIAL PLAZA OF THE PACIFIC      190 MERCHANT STREET, SUITE 1011      HONOLULU, HAWAII 96813  
TELEPHONE: (808) 521-5631      TELETYPE: (808) 521-1102  
HONOLULU IRVINE DENVER

**TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER  
DEPARTMENT OF GENERAL PLANNING**

**FROM: HIRAM K. KAMAKA, DIRECTOR**

**SUBJECT: ENVIRONMENTAL IMPACT STATEMENT  
MAILI KAI PROPERTY - WAIANAE  
TAX MAP KEY 8-7-10: 02 and 14**

We have determined that the Environmental Impact Statement for the proposed Maili Kai is generally acceptable.

The recreational needs of the project has been addressed by the establishment of a public park, as shown on the Conceptual Master Plan, Figure II-9.

We are coordinating with the applicant to finalize the location of the proposed park site and also ascertain that the site meets City standards and park dedication requirements.

Thank you for the opportunity to comment on the EIS.

*Hiram K. Kamaka*  
HIRAM K. KAMAKA, Director

HKK:ei

cc: Mr. Matthew E. Grady, PBR Hawaii

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

ENV 2-1  
JA/G

**PBR**  
HAWAII

LANDSCAPE ARCHITECTURE      PLANNING      ENVIRONMENTAL STUDIES



Brenner Munger, Ph.D., PE  
Manager  
Environmental Department  
(808) 548 6880

March 23, 1988

Mr. Donald A. Clegg  
Chief Planning Officer  
City and County of Honolulu  
650 South King Street  
Honolulu, HI 96813

Dear Mr. Clegg:

Subject: Draft Environmental Impact Statement (EIS) for Proposed  
Mailli Kai Property Project, Mailli, Waianae, Oahu

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

1. The first sentence in Section 5.5.1 on page IV-80 regarding extension of underground lines by HECO within the project area is incorrect. As part of the Kautama Road Improvement, HECO only supplied service to a City and County street light transformer and not along the entire extent of that improvement.
2. It should also be noted that in the second sentence of the same section, the existing HECO system will have to be extended and reinforced to provide adequate service in the project area. However, HECO does not anticipate construction of a new substation for the subject development.
3. There are no existing transmission or distribution lines crossing or in proximity to the subject development.

Sincerely,

*Brenner Munger*

cc: Matthew E. Grady, Project Manager  
PBR Hawaii

An HEI Company

April 6, 1988

Dr. Brenner Munger  
Manager, Environmental Department  
Hawaiian Electric Company, Inc.  
P. O. Box 2750  
Honolulu, Hawaii 96840-0001

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILLI KAI PROPERTY HOUSING PROJECT  
WAIANAЕ, OAHU, HAWAII  
THK: 8-7-10: 02,14

Dear Dr. Munger:

Thank you for the copy of your letter of March 23, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, City and County of Honolulu regarding the subject Draft EIS. The following is provided in response to your letter.

1. The Final EIS will be corrected to note that HECO only supplied service to a City and County street light transformer on Kautama Road and that electrical service to the proposed project is not presently provided.
2. The Final EIS will note that electrical service will have to be extended and reinforced to provide adequate service in the project area. Additionally, the Final EIS will note that HECO does not now anticipate construction of a new substation for the proposed project.
3. The Final EIS will note that there are no existing transmission or distribution lines crossing or in proximity to the proposed project.

FINANCIAL PLAZA OF THE PACIFIC      150 MERCHANT STREET, SUITE 1111      HONOLULU, HAWAII 96813  
TELEPHONE: (808) 531-5631      TELECOPIER: (808) 533-1102  
HONOLULU IRVINE DENVER

Dr. Brenner Hunger  
MAILI KAI DRAFT EIS  
April 6, 1988  
Page 2

Thank you for your comments and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning

XII-48

271FD15\_.WP



## HOU HAWAIIANS

A TRIBAL OHANA DEDICATED TO THE SURVIVAL OF THE HAWAIIAN PEOPLE  
P.O. BOX 721 HALEIWA, HAWAII 96712



March 24, 1988

Donald A. Clegg  
Chief Planning Officer  
City & County of Honolulu  
Dept. of General Planning  
650 South King Street  
Honolulu, Hawaii 96813

RE: Comments on Draft Environmental Impact Statement  
Maui Kai Project  
Maui, Oahu, Hawaii  
TMK NO. 8-7-10-2 & 4

Aloha Mr. Clegg:

The Hou Hawaiians is a native Hawaiian Ohana, interested in the preservation of Native Hawaiian culture. The Church of Hawaii Nei is a religious organization interested in the preservation of traditional Hawaiian religion and culture. Maui Loa, a.k.a. Doctor Nui Loa Price, is the founder of the Church of Hawaii Nei and the Chief of the Hou Hawaiians. Maui Loa and the Church of Hawaii Nei are also claimants to the adjacent 89 acre parcel of land, TMK 8-7-10-07, as the successful high bidders at public government auction held on . The following comments are submitted on behalf of Maui Loa, a.k.a. Doctor Nui Loa Price, and the Hou Hawaiians, the Church of Hawaii Nei:

1. The archaeological study included in the Draft EIS is inadequate.

The study identified 12 new archaeological sites, but failed to determine the age or function of most of these sites. Insufficient work has been done to date and identify previously described sites. Language contained in the descriptions of the sites is as follows:

Site T-7 - Boundary wall "[The wall dates to at least the early 20th century. Further dating of the site is probably impossible."

Site T-8 - Rock Mounds "Dates and functions of the mounds are unknown."

Site T-9 - Stone Enclosure and Wall "Ages and functions of these two features are unknown; . . ."

Site T-12 - C-Shape Enclosure "Although it's exact age and function are unknown, large-calibre bullet cartridges present at the site suggest the site may date to WWII and may be associated with large bunkers and other defensive works located further west, at the crest of Puu-O-Hulu-Makai."

Site T-17 - Boundary Wall "[I]t is difficult to deduce the actual age of such affected features. . . ."

Site T-20 - C-Shape and Enclosure "At present, the age and function of site T-20 is unclear. Based on information supplied by Mr. Wayne Perrin, T-20 may have evolved either during extensive moss-rock operations conducted c. WWII, or during land-clearing conducted sometime earlier."

Site T-21 - Platform "At present age and function of Site T-21 remain problematic. . . ."

Site Ch-Oa-7 - Rock Mound and Wall "[M]ay be nothing but a bulldozed pile of boulders" . . . "may also date to the early 20th century."

Site Ch-Oa-13 - Enclosure "[A]ge and function of Ch-Oa-013 is unknown"

Ch-Oa-16 - C-shape Enclosure "While structures such as Ch-Oa-16 have been associated with aboriginal occupations, the fact that Ch-Oa-16 is present in the midst of an area long used for 20th century mass (sic) rock gathering suggests the site does not predate the rock gathering. If it did predate the gathering, it is likely the enclosure, having been scavenged for rocks, would not exist."

A. We do not agree that further dating of these sites is impossible.

B. We suggest that the date of most of the mounds, walls and enclosures is prehistoric (possibly as old as five or ten thousand years!) and

will be much hotter than December. Anyone who would make such a statement about the temperature range could not have spent very much time on the property itself.

#### DISCUSSION

The letter submitted by Jacquelin N. Miller, Associate Environmental Coordinator, University of Hawaii at Manoa, states:

"On page 7, Section 4, it states [p]rior to construction an archaeological reconnaissance survey will be conducted by a qualified archaeologist'. In accordance with the EIS content requirements (EIS Rules 11-200-17) the historic perspective must be addressed in the EIS. Therefore, an archaeological survey must be conducted before the preparation of the EIS and a complete archaeological report must be presented in the Draft EIS. (We call your attention to the recent Declaratory Ruling No. 87-1 of the Environmental Council, (OEOC) Bulletin, July 8, 1987, where in the use of preliminary or incomplete reports at the Draft EIS review stage was declared unacceptable.) The Draft EIS would not be complete without a comprehensive review of the archaeological impacts. *Furthermore, it is our belief that this area has a high potential for significant archaeological remains.*" [Italics added.]

Relevant portions of the Rules are as follows:

§11-200-2. "Environment' means humanity's surroundings, . . . including . . . objects of historic or aesthetic significance."

§11-200-12(b) "In most instances, an action shall be determined to have a significant effect on the environment if it: (1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;"

§11-200-14 "The EIS process shall involve at a minimum: identifying environmental concerns, obtaining various relevant data, conducting necessary studies, receiving public and agency input, evaluating alternatives, and proposing measures for minimizing adverse impacts. An EIS is meaningless without the conscientious application of the EIS process as a whole, and shall not be merely a self-serving recitation of benefits and a rationalization of the proposed action."

their function is ceremonial and burial. Although, there are modern repairs to the walls and modern structure among the ancient ones, one should not conclude that all of the structures are modern.

C. Dating an archaeological site by the presence of large caliber cartridge shells found there is like dating the Parthenon as being less than 40 years old because a Winston cigarette butt was found on the site.

D. Is Wayne Perrin a reliable source of archaeological information?

E. The descriptions of seven of the 12 new sites identified, admit that their age and function are unknown. No reliable scientific evidence is advanced for the date of any sites.

F. The logic that none of the sites could be aboriginal because they still exist in spite of years of vandalism and desecration is perverted.

G. Our own two hour investigation has revealed many sites not mentioned in the Draft EIS (see attached testimony of Walter R. Schoettle).

H. All or most of the walls are oriented on lines between major geographical features, suggesting to us that while they may have been subsequently used as property boundaries and cattle enclosures, they were originally constructed in ancient times by native Hawaiians as parts of ceremonial structures.

I. The accuracy of information contained in the Draft EIS is very questionable. For example, on page 1-8, under the section on Climate and Meteorology it states: "The existing climate and meteorology of the project area is characterized by relatively low rainfall, typically northeast tradewinds and temperatures between 72 and 80 degrees F." This indicates that whoever wrote the EIS has never set foot on the subject property. Otherwise, he would have known that temperature range given bears no relation to the truth. Rare, indeed, is the day when the temperature does not exceed 80 degrees. While we do not have empirical data, based on our personal knowledge of the area and subject property, we can state that the temperature on the subject property will frequently exceed 100 degrees Fahrenheit. It will certainly very often reach the high 90's.

A similar statement about temperature range is contained on page E-3 of the Archaeological Survey, as follows: "The climate in the project area is typical of leeward Oahu--average annual precipitation measures c. 20 inches, and average temperatures in the area range from 72-80 degrees F". While the survey was conducted in the winter, during the period December 15-23, 1987, we suspect that the temperature exceeded 80 degrees during much of the day each of those days. The temperatures in August and September

The archaeological survey included in the Draft EIS is inadequate to enable the reader to properly evaluate the significance of the archaeological sites on the subject property. There is no scientific evidence, merely self-serving conclusions about the age of the structures found. The reader is unable to determine for himself whether the conclusions of the study are correct. We believe that there, indeed, are very significant cultural and historical structures and remains on the subject property which are worthy of preservation and further excavation and study.

## 2. Discussion of Water Supply is inadequate.

The Draft EIS proposes using 0.404 MGD from on-site wells for irrigation of the proposed golf course. Three potential problems are ignored or inadequately addressed.

A. The developer acknowledged that well water taken in this amount may very well exhaust whatever supply of fresh groundwater presently exists in the area. This will undoubtedly destroy whatever fresh water resources presently exist under TMK 8-7-10-07. Provision for protection of neighbor's groundwater ought to be made.

B. The developer acknowledges that large scale irrigation with brackish water will increase the salinity of land and water in the neighborhood. The developer simply states that if this becomes a problem they will install water treatment facilities to solve the problem. Further study and more information is needed pertaining to this potential problem.

C. Taking water in this amount may very well result in a lowering of the present water table. As there are already sinkholes on the subject property, a lowering of the water table may result in more sinkholes in the neighborhood. Further hydrological studies should be conducted to determine that there will be no adverse effects to the water table caused by the withdrawal of 0.404 MGD by on-site wells.

Very truly yours,

*Maui Loa*

Maui Loa

WALTER R. SCHOETTLE  
ATTORNEY AT LAW  
SUITE 102  
550 MALEKAUPULA STREET  
POST OFFICE BOX 898  
HONOLULU, HAWAII 96808  
TELEPHONE (808) 537-3814

March 24, 1988

## TESTIMONY OF WALTER R. SCHOETTLE

On March 23, 1988, Maui Loa, a.k.a. Doctor Nui Loa Price, and I went to the subject property to observe the sites mentioned in the Draft EIS for ourselves. Our time was limited to about two hours. Therefore, we were able to explore only a small portion of the subject property.

We entered by foot from Mamoolii Street along a dirt road following the drainage channel on the northerly boundary of TMK No. 8-7-10-07. We entered the subject property where the drainage channel turns to the south, and immediately observed the wall designated as T-17. At first it did not appear to be a Hawaiian wall, because it has obviously been repaired using scavenged stone. However, we continued along the channel in a southerly direction for about 250 yards to a point where the channel turns away from the wall.

We crossed the channel and followed the wall. We observed several grass covered mounds in this area. Looking more closely at T-17, it now clearly appeared to Mr. Price to be a Hawaiian wall from its structure and orientation. We followed the wall in a southerly direction to a point just northerly of site T-6. At this point another wall running in a westerly direction intersects with T-17. This wall is in the approximate location of the dotted line intersecting T-17 just below the hyphen in T-6 on Figure 2. This wall is a magnificent wall in nearly perfect condition. This wall is not even mentioned in the Draft EIS. From the size and workmanship that obviously must have gone into the construction of this wall, I conclude that it cannot have been constructed as an enclosure for cattle. The number of man-hours necessary for such a project would have made it impracticable for a cattle enclosure even using slave labor. It may have been used as a cattle enclosure, but it certainly was not constructed for that purpose. In this area there were more grass covered mounds, suggesting burial mounds.

We continued on along T-17 and soon came to the sinkholes described as Site T-6. The sinkholes are surrounded by a very extensive and intricate network of stone walls, mounds and other stone structures which do not seem to me to have any modern function. In the sinkholes there were concrete structures which were obviously modern. There were also stone structures

which may have been ancient.

Mr. Price indicated to me that the sinkholes are very significant. The sinkholes indicate that there is most likely a network of underground caverns used by the Hawaiians. If excavated, he suggested that Hawaiian artifacts will be found in these caverns. The caverns and sinkholes are related to the surface rock structures in definite patterns. If excavated and carefully mapped all of these relationships would become apparent.

In this area we also found an area that was paved with stones and contained insets which were obviously the foundations for some kind of wooden structure. Whether this was modern or ancient was not obvious.

In this fairly large area, it was difficult to walk more than several yards without tripping over a low wall or other kind of stone structure. Traditional Hawaii medicinal and ceremonial herbs were also growing wild in this entire area. Mr. Price indicated that these types of herbs were grown by Hawaiians at important, sacred Hawaiian heiau sites.

We continued along T-17 to the point where the wall jogs to the east. We did not observe much of significance along this section of the wall, as our time was growing short, and we were now proceeding at a hurried pace. At the point where the wall jogs east we tried to locate sites 18-22. We did not have time to identify the sites, but we did observe numerous mounds and walls in this area. Some of these were covered with grass.

We turned westerly towards the drainage ditch. We did not observe Site 13. We followed the ditch and channel back in a northerly direction. When we got to the point where the channel turns westerly, we observed in the very northerly corner of the subject property, a grassy knoll covered with very large Easter Island-like limestone rocks, half buried in the ground. The age and function of these rocks was unknown. This site was not mentioned in the archaeological survey in the Draft EIS.

Although I did not take particular note at the time, from my present recollection, I did not observe moss on any of the rocks comprising the walls and mounds. It seems unlikely to that these structures are from ground-clearing, ranching, and moss rock operations. The conclusion that these structures are not older than the 19th century seems highly improbable to me.

On the way back to Honolulu, for the first time I directed my attention to the cliffs along the Waianae coast. Numerous terraces, trails and other stone structures were obviously apparent. I had never noticed any of these structures before, but certainly found them interesting and indicative of possible extensive native Hawaiian remains in the area.

Beside Farrington Highway, in the middle of West Beach construction, Mr. Price showed me a rock ledge covered with petroglyphs, which was being covered with dirt by construction equipment, even while were on the site.

I am not an archaeologist, and I do not even have any formal training or education in the subject. However, I do subscribe to *National Geographic Magazine*, and I have an interest in history. I read as much as I can on the subject. I grew up in Southern Ohio, an area once occupied by mound building Native Americans predating the Miami Indians who occupied the area when White men first arrived. In those days, I visited many of these areas preserved by the State of Ohio and the National Park Service such as Serpent Mound and Mound City Group.

The explanations given in the Draft EIS of modern origin for the structures on the subject property seem improbable to me. Without any scientific evidence to the contrary, I cannot reject the possibility that these structures are the remains from antiquity. If the ruins and remains I observed on March 23 were constructed by Native Hawaiians, they compare favorably with the archaeological sites I have seen in Ohio. If so, they are well worthy of preservation.

Walter R. Schoettle  
Walter R. Schoettle

## HOU HAWAIIANS

A TRIBAL OHANA DEDICATED TO THE SURVIVAL OF THE HAWAIIAN PEOPLE  
P.O. BOX 721 HALEIWA, HAWAII 96712



### TESTIMONY OF MAUI LOA

My name is Maui Loa. I am a descendent of Kalaeloa, through my mother Leilani Hina Kalaeloa. My credentials include being the hereditary chief of the Hou Hawaiians, founder of the Church of Hawaii Nei, and curator of the Hawaiian Ethnic Art Museum.

According to my Kupuna, it was the Kalaeloa ohana who originally built and attended the Papa Kalaeloa Heiau in coral stone walls whose remnants criss-cross the Maui Kai project property.

It is part of my people's lore, that in the Ikipo (mystic past) the coral walls built on the surface of the aina were indicative of the maze of burial caves beneath.

According to legend, my namesake the mythological god Maui emerged from the underwater caves when the sea retreated to the present shoreline. The Kupuna tell me this very valley marks one of the oldest spots of habitation on the Island of Oahu, possibly as long ago as five to ten thousand years. Substantiating these claims, fishhooks and other artifacts have been found embedded in pieces of coral. The elders believed this proved man must have inhabited these islands during the time the sea covered the area some ten or more thousand years ago.

The same informants say the now desecrated sinkholes were considered the entrance to the former underwater caves, abode of Puhī the guardian eel and pua palaoa the now extinct whale shark. The rarest and most sought-after niho palaoa (whale tooth ivory) are said to be found in this area.

The ohana's elders also spoke of a time when the huge slabs of rock in this valley were shaped in the forms of easily identifiable imagery. Historically, many of these slabs were destroyed and broken up into almost

unidentifiable fragments by zealots prior to 1900. I have been told, however, even after this date, when the U.S. surveyed this area, there were descriptions of the large slab's forms.

It is most important to the concerned Native Hawaiian and others dedicated to a gaining of the pre-contact culture, that as much of this valley as possible be explored in depth and preserved for posterity.

In conclusion, to date, there has been little evidence brought to light that people lived on the Island of Oahu prior to 1000 a.d. Yet here, these ancient burial grounds and coral beds may contain indisputable artifact evidence that people have inhabited these islands for over 10,000 years.

Very truly yours,

*Maui Loa*

Maui Loa

April 11, 1988

Maui Loa a.k.a. Dr. Mui Loa Price  
Hou Hawaiians  
P. O. Box 721  
Haleiwa, Hawaii 96712

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAE, OAHU, HAWAII  
TMK: 8-7-10: 02, 14

Dear Maui Loa:

The following is provided in response to your letter of March 24, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, Department of General Planning, City and County of Honolulu regarding the subject Draft EIS.

1. THE ARCHAEOLOGICAL STUDY

The archaeological reconnaissance survey and report included in the Draft EIS (see Chapter IV, Section 3 and Appendix E), was performed and prepared in accordance with applicable federal, state and city and county regulations. As noted in the survey report, the subject property has been subjected to numerous disturbances, including extensive agricultural activities, bulldozing, fires, rock quarrying, WW II military use and charcoal manufacturing. As noted in the survey report, the general age and function of the sites have been attributed to most of the sites and related to the disturbances noted above. Also as noted in the survey report, the sites are attributed to the historic period (1850's to present-day).

- A. All of the physical remains present within the Maili Kai property are most reasonably and economically interpreted as evidencing the general age and functions stated above.
- B. There is a total lack of data that might suggest aboriginal ceremonial or burial functions. Further, there is no credible, verifiable evidence to support aboriginal occupation in the Hawaiian Islands 5,000 to 10,000 years ago.
- C. Sites are dated to the extent possible using all available information, including MW II artifacts.

FINANCIAL PLANS OF THE PACIFIC    100 BEECHMOUNT STREET, SUITE 1100    HONOLULU, HAWAII 96813    TEL. (808) 531-2411    FAX. (808) 531-1882  
BRANCH OFFICE    1100 LAKAWAN CENTER    100 ALPHEUS STREET, SUITE 100    HALEIWA, HAWAII 96721    TEL. (808) 961-3310    FAX. (808) 961-3999

Maui Loa a.k.a. Dr. Mui Loa Price  
MAILI KAI PROPERTY DRAFT EIS  
April 11, 1988  
Page 2

- D. Our consulting archaeologist, as a professional consulting archaeologist, selects informants carefully to assure, to the greatest extent possible, that any information they may provide will be accurate. We are confident that the information provided by Mr. Perrin to our consulting archaeologist was accurate.
- E. The form, function and age of sites found on the Maili Kai property, as stated in the archaeological reconnaissance survey report, are based on the field survey, literature survey and discussions with knowledgeable persons, as well as the consulting archaeologist's own knowledge and information of the site.
- F. The significance of the sites found on the Maili Kai property have been determined based on applicable federal, state and city and county regulations as is noted in the Draft EIS.
- G. As noted in the Draft EIS (see Chapter IV, Section 3.1), 100 percent of the site was covered by the archaeological survey. The survey was conducted by experienced, qualified archaeologists and field personnel. Following discussions with appropriate state agency personnel, it is believed that all significant sites on the property have been properly identified and described.
- H. As noted above, the descriptions of the sites found on the Maili Kai property have been prepared by professional archaeologists based on the physical and literature evidence available.
- I. The weather information included in the Draft EIS (see Chapter IV, Sections 1.5, 3 and Appendix E), are provided in either general or specific terms to meet the objective of the particular section. The generalization of the site weather conditions in no way denigrates the accuracy and/or validity of the document.

Discussion

As noted above, the archaeological survey performed for the proposed project and as included in the Draft EIS (see Appendix E) was performed in accordance with applicable federal, state and city and county rules and regulations.

Maui Loa a.k.a. Dr. Nui Loa Price  
MAUI KAI PROPERTY DRAFT EIS  
April 11, 1988  
Page 3

2. DISCUSSION OF WATER SUPPLY

- A. As noted in the Draft EIS (see Chapter IV, Section 5.2.2),  
"For golf course irrigation the developer proposes to  
develop on-site wells. The brackish water found in the  
limestone aquifer at shallow depth is too brackish for  
domestic and ordinary farm uses but may be acceptable for  
salt-tolerant plants. The brackish water would be stored  
and pumped into the irrigation pipe system from lined ponds  
located in the golf course. Treatment, in accordance with  
appropriate state and county regulations may be required if  
the salinity of the groundwater is too high for irrigation  
purposes." At no point in the Draft EIS does the developer,  
as stated in your letter, "acknowledge that well water taken  
in this amount may very well exhaust whatever supply of  
fresh groundwater presently exists in the area."
- B. As noted in the Draft EIS (see Chapter IV, Section 5.2.1 and  
5.2.3), a potable water master plan will be prepared and  
submitted to the BMS prior to grant of tentative subdivision  
approval and the developer will continue to work with  
appropriate governmental agencies to minimize potential  
adverse impacts should they occur.
- C. As noted above, appropriate water studies and coordination  
with appropriate governmental agencies will be accomplished  
prior to construction and subdivision approval.

TESTIMONY OF WALTER R. SCHOETTLE

As noted previously, the archaeological site information included  
in the Draft EIS was based on a field archaeological  
reconnaissance survey, literature searches and consultation with  
knowledgeable persons. This work was performed by qualified,  
experienced, trained professional archaeologists in accordance  
with applicable federal, state and city and county regulations.  
The information included in the testimony of Walter R. Schoettle  
will be included in the Final EIS.

TESTIMONY OF MAUI LOA

The above noted statements regarding the performance of the  
archaeological survey and interpretations of age and function of  
recorded sites are applicable to the testimony of Maui Loa. That

Maui Loa a.k.a. Dr. Nui Loa Price  
MAUI KAI PROPERTY DRAFT EIS  
April 11, 1988  
Page 4

is, the archaeological survey work performed for the proposed  
project, has been performed by qualified, experienced, trained  
professional archaeologists in accordance with applicable  
federal, state and city and county regulations. The information  
contained within the testimony of Maui Loa will be included in  
the Final EIS.

Thank you for your comments and participation in the Draft EIS  
review process. Your letter and this response will be appended  
to the Final EIS.

Sincerely,

PBR HAWAII

*Matthew E. Grady*

Matthew E. Grady  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer,  
Department of General Planning



STATE OF HAWAII  
 OFFICE OF HAWAIIAN AFFAIRS  
 1000 KAPOLANI BLVD., SUITE 1600  
 HONOLULU, HAWAII 96813  
 PHONE 548-5000  
 FAX 548-2442

The archaeological survey and information contained in the draft EIS describes the historic period remains in the project area, but it does not attempt to locate or evaluate the buried prehistoric Hawaiian remains that are certain to exist in such a favorable topographic location. The research design for the survey does not provide justification for the lack of subsurface survey. Reference should be made to Sinoto's report on the recovery of human skeletal remains in Luualalei as well as the implications of Sinoto's work on the potential for similar finds in the project area. All archaeological reports should be made available to interested persons in standard format.

The written comments of the Department of Land and Natural Resources, the University of Hawaii Environmental Center, and the Maianae Historic Preservation Committee should be included in the final EIS.

Sincerely,  
  
 Mr. Kamakahi A. Kanahole, III  
 Administrator

EN/KK  
 cc: DLNR  
 PER Hawaii's  
 NHEC

February 26, 1988

Mr. Donald A. Clegg  
 Chief Planning Officer  
 Dept. of General Planning  
 City and County of Honolulu  
 650 South King Street  
 Honolulu, HI. 96813

Dear Mr. Clegg:

SUBJECT: Draft EIS: Mailli Kai Property, Luualalei, O'ahu.  
 TWK: 8-7-10: 2, 14

Thank you for sending our office a copy of the Draft EIS for the proposed Mailli Kai Property project and for giving our office the opportunity to comment.

The applicant proposes that 168.5 acres of agricultural lands be designated as residential and low density apartment. The remaining agricultural lands on the property would be developed as a golf course. The project will have an effect on archaeological resources in the project area.

Only one archaeological site in the entire Luualalei Mupua'a is on the Hawaii Register of Historic Places, and so little research has been conducted in the area that nothing is known about common archaeological research interests such as settlement patterns, cultural evolution, prehistoric Hawaiian population in Luualalei. A settlement chronology needs to be established and a basic assemblage of cultural remains needs to be recovered for comparative studies. Consequently, any archaeological study done in the project area has the potential for making an important contribution to Hawaiian archaeology.





April 11, 1988

State of Hawaii  
Office of Hawaiian Affairs  
1600 Kapiolani Blvd., Suite 1500  
Honolulu, Hawaii 96814

Attention: Mr. Kamaki A. Kanahale, III,  
Administrator

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY HOUSING PROJECT  
WAIANAHE, OAHU, HAWAII  
TRK: 8-7-10: 02,14

Dear Mr. Kanahale:

Thank you for the copy of your letter of February 26, 1988 to Mr. Donald A. Clegg, Chief Planning Officer, City and County of Honolulu regarding the subject Draft EIS. The following is provided in response to your letter.

To determine the archaeological and historical significance of the subject property relative to other lands in the Maili and Luualaei areas, a full archaeological reconnaissance survey of the property was performed. A copy of the survey report was included in the Draft EIS as Appendix E. In accordance with applicable federal, state and county regulations, the survey performed was limited to surface features. Based on the field survey performed and the literature search that preceded the field survey, it is not certain that buried or prehistoric Hawaiian remains exist on the project property. The Archaeological Reconnaissance Survey report lists those bibliographic references that are pertinent to the subject property. We note that there is a considerable body of information relative to the Maili Kai property as well as the Luualaei area in general. The reference to Sinoto's work as included in your letter appears to relate to other Luualaei lands and not the proposed Maili Kai project property.

Based on the field reconnaissance survey and the literature survey, it is evident that the Maili Kai property has experienced significant modifications due to agricultural activities, WW II, charcoal manufacturing and rock quarrying. Given the unlikely possibility that prehistoric remains of any significance might still be present on the site, an archaeological reconnaissance survey involving extensive

Mr. Kamaki A. Kanahale, III  
DRAFT EIS FOR MAILI KAI PROPERTY  
April 11, 1988  
Page 2

subsurface testing was neither appropriate nor required. As indicated in the Draft EIS (see Chapter IV, Section 3.3), in accordance with the consulting archaeologist's recommendations, limited subsurface testing at five sites prior to any construction work and archaeological monitoring of initial grubbing and grading work would constitute adequate and sufficient assurance that should any previously unidentified remains of potential significance be revealed, evaluation of their significance would be made in consultation with staff archaeologists of the Department of Land and Natural Resources, Historic Sites Section, and any appropriate mitigation work would be accomplished.

The survey methods, procedures and results were performed and prepared in consultation with the State Historic Preservation Office and a copy is on file with the State Department of Land and Natural Resources, Historic Sites Section for review by interested persons.

In accordance with applicable EIS rules, the written comments of the Department of Land and Natural Resources, the University of Hawaii Environmental Center, the Waianae Preservation Committee and all others will be appended to the Final EIS. We note that as of this date, a comment letter from the Waianae Preservation Committee has not been received.

Thank you for your letter and participation in the Draft EIS review process. Your letter and this response will be appended to the Final EIS.

Sincerely,

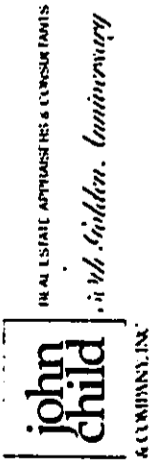
PBR HAWAII

*Matthew E. Grady*  
Matthew E. Grady,  
Project Manager

cc: Mr. Donald A. Clegg, Chief Planning Officer  
City and County of Honolulu

APPENDIX A

MARKET ANALYSIS



Financial Plaza  
of the Pacific  
130 Merchant Street  
Suite 1040  
Honolulu, Hawaii 96813  
Telephone  
(808) 533-2951  
Telex  
(808) 523-7672

January 15, 1988

Mr. Matthew E. Grady  
PBR Hawaii  
Financial Plaza of the Pacific  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

Dear Mr. Grady:

At your request, John Child & Company, Inc. has prepared market assessments covering a proposed affordable housing project for the Mailli Kai property. This letter summarizes our assessments which are presented in the accompanying summary report.

#### BACKGROUND

Kaiser Cement Corporation (KCC) owns the fee simple interest of the Mailli Kai property located in Mailli, Waianae, Oahu, Hawaii. The property includes about 415 acres. KCC is seeking a Development Plan amendment to reclassify approximately 169 acres of Agricultural lands to Residential and Low-Density Apartment to allow development of a proposed single- and multi-family unit housing project.

About 1,435 units are proposed. Most of the units will be priced to be affordable to the gap group based upon current City & County qualification guidelines and the Waianae market trends.

KCC has retained PBR Hawaii to prepare an Environmental Impact Statement (EIS) for the proposed project as part of the Development Plan amendment process. In this regard, you asked John Child & Company, Inc. to assist you in preparing the EIS by assessing the market support for the proposed housing project in Mailli Kai.

Mailli Kai Property  
130 Merchant Street  
Honolulu, HI 96813  
John Child & Company, Inc.  
130 Merchant Street  
Honolulu, HI 96813

Mr. Matthew E. Grady  
January 15, 1988  
Page 2

In addition, to assist you in the planning and design of the master development plan, you have asked us to assess the market support for the 1,435 proposed single- and multi-family residential units at Mailli Kai.

#### STUDY OBJECTIVE

The objective of our assistance is to estimate the current and projected market support for the proposed 1,435 single- and multi-family residential units in terms of:

1. Property characteristics and amenities
2. Typical market sales prices
3. Projected annual absorption.

#### STUDY APPROACH

The analysis is conducted in two parts. One analysis addresses the majority of the market priced single- and multi-family units which would be affordable to gap group buyers (affordable units). The second analysis addresses the remaining single-family units with larger, view-oriented lots which would be priced above the typical gap group market (view units).

Section II of the accompanying report summarizes our methodology and findings for the affordable units. Section III of the report summarizes the analysis covering the higher priced view units.

#### DEFINITION OF GAP GROUP

Gap group is defined as Oahu households with annual incomes between 80% and 120% of the median household income for the City & County of Honolulu as determined from time to time by the City & County of Honolulu or the Hawaii Housing Authority.

#### AFFORDABLE UNIT DEFINITION

Affordable units are defined as housing units planned for development at Mailli Kai which are priced at levels which would be affordable to the gap group market based on current income and financing levels. Affordable units are not gap group units. Gap group units are housing units which are reserved for purchasers who meet the gap group definition.

PROJECT DESCRIPTION

The Mailli Kai development is planned to include about 1,435 units. Current plans include a variety of unit types ranging from single-family homes built on 10,000-sq lots to low-density apartments. The proposed unit mix is summarized as follows:

Mailli Kai Unit Mix			
Land use	Approximate land area (acres)	Development density (units/acre)	Units
R-10 single-family (10,000-sq view lots)	30	4.0	120
R-5 single-family (5,000-sq lots)	58±	6.0	411
Multi-family townhouse	36±	12.0	432
Low-density apartment (abuts golf course)	29.5±	15.0	472
<b>Total</b>			<b>1,435</b>

All units except for the R-10 view units would be priced at levels which would be affordable to the gap group market. Based on current income levels and mortgage interest rates, gap group families of four would be able to afford units priced between \$79,000 and \$125,000.

LIMITING CONDITIONS AND UNDERLYING ASSUMPTIONS

This report is subject to the limiting conditions and underlying assumptions presented in the accompanying report.

ESTIMATED MARKET SUPPORT FOR HOUSING DEVELOPMENT IN WAIANAË AND EWA

Affordable Units

The current size of the gap group on Oahu is estimated to be about 30,000 households based on studies prepared for the State and City agencies and additions to the gap group housing inventory in recent years. Public and private developments which have been oriented to the gap group over the recent past have enjoyed very strong market response with interested purchasers far outnumbering available units. However, a sufficient number of gap group units has not been marketed over recent years to significantly reduce overall demand.

A consequence of this imbalance of supply and demand for gap group housing is a very strong demand for all single-family gap group housing projects which are located within reasonable travel times to employment. Recent success in marketing housing projects with prices oriented to the gap group market has encouraged more development of affordable housing. The State recently announced a requirement for 60% of new housing development to be allocated to affordable housing will result in significantly more additions in the future. However, it will require very substantial numbers of housing units oriented to the gap group market before there is a significant change in this supply/demand relationship.

View Units

The projected residential housing requirements for view units were compared to the projected available inventory of market priced housing in Waianaë and Ewa. Currently housing supply exceeds demand; however, within one or two years, the existing and planned inventory would be insufficient, and an additional 900 to 1,000 units would be required. However, assuming Ewa by Gentry, Village Park and Kapolei Village receive necessary land use and zoning approvals and development proceeded as proposed, the total available inventory would exceed demand from 1990 through about 2000.

As a result, major projects would be expected to delay or decrease the proposed phasing to minimize the surplus inventory. By 2001, housing requirements would be expected to exceed available inventory and major residential projects would be expected to accelerate development. About 5,000 units in Ewa Marina and Puuloa Estates would be expected to be developed between 2001 and 2005. In addition several thousand residential units could also be developed

in Ewa Town Center. Market priced units will compete in terms of location, price, design, and project amenities.

MARKET ASSESSMENTS  
FOR MAILI KAI

Affordable Units

The outlook for the 1,315+ housing units in Maili Kai which would be affordable to gap group purchasers varies based on unit type. Single-family units would attract a larger market share than multi-family units. The island-wide market demand for gap group housing is expected to remain very strong over the foreseeable future. While most residential developments in the Waianae/Ewa area will have small portions of their inventory oriented to the gap group market, sufficient demand would exist to accommodate all anticipated supply. Currently, the major competing gap group projects would be Kahi Kani, a proposed 290+ unit single-family project in Whitmore Village, Waihiava, and West Loch Estates, a proposed 750+ unit single-family project in Honouliuli, Ewa.

Selling Prices

Based on current income qualification levels, mortgage interest rates, and sales prices in competitive gap group projects, the typical sales prices of Maili Kai affordable single-family units would range between \$95,000 and \$120,000. Multi-family units would range between \$55,000 and \$85,000.

Absorption

Single-family developments located outside of the Waianae coast and oriented to the gap group market have experienced very rapid absorptions. The recently announced Valley Homes project in Makaha Valley consisting of 119 single-family units has also received very positive market response. However, other Waianae projects have generally experienced slower absorption rates than comparable projects located elsewhere on Oahu. Maili Kai's convenient location in close proximity to Ko Olina and Campbell Industrial Park, and the anticipated growth in Kapolei, combined with project security features, attractive unit designs, and affordable unit pricing, should mitigate most constraints to the project location.

Absorption rates for single-family units are significantly faster than those projected for multi-family units. Under the planned mix of unit types, the 411+ affordable single-family Maili Kai units would be expected to sell within three to four years. The 90+

multi-family units would be absorbed at slower rates and would be expected to sell within 9 to 16 years. As development at Ko Olina and Kapolei advance and the Maili Kai development becomes established, the rate of absorption for Maili Kai would increase. Delays or cancellation of competing projects in Ewa and Central Oahu would also result in faster rates of absorption.

View Units

The market outlook for Maili Kai supports development of the 120+ view units over the 1990-1995 period. The projected housing requirement is expected to remain relatively strong. The most competitive available inventory would be:

- West Loch Estates
- Ewa by Gentry
- Village Park.

Although Makakilo would be in a position to offer competitively priced units, their new inventory is most likely to be priced higher than Maili Kai. Waikole and Mililani Mauka are also expected to be priced significantly higher and would not be directly competitive.

Selling Prices

Based on the current and projected sales prices of competitive developments, average sales prices of about \$140,000 to \$150,000 for the Maili Kai R-10 single-family view units would be reasonable.

Absorption

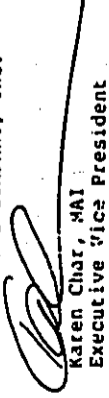
Considering the projected housing requirements and available inventory, the 120+ higher priced housing units would be expected to sell in about two to three years. The actual sales performance would depend on the timing, pricing and qualifying requirements and subsidies, if any, offered at West Loch Estates, Ewa by Gentry and Village Park.

Mr. Matthew E. Grady  
January 15, 1988  
Page 7

We appreciate having the opportunity to assist you. Please call us if you have any questions.

Very truly yours,

JOHN CHILD & COMPANY, INC.



Karen Char, MAI  
Executive Vice President

*Uson Y Ewert*  
Uson Y. Ewert, ASA  
Appraiser

TABLE OF CONTENTS

Letter of Transmittal  
Table of Contents

Page

<u>I - INTRODUCTION AND BACKGROUND</u>	
Background . . . . .	I-1
Study Objective . . . . .	I-1
Project Description . . . . .	I-1
Limiting Conditions and Underlying Assumptions . . . . .	I-2
<u>II - MARKET ASSESSMENT - AFFORDABLE UNITS</u>	
Study Approach . . . . .	II-1
Regional Background . . . . .	II-2
Definition of Gap Group . . . . .	II-2
Gap Group Market . . . . .	II-2
Gap Group Housing Inventory . . . . .	II-3
Estimated Market Support for Affordable Housing . . . . .	II-6
Market Assessment for Mailli Kai Affordable Units . . . . .	II-7
<u>III - MARKET ASSESSMENT - VIEW UNITS</u>	
Study Approach . . . . .	III-1
Current Housing Demand . . . . .	III-1
Projected Housing Demand . . . . .	III-2
Existing and Projected Housing Inventory . . . . .	III-4
Estimated Market Support for Housing Development . . . . .	III-6
Market Assessment for Mailli Kai View Units . . . . .	III-7
Design Considerations . . . . .	III-8
<u>ADDENDA</u>	
Addenda A - Current and Proposed Competing Affordable Projects	
Addenda B - Absorption Rates for Selected Comparable Affordable Projects	
Addenda C - Selected Affordable Unit Developments	
Addenda D - Current and Proposed Single-Family Multi-Family Competing Market Units	
Addenda E - Single-Family Absorption Rates for Selected Major Residential Projects	
Addenda F - Major Competing Residential Development in Waianae, Ewa and Central Oahu	
Certification	
Qualifications of John Child & Company, Inc.	
Qualifications of Karen Char	
Qualifications of Uson Y. Ewart	

I - INTRODUCTION AND BACKGROUND

This section presents the background, study objective, project description, and limiting conditions and underlying assumptions.

BACKGROUND

Kaiser Cement Corporation (KCC) owns the fee simple interest of the Mailli Kai property located in Mailli, Waianae, Oahu, Hawaii. The property includes about 415 acres. KCC is seeking a Development Plan amendment to reclassify approximately 169 acres of Agricultural lands to Residential and Low-Density Apartment to allow development of a proposed single- and multi-family unit affordable housing project.

About 1,435 units are proposed. Most of these market priced units will be affordable to the gap group based upon current City & County qualification guidelines.

KCC has retained PBR Hawaii to prepare an Environmental Impact Statement (EIS) for the proposed project as part of the Development Plan amendment process. In this regard, you asked John Child & Company, Inc. to assist you in preparing the EIS by assessing the market support for the proposed affordable housing project in Mailli Kai.

In addition, to assist you in the planning and design of the master development plan, you have asked us to assess the market support for the 1,435 proposed single- and multi-family residential units at Mailli Kai.

STUDY OBJECTIVE

The objective of our assistance is to estimate the current and projected market support for the proposed 1,435 single- and multi-family residential units in terms of:

1. Property characteristics and amenities
2. Typical market sales prices
3. Projected annual absorption.

PROJECT DESCRIPTION

The Mailli Kai development is planned to include about 1,435 units. Current plans include a variety of unit types ranging from single-family homes built on 10,000+ sq lots to low-density apartments. The proposed unit mix is summarized as follows:

Mailli Kai Unit Mix

<u>Land use</u>	<u>Approximate land area (acres)</u>	<u>Development density (units/acre)</u>	<u>Units</u>
R-10 single-family (10,000# view lots)	30±	4.0	120
R-5 single-family (5,000# lots)	68±	6.0	411
Multi-family townhouse	36±	12.0	432
Low-density apartment (abuts golf course)	29.5±	15.0	472
<b>Total</b>			<u><b>1,435</b></u>

All units except for the R-10 view units would be priced at levels which would be affordable to the gap group market. Based on current income levels and mortgage interest rates, gap group families of four would be able to afford units priced between \$79,000 and \$125,000.

LIMITING CONDITIONS AND UNDERLYING ASSUMPTIONS

This report is subject to the following limiting conditions and underlying assumptions.

Report Format

At the request of the client this report is prepared in summary format. The detailed analysis and supporting documentation are in the files of John Child & Company, Inc.

Property Description

A complete legal description was not reviewed by the appraisers. The appraisers reviewed maps, photographs, site plans, and other descriptive material covering the existing site and proposed development site plans. Conclusions relating to the physical character of the site and its adaptability for residential development is based upon information developed by the various consultants to Kaiser Cement Corporation and onsite inspections.

Basis of Analysis, Opinions, and Conclusions

The absorption rate conclusions assume the project is marketed as free simple units, and reflect the sizes, characteristics, and price ranges concluded as appropriate in the analysis.

The analyses assume the developer(s) of Mailli Kai have the experience and expertise to design, construct, and market the individual units on a competitive basis.

The number of units which would be affordable to the gap group will vary in relation to median income levels and interest rates. The analysis assumes pricing levels which are affordable to the gap group will change in proportion to median income over the projected marketing period.

The analysis, opinions, and conclusions of this report are our informed judgement based on market and economic conditions as of the date of the report.

We have relied on data and information provided by others. We believe the information to be reliable; however, we do not assume any responsibility for the accuracy of information provided by others.

Our analysis, opinions, and conclusions assume:

1. No hidden adverse surface or subsurface, drainage, subsoil, ground water, or geological structures or conditions exist.
2. The client has provided us with all significant, relevant information covering the subject of this report.
3. There are no hazardous or environmentally dangerous materials present which would have an impact on the value or use of the property.

No responsibility is assumed for matters legal in character nor for the title which is assumed to be good and merchantable.

Any drawings, maps, photographs, and similar exhibits accompanying this report are included to assist the reader in visualizing the property. No responsibility is assumed for the accuracy of these exhibits.

All applicable public and private zoning codes and regulations, building and health codes, and other factors which affect the utility and value of the property were considered.



#### Terms of Assignment

Our assistance is limited to preparing this report to be used for your internal information. As a result, in accepting this report, the client specifically agrees that our findings and conclusions are solely for internal decision-making and that our report will not be referred to or presented to any other party for obtaining financing or any other purpose.

We have no obligation to update our report because of events and transactions occurring subsequent to the date of the report.

Neither our fees nor payment were contingent upon the results of the report.

#### Use of Report

This report is prepared as part of the EIS submittal and will be incorporated in its entirety in the Appendix. This report may not be reproduced or published for any other purpose without the prior written consent of John Child & Company, Inc., and then only with proper qualification.

This report conforms with the By-Laws and Regulations of the American Institute of Real Estate Appraisers of the National Association of Realtors, the International Society of Real Estate Appraisers, and the American Society of Appraisers.

The contents of this report, the identity of the appraisers or any reference to John Child & Company, Inc., the American Institute of Real Estate Appraisers, the International Society of Real Estate Appraisers, and the American Society of Appraisers, or to their respective designations may not be disseminated to the public through advertising media, public relations media, news media, sales media, or any other public means of communication.

## II - MARKET ASSESSMENT - AFFORDABLE UNITS

This section summarizes the study approach and market assessments for affordable units at Mailli Kai. Affordable units would be priced at levels for which the gap group market could qualify.

### STUDY APPROACH

The study approach to complete the market assessments for affordable units is outlined as follows:

- Overview of housing and demographic trends on Oahu, Waianae and Ewa.
- Review of recent publications covering affordable housing. The articles include:
  - Oahu's Affordable Housing Crisis, Department of Housing and Community Development (DHCD), City & County of Honolulu, dated March 16, 1987.
  - Three-Year Housing Assistance Plan For The City & County of Honolulu, October 1985-September 1988, DHCD, City & County of Honolulu, dated June 1985.
  - Hawaii State Plan: Affordable Housing Issue Paper, Department of Planning and Economic Development, State of Hawaii, dated December 1984.
  - Affordable Housing Issue Paper, Department of Planning and Economic Development (DPED), Hawaii, dated December 1981 - Daly & Associates, Inc.
- Interviews with representatives of DHCD and Housing Finance and Development Corporation (HFDC), formerly Hawaii Housing Authority, as a basis to evaluate household income levels and housing prices the gap group could afford.
- Review of historical absorption rates, sales price range, buyer profile and unit characteristics of comparable projects oriented to the gap group.
- Identification and evaluation of existing and proposed competitive residential developments on Oahu sponsored by HFDC, DHCD, or private developers.
- Assessment of the competitiveness of the proposed Mailli Kai project in relation to the current and proposed residential projects on Oahu.

- Estimate of the sales prices and absorption period for the proposed Maili Kai project based on the absorption rates experienced by recent comparable projects, projected market trends and the competitive position of the Maili Kai project.

#### REGIONAL BACKGROUND

Trends in Hawaii, Oahu, Waianae and Ewa were reviewed in terms of population, personal income, employment and economic activity. Significant trends are outlined as follows:

- Resident population of Hawaii is projected to reach 1.3 million by 1990 and 1.5 million by 2005.
- Personal income in Hawaii has increased 8% to 12% annually since 1965 and compares to National levels.
- Employment continues to grow in government, service and retail trades; Hawaii's current unemployment rate of 3.9% compares favorably to National averages.
- Economy of the State is expected to remain strong.
- Resident population of Oahu is expected to reach 954,500 by 2005.
- Most dramatic growth in the past 10 to 15 years occurred in Central Oahu; however, in the next 10 to 20 years growth is expected to focus in the Ewa area.
- 1985 population distribution on Oahu includes about 4.5% in Ewa (36,738 residents) and 4.3% in Waianae based on current estimates by DGP.

#### DEFINITION OF GAP GROUP

The gap group household is defined in relation to median household income. The DHCD defines gap group households as those with incomes between 80% and 120% of the median household income estimate provided by HUD for metropolitan areas of Hawaii.

#### GAP GROUP MARKET

The gap group housing market was reviewed in terms of household incomes, population, and supply and demand relationships on Oahu. Significant trends relating to the gap group market and housing inventory on an island-wide basis are outlined as follows:

- The minimum and maximum income levels for typical household sizes under the current DHCD guidelines are as follows:

11-2

#### Gap Group Qualification

Number persons in household	Household Income	
	Minimum	Maximum
2	\$21,850	\$32,775
3	24,550	36,825
4	27,300	40,950
5	29,000	43,500

- In 1980, estimated gap group households on Oahu totaled 39,366 households. A total of 27,292 of these households were renting their units.
- Since 1980, sales prices of homes have risen faster than increases in household income. This has resulted in an increase in the number of gap group households.
- Based on a review of the Daly & Associates, Inc. Affordable Housing Issue Paper, prepared in 1981, and recent trends in Oahu population, household incomes, and affordable housing inventory, over 30,000 households on Oahu are estimated to be in the gap group market.
- Demand for affordable housing will increase because of increasing numbers of household formations which increase the competition and push prices further upward.
- The problem of housing affordability shows no sign of dissipation in the near future; factors influencing both supply and demand are expected to continue pushing the cost of housing further out of reach of the average household.
- Specific needs of the gap group desiring to become homeowners include: smaller, lower cost "starter homes," and/or reduced initial cost to enable them to qualify to purchase.
- The gap group market is an island-wide market. Projects located in reasonable proximity to employment, schools and shopping would effectively compete for the gap group buyer.

#### GAP GROUP HOUSING INVENTORY

##### Historic Inventory

The historical and current inventory of gap group housing on Oahu was reviewed. Significant trends and findings are outlined as follows:

11-3

- The current range of purchase prices a gap group household could afford, based on household size, income, 10% down payment, 3% qualifying ratio, \$100 per month reserves, and 30-year conventional financing at 10.0% interest, are summarized as follows:

Gap Group Unit Pricing		
Number Persons in household	Estimated Range of Purchase Prices	
	Minimum	Maximum
2	\$ 61,100	\$ 98,000
3	70,200	111,700
4	79,500	125,600
5	85,300	134,200

- Relatively few gap group projects have been marketed over the recent past. Those which offered a single-family detached unit in a reasonable location attracted more qualified buyers than units available for sale, and consequently, experienced short marketing periods.
- Until recently, the private sector has not played a major role in providing single-family units oriented to the gap group. A review of major projects over the past two years indicates a change in this trend:

Major Affordable Projects		1986	1987
Private sector projects:			
Single-family		0	413
Multi-family		582	434
Publicly assisted projects:			
Single-family		493	15
Multi-family		42	44
Total		1,117	906

- These major projects are estimated to represent about 75% of the affordable units marketed on Oahu which were oriented to the gap group purchaser. Therefore, total annual additions are estimated at between 1,200 and 1,500 units.

- Most of these major projects typically attracted at least three times as many qualified buyers as there were units available for sale. Therefore, demand indicated by buyer interest is estimated to range from 3,600 to 4,500 units annually.
- The number of gap group units developed by the public and private sector has not been sufficient to significantly reduce the overall demand for gap group housing units.
- Based on the relatively limited numbers of affordable units which have been marketed in the recent past, the outlook for construction of affordable units is not encouraging. Rising material costs, coupled with the increasing cost and limited supply of suitable land, can be expected to continue pushing the costs of producing housing units higher.
- The State has announced its policy of requiring 60% of new housing inventory as a condition of land use reclassification. As a result, significantly more than 10% of future housing development on land not currently zoned for residential use could be oriented to the gap group market.

#### Planned and Projected Inventory

Publicly assisted gap group housing developments are generally developed as individual projects. In the private sector large residential developments either develop individual projects oriented to the gap group market or orient a portion of a larger project inventory to the gap group. A review of major housing projects which are currently being developed or are proposed for development and contain competitive affordable units indicates the following:

- The projects include 34,601 proposed residential units. About 38% (13,088 units) are proposed to be marketed as gap group units. See Addenda A for a summary of these projects.
- About 51% (6,691 units) of the gap group units are expected to be single-family units, and 40% (5,245 units) are expected to be multi-family units. The unit types of the remaining units have not been specified.
- About 510 of the 6,700 single-family gap group units have already been marketed and are under construction.
- Marketing is projected to commence on about 7,500 gap group units prior to 1991. However, many projects require land use/zoning approvals which may delay the projected time-tables.

- About 50% or 3,780 of the units scheduled to commence marketing prior to 1991 are single-family units.
- One-half of the proposed gap group units are multi-family; however, market patterns have shown that the single-family dwellings are more desirable if they can be afforded.
- Most residential projects recently marketed in Waianae have been publicly assisted projects developed by HHA. HCDC has only developed low cost rental projects in the area over the recent past.
- Since HHA starts construction on a project only when there are three times as many income-qualified applicants as there will be units, and is charged with the distribution of affordable housing on a State-wide basis, their activity in Waianae is a conservative indication of demand for affordable housing units in the area.
- Currently, the major competing gap group projects on Oahu would be Kahl Kani, a proposed 290-unit single-family project in Whitmore Village, and West Loch Estates, a proposed 750-unit single-family project in Honouliuli, Ewa.

#### ESTIMATED MARKET SUPPORT FOR AFFORDABLE HOUSING

Affordable unit additions on Oahu are estimated to have ranged from 1,200 to 1,500 units over the recent past. With an estimated annual demand for 3,500 to 4,500 gap group units, there has been an unfulfilled demand for about 2,400 to 3,000 affordable units per year. An additional 13,000 units are proposed to be oriented to the gap group in Waianae, Ewa and Central Oahu over the foreseeable future. If all of the proposed projects market units according to current schedules, there would be about 1,000 units added annually over the foreseeable future. However, it is probable that many of these proposed developments will be significantly delayed or altered, and there would still be unfulfilled demand.

The marketing of recent projects oriented to the gap group market reflects this pent up demand. These projects have attracted large numbers of prospective gap group purchasers from wide geographic areas. Typically, as many as three to four times as many buyers as available units have been attracted to these affordably priced projects.

The location of the housing units has not been a significant factor unless the project was in a very remote location. Location is expected to remain a less significant factor within the gap group market, if the right housing product can be offered at an affordable price and the project is located in reasonable proximity to employment, schools, and shopping. Housing projects in Waianae have historically achieved less market support due to their remote

11-6

location, high-density, plain designs, and adverse reputation of higher crime rates.

#### MARKET ASSESSMENT FOR MAILI KAI AFFORDABLE UNITS

The projected demand for the 1,315 affordable units in Maili Kai varies by unit type. The island-wide market demand for gap group housing is expected to remain very strong over the foreseeable future. While most residential developments in the Central Oahu/Ewa area will have significant portions of their inventory oriented to the gap group market, a sufficient demand would exist to accommodate all anticipated supply.

#### Unit Sizes and Price

Because of the range of household sizes and income levels comprising the market, a range of unit sizes in terms of bedroom and bathroom count would be appropriate for Maili Kai. Recommended affordable unit sizes and price ranges are summarized as follows:

#### Recommended Mix of Affordable Units

Unit type	Bedroom/ bath count	Net living area		Estimated selling price range
		excluding carport (sq)	including carport (sq)	
Single-family	3/2 3-4/2	900-1,000 1,000-1,200	900-1,000 1,000-1,200	\$ 95,000-\$105,000 105,000- 120,000
Townhouse	2/1 2-3/1.5-2	750- 800 800- 900	750- 800 800- 900	70,000- 80,000 80,000- 85,000
Low-density apartments	2/1	750- 800	750- 800	55,000- 65,000

#### Absorption

Comparable single-family developments affordable to the gap group market have experienced very rapid absorption rates. Multi-family projects oriented to the same market have not been absorbed as rapidly as single-family units. A summary of recently marketed projects including absorption rates is presented in Addenda B. Addenda C includes a summary of selected projects which are or have been oriented to or affordable to the gap group market.

The sales experiences of projects affordable to the gap group reflect the following absorption data:

11-7

- Single-family units generally have absorption rates which are two to three times faster than absorption rates for multi-family projects.
- The average monthly absorption rate for the four major publicly assisted single-family projects in 1986 was 91 units. These units were sold with a buy-back provision which effectively precludes the buyer from benefiting from any future increase in the unit value for 10 years.
- Soda Creek is the only major privately developed single-family affordable project in the past two years. While the unit sales have not closed, most of the 413 units were "sold" within a two-month period. It did not have a buy-back provision.
- The average monthly absorption rate for the five most recent privately developed multi-family projects is 29 units. These units do not have buy-back provisions.
- Absorption rates are influenced by financing. Most projects were conventionally financed through FHA/VA. However, the impact of other financing is evident for the Holani at Makaha single-family project. The project had a total of 147 units and started marketing in 1986. The 100 units which were available with financing through Farmer's Home Loans (34 interest) sold in two months. The 47 other units were marketed with conventional (FHA) financing, and there are still 20 units remaining to be sold. The 27 units were sold over an 18-month period.
- Waianae district projects have been significantly influenced by financing. Those projects with very favorable financing such as Farmer's Home Loans sold rapidly. Projects with conventional financing sold at generally slower rates than similarly financed projects located elsewhere on Oahu.
- Primary reasons cited by brokers and public agency representatives for the slower absorption rates in Waianae include remote locations, generally lower income levels for the community, and concern over reputation for higher crime rates for the area.

With the exception of projects in Makaha Valley, there has not been a master-planned residential development in Waianae which would be comparable to that proposed for the Maili Kai site. Most residential projects recently marketed in Waianae have been publicly assisted projects developed by HHA. The Maili Kai units will be more attractive than the typical HHA projects due to the master-planned setting, security and project amenities, and absence of the buy-back provision on the majority of the units.

11-8

The recently announced Valley Homes project in Makaha Valley is a more comparable development. In the past five weeks the developer has shown his model unit to a variety of realtor groups and has already received over 30 purchase offers. At this rate, it is probable that the 119 single-family unit condominium project will sell out in a few months. The positive response to this comparable project indicates significant demand exists for well designed units in a master-planned setting.

The Maili Kai affordable units could experience a very rapid sell-out such as that indicated for Valley Homes; however, lower absorption rates are projected for Maili Kai due to its less familiar location and smaller scale of development. The absorption rates projected for the single-family units are greater than that projected for the multi-family units based on the experiences of similar projects. The following absorption rates would be reasonable for the Maili Kai affordable units:

Unit type	Planned units	Annual absorption rate	Projected absorption (years)
R-5 single-family units	411	100-150	3-4
Multi-family townhouse units	432	30-50	9-14
Low-density apartment units	472	30-50	9-16

Projected absorption rates for affordable units at Maili Kai total 160 to 250 units per year. This represents a market share of between 4% and 6% of Oahu's projected annual demand for 4,000+ units oriented to the gap group market.

As development of Ko Olina resort and Kapolei in the easterly portion of the Ewa district proceeds, Maili Kai's location will become more attractive. In addition, as development of the Maili Kai project is established and the quality of the master-planned community is evident, Maili Kai units will become more competitive. Therefore, it is reasonable that absorption rates will increase in the latter stages of development. Delays or cancellations of competing housing projects in Ewa and Central Oahu would also result in increasing rates of absorption for the Maili Kai units.

#### Design Consideration

A master-planned community is recommended to attract buyers to the Maili Kai project. A master-planned project would attract buyers because of the overall quality and design of the area would be known, buyers could exercise control over the quality of maintenance through an owner's association, and master planning provides a means of developing a sense of community among the component projects. Individual projects within the various categories of land use should present a feeling of a separate community which buyers could identify with. All buyers are

11-9

concerned about security - for their families and their investment. The master development plan and project designs should provide integrated security measures for each project in order to mitigate security concerns.

The overriding factors for affordable housing are price, type of unit, unit size, and unit design. Location is not a significant factor provided the project is located in reasonable proximity to employment, schools, and shopping. The future development of Ko Olina as a major employment center and planned development of Makakilo Shopping Center, both within 10-minute driving times of the Maili Kai site, would help to make Maili Kai competitive with other proposed developments.

Options offered on single-family units are generally very limited in comparable projects, and if offered, were very basic: for example, patio for expansion, garage upgrade, or appliance package. Community amenities are typically not important in the purchase decision. Buyers of affordable units do not want significant monthly obligations for maintenance of common areas/recreational facilities since they are very concerned about maximizing their purchasing dollar and meeting monthly debt service obligations.

### III - MARKET ASSESSMENT - VIEW UNITS

This section summarizes the study approach and market assessments for the single-family view units in Maili Kai. These units would be priced above levels which are affordable to the gap group market.

#### STUDY APPROACH

The study approach to complete the market assessments included:

- Review of current and projected demand for housing units on Oahu and especially in Waianae and Ewa.
- Review of sales absorption rates, sales prices, buyer profiles, and unit characteristics of comparable projects.
- Inventory of competitive under-construction, planned and proposed inventory in all major residential development in Waianae and Ewa.
- Review of the competitive strategies of major residential developments in Waianae and Ewa.
- Estimate the unit sizes and average sales prices appropriate for Maili Kai.
- Estimate of average annual absorption of the Maili Kai single-family view units.

#### CURRENT HOUSING DEMAND

The historical and current demand for housing on Oahu was reviewed. Significant trends are outlined as follows:

- Since 1981, between 2,500 and 4,000 new housing units have been added annually on Oahu.
- At the same time vacancies have remained relatively low, ranging from 3.1% to 4.7%.
- About 41% of Hawaii's housing inventory is owner-occupied.
- Over the past 15 years, the strongest growth in new housing units has been concentrated in Central Oahu. From 1980 to 1985 occupied housing units in Central Oahu increased from 26,300 to 31,300 and represented 10% of Oahu's increase in occupied inventory.

- At the same time occupied housing units in Waianae increased from 7,660 to 8,300 units and Ewa increased from 8,800 to 9,200 units. In 1985, Waianae and Ewa represented 3.4% and 3.7% of Oahu's occupied inventory, respectively.
- Since 1980, over 23,000 new housing units have been added on Oahu. About 9,400 are single-family units.
- Annual new sales in major projects in Waianae and Ewa and Central Oahu have averaged as follows:

Mililani	300-400
Makakilo	100-200
Gentry-Waipio	300-400
Village Park	250-300

- Overall, an estimated annual average of 800 to 1,200 units have sold in Ewa and Central Oahu. There have not been any major private residential developments in Waianae in the recent past.
- From 1981 to 1985, average sales prices for residential properties on Oahu have remained relatively stable. Since 1986, prices have increased significantly.
- In comparison, average single-family sales prices in both Waianae and Ewa have increased about 3% annually since 1984.
- Average sales prices for single-family residential properties ranged as follows:

	Oahu	Waianae	Ewa
1981	\$191,597	NA	NA
1982	184,227	NA	NA
1983	188,742	NA	NA
1984	187,270	\$ 97,826	\$138,600
1985	188,500	108,811	139,100
1986	210,600	104,600	144,925
Sept. 1987	261,900	106,800	151,850

#### PROJECTED HOUSING DEMAND

Demand for housing on Oahu is expected to continue to remain strong as population, employment and household incomes continue to increase. Significant trends in projected housing demand are outlined as follows:

- Department of General Planning (DGP) projects Oahu's population to increase to 954,000 persons by 2005. The increase in population by 2005 would represent an additional demand for at least 48,200 housing units, assuming an average household size of 2.9 persons on Oahu.
- On Oahu, the primary new demand for housing would be in Ewa because of new employment opportunities created by:
  - Ko Olina Resort
  - Expansion of Campbell Industrial Park
  - Barber's Point Harbor
  - Ewa Town Center.
- The Mailli Kai project is located within a 10-minute drive of these employment centers and would be more convenient than some of the proposed developments in the Ewa District.
- According to DGP, the population of Ewa is expected to double to 83,100 by 2005, while Waianae's population is projected to increase by about 2,600 persons to 39,300. However, DGP's estimates of the population in Ewa may be conservative because:
  - Oahu's overall demand for new households could represent at least 48,200 new units.
  - Ewa and Central Oahu would be expected to represent a significant portion of the new demand because of:
    - New job opportunities in both Ewa and Central Oahu.
    - Availability of competitively priced residential properties.
- As a result, historical annual absorption levels of 800 to 1,200 units would be expected to double to 1,500 to 2,500 units over the next 20 years. Ewa would attract about two-thirds of the future units based upon projected population growth, say 1,000 to 1,700 units per year.
- Overall new housing demand in Ewa and Central Oahu is estimated to be about 42,000 units by 2005. However, considering an average vacancy rate of about 5%, the actual new housing units required would be about 44,200 units by 2005.
- Portions of the Waianae district which are located within reasonable travel time of employment opportunities in Ewa will compete with residential projects in Ewa for the new households attracted to the Ewa district.

**EXISTING AND PROJECTED HOUSING INVENTORY**

Major residential developments in Waianae, Ewa and Central Oahu were evaluated in terms of development status. These developments are summarized in Addenda D. Waianae has no proposed major residential developments which are or would be comparable to the Maui Kai view units other than Mauna Olu subdivision. Mauna Olu subdivision was marketed as vacant houselots and has no unsold inventory. The existing and projected housing inventory for Ewa and Central Oahu is summarized as follows:

- Current unsold inventory in major projects:

Project	Unsold Inventory	
	Single-family	Multi-family
Millilani	402	330
Village Park	231	--
Makakilo	96	24
Total	729	354

- Typical sales prices of the unsold inventory:

Project	Sales Price Range	
	Single-family	Multi-family
Millilani	\$122,000-214,000	78,000-160,000
Village Park	135,900-145,200	--
Makakilo	140,000-223,000	78,000-134,000

- Over 51,000 additional units are proposed as follows:

Project	Potential new units
<u>Waianae</u>	
Valley Homes	119
<u>Ewa</u>	
West Loch Estates	1,500
Makakilo	3,000
Kapolei Village	4,000
Puuloa Estates	300-330
Ewa Marina	4,850
West Beach	9,200 (1)
Ewa by Gentry	7,000-8,000
Ewa Town Center	N.A.
<u>Central Oahu</u>	
Millilani Mauka	6,640
Waikole	2,700
Village Park	3,480
Waiaua Ridge	8,000
Total	<u>50,789-51,819</u>

- State land use and County zoning approvals are required to develop the proposed projects. Current approvals permit development as follows:

	Potential new units
Development approvals obtained	7,834
State land use approved	3,265-3,925
State and County approvals required	39,690-40,690

- However, approvals are expected for a significant number of new units. Excluding Ewa Marina, Ewa Town Center and West Beach, 14,680 planned and about 22,000 proposed units are scheduled for Waianae, Ewa and Central Oahu.

(1) Luxury multi-family residential units.



- The annual additions could range from about 800 to 3,300 units based on the current schedule. However, new units would be delayed when supply exceeds demand, and 3,300 units are unlikely to be built if the demand were not sufficient to support sales. Addenda E provides a summary of single-family unit absorption rates in selected developments.
- The proposed price ranges of competitive projects are as follows:

Project	Units	Sales price range
West Loch	600	\$130,000-180,000
Mililani Mauka	5,630	118,000-280,000
Maikale	8,000	130,000-200,000
Village Park (expansion)	3,480	120,000-195,000
Makakilo	3,000	119,000-190,000
Waiala Ridge	8,000	130,000-140,000
Ewa by Gentry	7,000-8,000	135,000 (average)
Kapolei Village	4,000	130,000-150,000
West Beach	9,200	N.A.

Addenda F provides a summary for selected major residential developments in Waialae, Ewa and Central Oahu which would compete with the Maili Kai view units.

#### ESTIMATED MARKET SUPPORT FOR HOUSING DEVELOPMENT

The projected housing requirements were compared to the projected available inventory. Currently housing supply exceeds demand; however, within one or two years, the existing and planned inventory would be insufficient, and an additional 900 to 1,000 units would be required. However, assuming Waiala, Mililani Mauka and Ewa by Gentry receive necessary land use and zoning approvals and development proceeded as proposed, the total available inventory would exceed demand from 1990 through about 2000.

As a result, major projects would be expected to delay or decrease the proposed phasing to minimize the surplus inventory. By 2001, housing requirements would be expected to exceed available inventory. Major residential projects would be expected to accelerate development. About 5,000 units in Ewa Marina and Puuloa Estates would be expected to be developed between 2001 and 2005. In addition several thousand residential units could also be developed in Ewa Town Center.

III-6

#### MARKET ASSESSMENT FOR MAILI KAI VIEW UNITS

The market outlook for view units in Maili Kai supports development of the 120+ units over the next two to three years because of their larger lot sizes, convenient location, views and master-planned community setting. The projected housing requirement in the Waialae/Ewa areas benefiting from planned developments is expected to remain relatively strong. The most competitive future inventory would be:

- West Loch Estates
- Ewa by Gentry
- Village Park.

Although Makakilo would be in a position to offer competitively priced units, their new inventory is most likely to be priced higher than Maili Kai. Mililani, Maikale and Waiala Ridge are also expected to be priced higher and would not be directly competitive.

#### Unit Sizes and Prices

Average sales prices for Maili Kai single-family, view units in the \$140,000 to \$150,000 range would be reasonable based on the current and projected sales prices of competitive developments after adjustment for location and project amenities.

Unit prices would vary based upon unit size and design and lot topography, views, and size. The selling prices would range from about \$130,000+ for small (1,200sq) three-bedroom, two-bath units to about \$160,000 for large (1,800sq) four-bedroom, two-bath units on the large 10,000+sq view lots.

#### Absorption

A review of recent absorption rates experienced in comparable residential developments reflect annual sales volumes of 100 to almost 400 units annually. The absorption rates experienced in Mililani, Village Park and Makakilo over the recent past ranged from 100 to 400 units per year. Mauna Olu Estates in Makaha Valley sold 86 one- to two-acre view lots at prices ranging from about \$100,000 to \$200,000 over a five-week period in 1987. The strong market demand for these upscale residential lots indicates a market exists for upscale residential projects in Waialae.

Considering the projected housing requirements and available inventory in Ewa, and the convenient location of Maili Kai, the 120 view units would be expected to sell in about two to three years. The actual sales performance would depend on the design, timing, pricing, and financing offered for comparable units at West Loch Estates, Ewa by Gentry and Village Park.

III-7

Mali Kai's estimated market share could range from 31 to 71 of the projected new housing requirement for Ewa, and could range from about 40 to 90 units annually, depending on the type of units, pricing and marketing efforts, and competitive inventory available.

#### Unit Mix

If possible and economically viable, presales prior to construction would allow the buyer to select specific unit types to be built. As a result, the unit mix would reflect current market demand. However, if the unit mix must be predetermined, a mix of about 70% three-bedroom, and 30% four-bedroom units would be recommended based on current market trends.

#### DESIGN CONSIDERATIONS

Purchasers of view units are primarily interested in the view, unit design, and project amenities.

The potential buyer of the Mali Kai view units will have many alternative projects to choose from in this price range. However, Mali Kai will offer larger lot sizes and superior views. The unit design should include a functional floor plan, ample floor area, and attractive exterior appearance.

Developers listed the following items in response to a survey covering the elements of a good floor plan:

- Space should be well utilized;
- Kitchen should be well designed and laid out;
- Master bedroom should be roomy;
- Ample cabinet space;
- Efficient traffic patterns within the home;
- Interior layout should be attractive;
- Living areas oriented to the view.

#### Project/Development Amenities

The project amenities offered in the development are promoted as part of the sales presentation. The view units represent a relatively upscale project for the neighborhood and should have a separate identity of their own even within the master-planned Mali Kai development. Security features such as a gated entry and security guards would be appropriate for this upscale project. Amenities such as open space and recreational facilities are important and increase the desirability of the project, but are not the major factor in the purchase decision.

111-8

#### ADDENDA

Addenda A - Current and Proposed Competing Affordable Projects

Addenda B - Absorption Rates for Selected Comparable Affordable Projects

Addenda C - Selected Affordable Unit Developments

Addenda D - Current and Proposed Single-Family/Multi-Family Competing Market Units

Addenda E - Single-Family Absorption Rates for Selected Major Residential Projects

Addenda F - Major Competing Residential Development in Waianae, Ewa and Central Oahu

#### Certification

Qualifications of John Child & Company, Inc.  
Qualifications of Karen Char, MAI  
Qualifications of Usou Y. Ewart, ASA

**AFFORDABLE UNITS**  
Absorption Rates for Selected Comparable Affordable Projects

Name	Location	Year marketing began	Type	Number of units	Bedroom/bath	Living area (sq ft)	Average selling price	Monthly absorption rate
Mokulele	Kaneohe	1986	SFD	242	2/1.5 3/2 4/2	836 1,150 1,391	\$ 95,000 107,000 119,000	242 (1)
Hani Pua Gardens II	Kaneohe	1986	SFD	99	3/1.5 3/2	912 1,000	97,000 (2)	11
Lelehua Village	Wahiawa	1986	SFD	40	3/2	1,000	92,000 (1)	40
Hidden Valley Estates								
Increment I	Wahiawa	1983	Low-rise	28	2/1	817	81,500	11.5 (4)
Increment II	Wahiawa	1985	Low-rise	32	2/1	817	81,500	16
Increment III	Wahiawa	1986	Low-rise	40	2/1	837	85,000	10
Increment IV	Wahiawa	1987	Low-rise	14	2/1	817	86,000	14
Newtown Meadows	Newtown	1986	Townhouse	152	2/2	1,150	112,500	76
Notani at Makaha (5)	Makaha	1986	SFD	100	3-1	1,000	78,500	50
				47	3-1	1,000	78,500	2
Kupono	Waipio	1984	Townhouse	120	Studio 1/1 2/1	434 484 716	54,000 76,000 91,000	7.5
Crosspointe	Halewa		Townhouse		Studio 1/1, 1.5 2/1, 2.5	434 712 900	N.A. 80,000 105,000	
Selected Increments:		1984		58				28
		1984		46				27
		1985		34				17
		1986		58				28
		1986		40				20
		1986		32				16
		1986		44				22
		1987		44				22
Valley Homes	Makaha	1987	SFD	119	3/2	864-960	96,990	10 (6)
Acacia	Pearl City	1986	MF	90	2-1 3-2	607 771	61,800 71,800	1.5

- (1) This NHA-assisted project sold out in three weekends. There were 500 applicants, and 200 applicants are now on a waiting list.
- (2) Resales are currently averaging \$115,000.
- (3) Average per square price with a lot size of 1.7508. This NHA project is currently on hold until land is acquired.
- (4) Sales in this leasehold project were slow at first; however, after FHA approval, increment I units sold out in two months.
- (5) Low income NHA project with subsidized Farmers Home Loans on 100 of the 147 units. The remaining 47 units were conventionally financed.
- (6) Marketing began December 1987. Developer received 10 reservations after one week. Final MPP will be received in about 2 months.

Source: Public records and interviews with project brokers and representatives.

ADDENDUM B

**AFFORDABLE UNITS**  
Current and Proposed Competing Affordable Projects

Project	Location	Cap Corp			Competing unit type	Price	Start of marketing	Developer or agency	Remarks
		Total units	Unsold units	Unsold units					
<b>Projects Being Marketed or Under Construction:</b>									
Valley Homes	Makaha	119	119	119	SFD	\$94,990-\$96,990	1987	Circle Inc.	Developer received 10 reservations after one week of marketing.
Mokulele	Kaneohe	242	242	0	SFD	95,000-119,000	1986	NHA	Project sold out in three weekends May 1986.
Hani Pua Gardens II	Kaneohe	99	99	0	Townhouse	78,000-101,500	1986	Century House	Project sold about 10% units as of Dec. 1987.
Lelehua Village	Wahiawa	147	147	0	SFD	84,000-104,000	1986	NHA	Project has about 20 units left to sell.
Acacia	Pearl City	90	90	0	MF	61,800-71,800	1986	NHA	Construction to begin mid-1988.
Hani Pua Gardens II	Kaneohe	99	99	0	SFD	91,877-94,500	1986	CHCD	Target market was low to moderate income.
Notani at Makaha (5)	Wahiawa	240	240	10	Townhouse	90,000-171,000	1986	CHCD	Target market was the cap group.
								Sturley & Assoc.	Project complete, 95% sold.
		1,179	1,179	246					
<b>Planned or Proposed Projects:</b>									
Millions Parkway	Waipio	200	200	200	Townhouse	\$78,000	1988	Millions Town, Inc.	All units are 2-bedroom/1-bath. Target group low to moderate income.
Century One	Waipio	2,500	2,250	2,250	SFD/TH	Low to market	1988	Century House	Former Hana Brothers Pearl Meadows project.
Bay View	Waipio	700	700	700	SFD	\$188,000-\$200,000	1988	Century House	Project adjacent to Lelehua Village.
Cliffside	Waipio	2,700	2,112	2,112	Townhouse	Low to market	1988	Century House	Estimated eight-year development.
Millions Parkway	Waipio	150	150	150	Townhouse	\$95,000-\$120,000	1988	Sturley & Assoc.	Starts when the Villages project is sold out.
Millions Parkway	Waipio	50	50	50	MF	N/A	1988	NHA	Under consideration.
Millions Parkway	Waipio	4,000	1,675	1,675	SFD/TH	Low to market	1989	CHCD/CHCD	10-year build-out. 40% of cap units are SFD.
Millions Parkway	Waipio	570	570	570	MF	Cap group	1989	NHA	No definite plans at this time.
Millions Parkway I	Pearl City	570	570	570	SFD	\$110,000-\$120,000	1989	CHCD	County and Development Plan approvals outstanding.
Millions Parkway	Waipio	180	180	180	SFD	Cap group	1990	CHCD	Proposed SFD - no definite plans.
Millions Parkway	Waipio	100	100	100	MF	Cap group	1990	NHA	Proposed SFD/TH/elderly rentals - no definite plans.
Millions Parkway	Waipio	400	400	400	MF	Cap group	1990	CHCD	Under consideration.
Millions Parkway II	Pearl City	700	475	475	SFD	Low to market	1991	CHCD	County and Development Plan approvals outstanding.
Millions Parkway	Waipio	8,000	2,000 (2)	2,000	Mixed	Low to market	1991	Century House	County approvals outstanding.
Millions Parkway	Waipio	5,500	1,600 (2)	1,600	SFD	\$118,000-\$200,000	1991	Millions Town, Inc.	County approvals outstanding.
Millions Parkway	Waipio	1,010	91 (2)	91	MF	\$5,000-40,000	1991	Century House	Both General and Development Plan approvals from the County are needed.
Millions Parkway	Waipio	1,200	0	0	MF	Cap to market	1991	City	Conducting preliminary studies.
Millions Parkway	Waipio	200	200	200	MF	Cap group	1991	City	1000 grandstanding, master plan not finalized.
		11,022	11,976	11,976					
		14,601	13,088	12,157					
Detailed Allocation:		SFD	17,819	6,491	6,181				
		MF (2)	15,638	5,245	6,824				
		MF	1,152	1,152	1,152				

- (1) Project offered two types of financing: Farmers Home Loan and Conventional. The Farmers Home financing was available on only 100 units; the other units had to be financed through conventional loans. The Farmers Home Loan units will not be sold immediately.
- (2) Assume 20% of development will be cap group.
- (3) Assume projects which have a mix of single-family/multi-family will be 50% single-family and 50% multi-family.

ADDENDUM A

SELECTED AFFORDABLE UNIT DEVELOPMENTS

Maianae

- Mali Sands
- Valley Homes
- Garden Groves
- Puu Haleakala
- Holani at Makaha
- Uluvehi
- Makaha Meadows

Other

- Hokulele
- Nani Pua Gardens II
- Leilehua Village
- Newtown Meadows
- Hidden Valley Estates
- Kupono
- Crosspointe
- Kahi Kahi
- Acacia
- Soda Creek

Project name: Mali Sands  
 Location: Mali  
 Developer: HHA  
 General description: Mali Sands is a 25-unit single-family development. The project targets the gap group.  
 Unit descriptions:  
 • Lot size is 5,000±  
 • 23 units are 3-bedroom/2-bath with a net living area of about 1,100±  
 • 2 units are 2-bedroom/2-bath with a net living area of about 1,200±.  
 Price: NA  
 Marketing: • Project was marketed in 1979.

**Project name:** Valley Homes  
**Location:** Hakaha  
**Developer:** Grecco, Inc.  
**General description:** Valley Homes is a 119-unit fee simple single-family condominium development.  
**Unit descriptions:**

- Lot sizes 4,000± - 5,000±
- Units are 3-bedroom/2-bath
- Living area is 864± - 960±
- Each unit will have one covered carport, a second covered carport will be an option.

**Price:**

- \$95,000 - \$99,000

**Marketing:**

- Marketing began during the last two weeks of December 1987.
- Final HPR should be complete in about 2 months.
- Client received 30 reservations after marketing for one week. Initial review shows most of the reservations were by investors.
- Project construction should begin by mid-1988 and be complete by first quarter 1989.

**Project name:** Garden Groves  
**Location:** Nanakuli  
**Developer:** Schrader Investment & Development Corp.  
**General description:** Garden Groves is a 46-unit fee simple townhouse.  
**Unit descriptions:**

- Units are 3-bedroom/2-bath
- Average living area is 1,100±
- Two open parking stalls per unit.

**Price:**

- Original price average \$46,500
- Resale asking prices range from \$79,500 to \$85,000.

**Marketing:** Project completed marketing in February 1985.

**Project name:** Puu Heleakala  
**Location:** Nanakuli  
**Developer:** Ferguson Land Company  
**General description:** Puu Heleakala is a 192-unit leasehold planned development housing project. There are two- and three-story townhouse clusters and a three-story walk-up garden apartment building.

**Unit description:**

- Townhomes are three- to four-bedroom with one bath to one and one-half baths. The net living area ranges from 1,133 $\frac{1}{2}$  to 1,276 $\frac{1}{2}$ .
- The garden apartments are 2-bedroom/one-bath with a net living area of 680 $\frac{1}{2}$ .
- Parking is available but not assigned.

**Price:**

- Original prices on the townhomes range from \$39,500 to \$44,900.
- Original prices on the garden apartments range from \$33,000 to \$34,000.
- Current resale asking prices on the townhomes range from \$52,000 to \$75,000.

**Marketing:** Project completed marketing in December 1974.

**Project name:** Holani at Makaha  
**Location:** Makaha  
**Developer:** HHA  
**General description:** Holani at Makaha is a 147-unit, fee simple, low income, single-family development.

**Unit descriptions:**

- Lot size 4,000 $\frac{1}{2}$  to 6,000 $\frac{1}{2}$
- Units are 3-bedroom/2-bath
- Average living area 1,000 $\frac{1}{2}$
- \$68,000 - \$73,000
- Began in 1986
- Most of the units (100) are financed through Farmer Home loans with interest rate of 11 and 3 $\frac{1}{2}$ . These units sold within two months.
- About twenty of the larger units, available through FHA and conventional financing, remain to be sold.
- The project official indicated that the distance from downtown and the negative socio-economic status associated with the Waianae Coast were the primary reasons why the project was not sold out.

**Price:**

**Marketing:**

**Project:** Uluvehi  
**Location:** Maianae  
**Developer:** Hawaii Housing Authority

**General description:** Uluvehi is a 380-unit leasehold development. The development consists of 228 duplex and 152 townhome units. There are also 60 rental units which are 1-bedroom/1-bath and 2-bedroom/1-bath.

**Unit description:**

Unit type	Total no. of units	Bdrm./ bath	Lot area (sq ft)	Unit size (sq ft)	No. of units
Duplex	228	3/1 4/1.5	3,700 3,700	1,121 1,273	142 86
Townhome	152	3/1.5 4/1.5	N.A. N.A.	984 1,187	74 78
Apartment (rental)	60	1/1 2/1	N.A. N.A.	520 829	10 50

**Pricing:**

- Project was originally sold in 1974.
- The current resale price on a 3-bedroom townhome is \$46,000. The 4-bedroom townhome is \$50,000-\$54,000.
- The current resale price on a 3-bedroom duplex unit is \$58,000-\$59,000. The 4-bedroom duplex unit is between \$60,000-\$64,000.

**Marketing:**

- The project was originally marketed in 1974. All units were sold in about 3 years.
- Due to construction problems, there was a 4-year moratorium on sales. During this time, about 70 units were repurchased by the City.
- Sales commenced on these 70 units about 1 year ago. During 1987, 25 units were sold.
- Realtor expects to have remaining 45 units sold by the end of 1988.
- Realtor is expecting to sell about 5 units per month.

**Project name:** Makaha Meadows  
**Location:** Makaha  
**Developer:** Hawaii Housing Authority

**General description:** Makaha Meadows is a 130-unit single-family and duplex subdivision.

**Unit descriptions:**

- Single-family 3-bedroom/2-bath unit has 1,064sq of net living area.
- Duplex 3-bedroom/1-bath unit has 880sq of net living area.

**Prices:**

- Project marketed in 1981.
- Single-family 3-bedroom/2-bath: \$83,000.
- Duplex 3-bedroom/1-bath: \$57,500.

**Project name:** Leilehua Village  
**Location:** Wahiawa  
**Developer:** Hawaii Housing Authority  
**General description:** Leilehua Village is a proposed 47-unit single-family project to be located in Wahiawa.  
**Unit descriptions:**

- Single-family units on 3,750± lots
- 3-bedroom/2-bath
- Living area approximately 1,000±

**Price:**

- \$79,000 leasehold
- \$92,000 fee simple

**Marketing:**

- Began in October 1986
- 184 applicants within 6 weeks
- 50% qualified under HHA guidelines
- Negotiations for the acquisition of the land have broken off and no definite timetable for completion is available.

**Project name:** Newtown Meadows  
**Location:** Newtown  
**Developer:** Herbert Horita  
**General description:** Newtown Meadows is a fee simple townhouse development with 152 two-bedroom, two-bath, upper and lower units.  
**Unit descriptions:**

- Two bedroom/two bath
- Approximately 1,100 to 1,200± of living area

**Price:**

- Range from \$105,000 to \$120,500.

**Marketing:**

- Began in January 1986
- Sold out in two months

**Buyer profile:**

- Buyers were described as new generation families with one child or newlyweds.
- Buyers were from the Aiea-Pear City-Waipahu area.
- Annual income was generally greater than \$36,000.



**Project name:**

Hidden Valley Estates

**Location:**

Wahiawa

**Developer:**

Hidden Valley Investment

**General description:**

Wahiawa's Hidden Valley Estates is a leasehold, townhouse project, developed in five increments.

**Unit descriptions:**

- Two-bedroom/one-bath
- 782# - 812# living areas

**Price:**

- Increment I & II - \$85,500
- Increment III - \$85,000
- Increment IV - \$86,000

**Marketing:**

- Increment I marketing began in 1983. Financing available was Hula Mae and conventional. Five units were sold in 10 months. FHA approval was received and the remaining 23 units sold out in two months.

- Increment II marketing began 1985 with 32 units. Sold out in two months.

- Increment III marketing began in 1986 with 60 units. Sold out in 6 months. Approximately 50% of these units were bought by investors. These investors then resold them.

- Increment IV marketing began in 1987 with 34 units. Sold out in one month. All but four units in this increment were sold to investors, who then resold it.

- To date only 6 units remain to be resold.

**Buyer profile:**

- All of buyers were first time buyers.
- Age: late 20's to early 30's;
- Couples with one or two children;
- Some retired couples;

- Incomes range from \$20,000 to \$30,000;
- Most buyers came from the Wahiawa area.

Project name:  
Location:  
Developer:  
General description:

Kupono  
Waipio

Kupono is a 120-unit, fee simple townhouse development located in Waipio.

Unit descriptions:

- Studio has approximately 434 sq ft
- One-bedroom/one-bath has approximately 484 sq ft
- Two-bedroom/one-bath has approximately 716 sq ft

Price:

- Range from \$53,000 - \$94,500.
- Average price by unit type is as follows:
  - Studio \$54,000
  - One-bedroom \$70,000
  - Two-bedroom \$93,000

Marketing:

Marketing began in 1985. The absorption rate was 7.5 units per month.

Buyer profile:

- Buyers were primarily singles and couples with no children.
- Buyers primarily came from the Pearl City, Waipahu or Honolulu area.
- Household incomes ranged from \$24,000 to \$36,000.

Project name:  
Location:  
Developer:  
General description:  
Unit descriptions:

Crosspointe  
Halawa  
Gentry

Crosspointe is a 546-unit leasehold townhouse development.

- Studio 434 sq ft
- 1-bedroom/1-bath or 1.5-bath, approximately 712 sq ft
- 2-bedroom/1.25-bath or 2.5 bath, approximately 900 sq ft

Price:

Average prices range from \$80,000 to \$105,000.

Marketing:

Built in 10 increments since 1984. The last increment is due for completion this year. Project personnel indicated that each 40-50 unit increment sold out in two months.

Buyer profile:

- Typical buyer was either single or married without children.
- Buyers were primarily from the Honolulu area.
- The average household income was between \$20,000 and \$45,000.

Project name: Kahi Kani  
 Location: Wahiawa  
 Land area (acres): 50  
 Developer: Oceanic Properties, Inc.  
 General description: A 290±-unit single-family development. Units to be priced for the "CAP group."  
 Total proposed housing units: 290±  
 Price range: \$100,000-\$120,000  
 Unit description:

Model	Bedroom/ bath count	Dwelling Area (sq)		Total
		Living	Carpport/ storage	
A	2/1	801	430	1,231
B	3/2	949	433	1,382
B-1	3/2	981	433	1,417
C	4/2	1,066	424	1,490

Development schedule:

- All government permits in place.
- Marketing to begin 1988.

Project name: Acacia  
 Location: Pearl City  
 Developer: DHCD  
 General description: Acacia is a 90-unit project sponsored by the Dept. of Housing. The project was targeted to the low/moderate income group.  
 Unit description:
 

- There are 60 two-bedroom/one-bath units with a net living area of about 607±.
- There are 30 three-bedroom/two-bath units with a net living area of about 771±.

 Price:
 

- Two-bedroom/one-bath units \$61,800
- Three bedroom/two-bath units \$71,800

 Marketing:
 

- Project was sold by James Kometani Realtors.
- The project began marketing in January 1986 to date 86 have sold.
- Realtor indicated that 51 of the units had to be sold to people within the low-moderate income group.
- The realtor had a difficult time meeting this requirement.

Project name: Soda Creek

Location: Eva

Developer: Gentry Homes, Ltd.

General description: Soda Creek is the first offering of the Eva by Gentry Development. It is a fee simple development containing 413 single-family homes.

Unit descriptions:

Model	Stories	Bdrm./bath	Area (sq)		Gross area
			Living area	Other area	
1	1	2/1	802	427	1,229
2	1	2/2	945	404	1,349
3	1	3/2	1,045	422	1,467
4	1	3/2	1,189	410	1,599
5	2	3/2.5	1,368	471	1,839
6	2	4/2.5	1,530	522	2,052

Price range:

- Original prices (9/9/87):
  - Model 1 - \$119,900
  - Model 2 - 125,500
  - Model 3 - 128,500
  - Model 4 - 135,500
  - Model 5 - 139,500
  - Model 6 - 144,800
- Current sales prices (12/1/87):
  - Model 1 - \$121,900
  - Model 2 - 128,000
  - Model 3 - 133,900
  - Model 4 - 143,500
  - Model 5 - 144,900
  - Model 6 - 149,900

Development schedule:

- Project began marketing September 1987.
- Project sold out in 3 weekends during the Parade of Homes. After two days of sales 206 units were sold.

VTDU UNITS  
Current and Proposed Single-Family/Multi-Family  
Competing Market Units

Project	Location	Total units	Market Units		Competing unit type	Prices	Start of marketing	Developer
			Total units	Unsold units				
Mulliken Unit 60 (starter homes)	Central	70	70	70	STD	\$122,700 - \$155,000	1987	Mulliken Town, Inc.
Resonatic	Doe	25	25	25	STD	140,000 - 180,000	1987	Finance Realty, Co.
Galaxy Ridge I & II		21	21	21	STD	150,000 - 220,000	1987	
National Harbors		50	50	50	STD	165,000 - 185,000	1987	
Paradise								
Village Park Phase 12 & 11	Kunla	211	211	211	STD	135,900 - 145,200	1987	Whitec Dev., Inc.
Subtotal		397	397	397				
Projects Being Marketed or Under Construction:								
Planned or Proposed Projects:								
Resonatic	Doe	3,000	1,000	1,000	STD	110,000 - 190,000	1987	Finance Realty
Mulliken Unit 63 (islander homes)		42	42	42	STD	134,000 - 214,000	1988	Mulliken Town, Inc.
The Ridge (islander homes)		300	300	300	STD	134,000 - 214,000	1987	
The Pinnacle		90	90	90	TN	175,000 - 165,000	1988	
Gentry Doe	Doe	7,500	5,675	5,675	STD	NA	1988	Gentry Homes
Hoplet Village	Doe	4,000	2,325	2,325	STD	130,000 - 150,000	1988	NA
Merle	Waipahu	2,700	2,020	2,020	STD	130,000 - 200,000	1988	Adac
West Loch-Phase I	Pelee City	570	255	255	STD	110,000 - 120,000	1989	DHCD
Waikane Ridge	Waikane	9,000	5,400	5,400	STD/WF	130,000 - 140,000	1990	Gentry Pacific
Village Park Expansion	Waipahu	3,480	3,480	3,480	STD/WF	120,000 - 195,000	1990	Whitec Corp.
Low Hazara	Doe	4,850	4,365	4,365	ST/WF	100,000 - 200,000	NA	Jack Koon
West Loch-Phase II	Pelee City	780	315	315	STD	110,000 - 170,000	1991	DECD
Mulliken Phase	Mulliken	6,440	4,648	4,648	ST/WF	55,000 - 280,000	1991	Quamur Properties
Paulas Estate	Doe	315	315	315	STD	Not Available	NA	Luka
Subtotal		40,297	26,410	26,410				
Total		40,444	26,807	26,807				

MAJOR COMPETING RESIDENTIAL DEVELOPMENT  
IN WAIANA'E, EWA AND CENTRAL OAHU

- Waiana'e
- Valley Homes
- Ewa
- Makakilo
- Kapolei Village
- West Loch Estates
- Puuloa Estates
- Gentry Ewa Development
- Ewa Marina
- West Beach
- Central Oahu
- Mililani
- Mililani Mauka
- Waikole
- Village Park
- Waiala Ridge
- Gentry-Waipio

VIEW UNITS  
Single-Family Absorption Rates for  
Selected Major Residential Projects

Name	Land tenure	Year marketing began	Number of units	Bedroom/bath	Living area (#)	Lot area	Selling price	Monthly absorption rate
<b>Mililani</b>								
Traditional	Fee Simple	1986	98 (1)	3/2 - 5/2.5	1,250-2,100	6,000-7,000	\$160,000 - \$219,000 (2)	8
New Design	Fee Simple	1986	215 (1)	2/1 - 4/2	760-1,240	4,000-5,000	115,000 - 164,000 (2)	18
<b>Village Park</b>								
Phase 7	Lease	1986	198	3/2 - 4/2	1,022-1,378	3,800-10,000	130,000 - 140,000 (3)	25 (4)
Phase 8	Lease	1986	153	3/2 - 4/2	1,022-1,378	3,800-10,000	130,000 - 140,000 (3)	25 (4)
Phase 10	Lease	1987	140	3/2 - 4/2	1,022-1,378	3,800-10,000	130,000 - 140,000	20
<b>Makakilo</b>								
Colony Ridge Phase I	Fee Simple	1986	80	3/2	1,560-1,759	5,000-8,760	140,000 - 168,000	7
Colony Ridge Phase II	Fee Simple	1987	25	3/2	1,560-1,759	5,000-8,760	140,000 - 168,000	8 (5)

(1) Number of units is actually number of sales closed in 1986.  
 (2) Based on Mililani 1986 Purchaser Profile Report, the average sales price for the Traditional and New Design Home is \$174,348 and \$138,595, respectively.  
 (3) Price range given by Sales & Development Manager - Village Park.  
 (4) Estimated absorption rate provided by Sales Manager for Village Park.  
 (5) Realtor expects these to be sold out in the next few months.

Source: Conversations with Sales Managers for projects and sales brochures.

**Project name:** Valley Homes  
**Location:** Makaha  
**Developer:** Grecco, Inc.  
**General description:** Valley Homes is a 119-unit fee simple single-family condominium development.  
**Unit descriptions:**

- Lot sizes 4,000± - 5,000±
- Units are 3-bedroom/2-bath
- Living area is 864± - 960±
- Each unit will have one covered carport, a second covered carport will be an option.

**Price:**

- \$95,000 - \$99,000

**Marketing:**

- Marketing began during the last two weeks of December 1987.
- Final HPR should be complete in about 2 months.
- Client received 30 reservations after marketing for one week.
- Initial review shows most of the reservations were by investors.
- Project construction should begin by mid-1988 and be complete by first quarter 1989.

**Project name:** Makakilo  
**Location:** Ewa  
**Land area (acres):** 1,800.00  
**Developer:** Finance Realty Company, Limited  
**General description:** This master-planned community includes multi- and single-family residences, recreational, commercial, conservation and public land uses.  
**Total proposed housing units:** 3,000  
**Price range:**

- Single-family homes \$119,000-\$190,000
- Multi-family homes \$75,000-\$90,000

**Development schedule:**

- Total of 3,000 units are able to be constructed without the need of further zoning approval.
- An absorption of 250 units per year is projected by the developer.
- Variety of housing units include garden apartments, single-family homes and townhouses.

**Project name:** Kapolei Village  
**Location:** Eva  
**Land area (acres):** 840.00  
**Developer:** Hawaii Housing Authority and Department of Housing and Community Development  
**General description:** The Kapolei Village Master Plan includes:

- 4,000 single- and multi-family residences, including 750 gap group housing and 150 elderly rental units
- schools
- parks
- shopping centers
- an 18-hole golf course

**Total proposed housing units:** 4,000

**Price range - Market:**

- Single-family homes \$130,000-\$150,000
- Single-family homes \$115,000
- Multi-family homes \$65,000

**Development schedule:**

- State land use reclassification from Agricultural to Urban use and necessary County zoning approvals are outstanding.
- A September 1988 commencement date is scheduled.
- The Master Plan completion is expected 15 years from commencement.

**Developer's projected absorption:**

- 150 units in 1989
- 400 units in 1990
- 400 units in 1991

**Project name:** West Loch Estates  
**Location:** Eva  
**Land area (acres):** 400.00  
**Developer:** Department of Housing and Community Development  
**General description:** The West Loch Estates preliminary Master Plan includes:

- 1,500 residential units
- 18-hole golf course
- Shoreland park
- Neighborhood parks
- School and child care facility

**1,500**

**Total proposed housing units:**

**Price range:**

**Lot pricing:**

- Gap group - \$45,000
- Market interior - 65,000-\$70,000
- Market view - 90,000-100,000

Various builders will be developing the house and lot packages. Package prices are estimated as follows:

- Gap group units - \$110,000-\$120,000
- Market units - 130,000-190,000

**Development schedule:**

**Phase 1 -**

- 315 gap group units
- 255 market units
- Projected construction to start mid-1988
- Projected marketing in mid-1989
- Projected absorption of 240 gap group units and 200 market units per year.

Phase II -

- 435 gap group units
- 345 market units
- 150 elderly apartments
- 3.6-acre commercial site
- Projected construction to start in mid-1990
- Projected marketing in mid-1991
- Same projected absorption rates.

Project name: Puuloa Estates  
Location: Ewa  
Land area (acres): 126.00  
Developer: Lusk  
General description: About 51 acres proposed for the development of 300 to 330 residential units in addition to a public park.  
Total proposed housing units: 300-330  
Price range: Not available.  
Development schedule:

- State land use classification is currently Urban.
- County approval for rezoning lands from Agricultural to Residential use is needed.



**Project name:** Gentry Eva Development

**Location:** Eva

**Land area (acres):** 883

**Developer:** Gentry Homes

**General description:**

Gentry Eva Development has proposed a total of 7,500 residential units. The first offering of units from Gentry Eva Development was 413 single-family homes called Soda Creek (please see separate write-up).

**Price range:**

- Single-family: \$125,000-150,000
- Multi-family: \$ 75,000-110,000

**Development schedule:**

- The next offering will be 250 multi-family units. The multi-family units are in the planning stage and a final decision is expected by February 1988.
- The required zoning has been received from the City.

**Project name:** Eva Marina

**Location:** Eva

**Land area (acres):** 1,100.00

**Developer:** Not known

**General description:**

The Eva Marina Community Master Plan includes:

- 1,850 residential units on 476 acres.
- 485 residential units dedicated to affordable housing.
- 1,600 slip marina encompassing about 98 acres.
- 55 acres of commercial and marina support area.
- 24.5 acres of park.

**Total proposed housing units:** 1,850

**Price range:**

- Majority of units to be priced at \$100,000-\$200,000.
- Lower density, ocean frontage units \$200,000-\$400,000.

**Development schedule:**

- 186 acres have required land use and zoning approvals.

**Project name:** West Beach  
**Location:** Eva  
**Land area (acres):** 632.00  
**Developer:** Herbert Horita  
**General description:** The preliminary West Beach Master Plan includes:

Acres

1,500 low-density apartments 108.00  
 3,700 medium-density apartments 78.90  
 4,000 resort condominiums 66.50  
 2 commercial sites 17.80  
 Beach club space 2.20  
 Hawaiian cultural center 21.80  
 Marina with 500 slips for boats 16.30  
 4 man-made lagoons 13.10  
 18-hole golf course 170.50  
 4 parks 51.40  
 Elementary school 6.90  
 Transit stations 2.70  
 Access and circulation 46.10

**Total proposed housing units:** 9,200  
**Price range:** Not available.  
**Development schedule:**

- As of 1986, State land use and County approvals have been applied for and have not yet been obtained.
- A commencement date of 1989 is projected by the developer.

**Project name:** Milliani  
**Location:** Central Oahu  
**Land area (acres):** 3,500  
**Developer:** Milliani Town, Inc.  
**General description:** This master planned fee simple residential community is located 20 miles from Downtown Honolulu. It is the largest planned community on Oahu. It has single-family as well as multi-family residences, recreational, commercial and public land uses.

**Total proposed housing units:** Approximately 17,000

**Unit description:**

Unit type	Lot area (#)	Net area (#)	Lana'i/ other area (#)	Gross area (#)	Bedrm./ bath	Asking price range
Executive	9,000-10,000	2,500-2,650	400-420	2,900-3,070	4/2-2.5	\$249,000-\$316,000
Traditional	6,000-7,000	1,250-2,100	360-400	1,610-2,500	3/2-5/2.5	160,000-219,000
New design	4,000-5,000	760-1,240	360-400	1,120-1,640	2/1-1/2	115,000-164,000
Islander	4,848-7,876	765-1,930	NA	--	2/1-4/2.5	156,000-214,000
Lots (vacant)	8,704-13,916	--	--	--	--	140,000-150,000

**Development schedule:**

- Current inventory is about 506 single family units.
- About 370 single family units to be brought on in 1988.

Buyer profile:

- Information taken from the 1986 Purchaser Profile Report.

	Traditional	New design
• Average income (combined husband & wife)	\$19,366	\$38,116
• Number of household members	3.03	2.93
• Previous residence:		
Millilani	43	27
Honolulu/Maikiki	191	281
Waipahu/Crestview	115	141
Aiea/Salt Lake/Pearl City	91	141
• Age:		
Husband	35	30
Wife	32	28
• Place of employment:		
Honolulu/Maikiki -		
Husband	49	50
Wife	54	58
Aiea/Salt Lake Airport -		
Husband	15	16
Wife	22	14
Pearl Harbor/Hickam -		
Husband	18	10
Wife	1	6

Project name: Millilani Mauka  
 Location: Millilani, Central Oahu  
 Land area (acres): 1,200.00  
 Developer: Oceanic Properties, Inc.  
 General description: The Millilani Mauka Development Plan includes:

- 5,630 single-family residences, from luxury homes to zero lot line and cluster developments.
- 1,010 low-density apartment and townhouse units.
- 101 subsidized residences.
- Commercial area with schools, recreational centers and churches.
- University of Hawaii's West Oahu College campus.
- A 20- to 30-acre site for senior citizen facilities.

Total proposed housing units: 6,640  
 Price range:  
 • Single-family homes \$118,000-\$280,000  
 • Multi-family homes \$55,000-\$69,000

Development schedule:  
 • Both General and Development Plan approvals from the County are needed.  
 • A State Land Use Hearing is scheduled for July 1987 to reclassify land use from Agricultural to Urban use.

**Project name:** Waikele  
**Location:** Waipahu, Central Oahu  
**Land area (acres):** 577.20  
**Developer:** Amfac, Inc.  
**General description:** The Waikele Master Plan includes:  

- 2,700 residential, multi-family units
- 25-35% units dedicated to low-to-moderate income families
- 14.5-acre village commercial center
- 50-acre office-business park center
- 25-acre community recreation center
- an elementary school
- a par-72 golf course.

**Total proposed housing units:** 2,700  
**Price range:**

- Single-family homes \$130,000-\$200,000
- Multi-family homes \$100,000-\$130,000

**Development schedule:**

- General and Development Plans have been approved by the County.
- Zoning approval has been obtained.
- Groundbreaking scheduled for 1988.
- Offsite improvements will be done by Amfac, Inc.
- A developer will be sub-contracted.
- An absorption of 340 units per year is projected by Amfac, Inc.

**Project name:** Village Park (Expansion)  
**Location:** Waipahu, Central Oahu  
**Land area (acres):** 691.50  
**Developer:** Waitec Development, Inc.  
**General Description:** The Village Park Master Plan includes:  

- 3,480 residential, multi- and single-family units
- 30 acres dedicated to subsidized housing
- 28.7 acres for commercial and light industrial use
- a shopping center
- elementary schools
- recreational facilities
- an 18-hole golf course

**Total proposed housing units** 3,480  
**Price range:**

- Single-family homes \$120,000-\$195,000
- Multi-family homes \$90,000-\$110,000

**Development schedule:**

- State Land Use Commission has reclassified the 691.50 acres for Urban use.
- County has approved the General and Development Plans for Phase I (100 acres).
- County Department of Land Use zoning was approved for Phase I (100 acres).
- County approvals on remaining 591 acres being pursued.

**Project name:** Waiava Ridge  
**Location:** Waiava, Central Oahu  
**Land area (acres):** 1,395.00  
**Developer:** Gentry Pacific, Ltd.  
**General description:** Master-planned community includes single- and multi-family residential units.  
**Total proposed housing units:** 8,000  
**Price range:**

- Single-family homes \$130,000-\$140,000
- Multi-family homes \$100,000

**Development schedule:**

- Development Plan designation on only a portion of parcel is approved.
- County zoning approvals outstanding.
- State Land Use Commission hearing began in July 1987 to reclassify land use from Agricultural to Urban. Hearing continued to November 16 and 17, 1987.
- Commencement scheduled for 1990.
- Absorption is projected at 400-500 units per year.
- A 16-year build-out is projected.

**Project name:** Gentry-Waipio  
**Location:** Waipahu, Central Oahu  
**Land area (acres):** 510.00  
**Developer:** Thomas Gentry  
**General description:** The Gentry Waipio Development Plan includes:  

	<u>ACRES</u>
1,700 single-family residences	193
1,500 low-density apartments	75
1,500 medium-density apartments	10
Light industrial use	120
Commercial site	14
Public facilities	24
Open space	34
Right-of-way	40

**Total housing units:** 4,700  
**Price range:**

- Single-family homes \$116,000-\$150,000
- Multi-family homes \$70,000-\$90,000

**Development schedule:**


- Project is completely developed.
- Remaining inventory includes three townhomes that are presently in escrow.
- Project experienced average annual sales of 300-400 units.

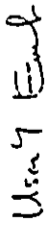
CERTIFICATION

We certify, to the best of our knowledge and belief:

1. Statements of fact in this report are true and correct.
2. Reported analyses, opinions and conclusions are limited only by the reported assumptions and limiting conditions and are our unbiased professional analyses, opinions and conclusions.
3. We have no present or prospective interest in the property which is the subject of this report, and we have no personal interest or bias with respect to the parties involved or the subject matter of this report.
4. Our compensation is not contingent on an action or event resulting from the analyses, opinions, or conclusions in or the use of this report.
5. Our analyses, opinions and conclusions were developed and this report conforms with the requirements of the Code of Professional Ethics and Standards of Professional Practice of the American Institute of Real Estate Appraisers (Appraisal Institute), International Society of Real Estate Appraisers (Society) and American Society of Appraisers (ASA), and the use of this report is subject to the requirements of these professional organizations relating to review by its duly authorized representatives.
6. The Appraisal Institute has a voluntary continuing education program. Karen Char, MAI is currently certified under this program.
7. Uson Y. Ewart made a personal inspection of the property which is the subject of this report.
8. No one other than the undersigned prepared the analysis, opinions and conclusions in this report.

JOHN CHILD & COMPANY, INC.

  
Karen Char, MAI  
Executive Vice President

  
Uson Y. Ewart, ASA  
Appraiser

QUALIFICATIONS OF JOHN CHILD & COMPANY, INC.

John Child & Company, Inc. (John Child) is a professional real estate service corporation which specializes in real estate appraisal and consulting. Founded in 1937, John Child is one of the largest and oldest real estate appraisal and consulting companies in Hawaii. The Company enjoys an established reputation for quality work and professional service. Our reputation is based on our ability to identify and use appropriate and current valuation techniques, our in-depth knowledge and analysis of local market conditions and trends, and the extensive training, education and experience of our professional staff.

PROFESSIONAL STAFF

The Company's professional staff has a wide range of real estate experience gained through a range of field experience, professional accomplishments, training and education. As a result, staff members hold designations earned from the major professional organizations.

Our staff members have earned their reputation for quality work and professional service. They qualify as expert witnesses in the courts of Hawaii, California and Massachusetts; instruct and lecture at the University of Hawaii and for various business and professional organizations; serve as review appraisers and arbitrators; and continue to attend courses, seminars and workshops to strengthen their own specialized appraisal skills and education. Our professional staff members include:

- Robert J. Vernon, MAI, CRE, Chairman
- Theodore Wrobel, SREA, ASA, President
- Karen Char, MAI, Executive Vice President
- Craig T. Smith, ASA, Appraiser
- Uson Y. Ewart, ASA, Appraiser
- Paul D. Cool, Appraiser
- Thomas J. Sullivan, Appraiser
- Darlene Ariola, Research Assistant
- Cheryl Emery, Research Assistant
- May Wong, Research Assistant
- Elizabeth Kimura, Research Assistant

All of our professional staff have attended recent seminars on FHLBB R41c and have been involved in preparing appraisal reports according to the FHLBB standards. The education and professional experiences of our staff members are outlined in their accompanying resumes.

SCOPE OF PROFESSIONAL SERVICES

The Company's real estate appraisal and consulting practice includes:

- Appraisal of real estate
- Highest and best use studies
- Market and financial feasibility analyses
- Economic and fiscal impact assessments

**KAREN CHAR, MAI, ASA**  
**Executive Vice President**

Education

M.B.A., University of Hawaii, 1972.  
B.B.A., University of Hawaii, 1970.  
Punahou School, 1967.  
Various courses sponsored by the American Institute of Real Estate Appraisers.

Professional Associations

Member, American Institute of Real Estate Appraisers (MAI designation).  
- Governing Councilor (1986-1988).  
- Vice Chairman, National By-Laws Committee (1986-1987).  
- Member, National By-Laws Committee (1985); National Admissions Committee (1982-1984).  
- Chairman, National Evaluation Report Subcommittee (1982)-  
Responsible for establishing grading criteria for business reports  
submitted for demonstration report credit and reviewing failing  
business reports.  
- President (1986), Vice President (1985), Secretary (1984), Honolulu  
Chapter No. 15.  
- Grader, National Board of Examiners (1982-1983) - Responsible for  
grading business reports and demonstration appraisal reports  
submitted for credit towards MAI designation.  
- Admissions Chairman, Southwest Region (1983).  
- Vice Chairman, Thirteenth Pan Pacific Congress of Real Estate  
Appraisers, Valuers and Counselors (1985-1986).

Senior Member, American Society of Appraisers, (ASA designation,  
specializing in business valuation).

Member, Panel of Arbitrators of the American Arbitration Association.

Professional Experience

Executive Vice President, John Child & Company, Inc. (1984 to present).  
Senior Manager, Peat, Marwick, Mitchell & Co. (1979-1984).  
Appraiser, John Child & Company, Inc. (1972-1978).

Court Testimony

Qualified as an expert witness in the valuation of real property and  
businesses in the Courts of the State of Hawaii.

Certification

The American Institute of Real Estate Appraisers conducts a voluntary  
program of continuing education for its designated members. MAIs and RMs  
who meet the minimum standards of this program are awarded periodic  
educational certification. Karen Char, MAI is certified under this  
program.

- Arbitration
- Litigation support.

Our studies cover a variety of real estate interests including fee simple,  
leasehold, leased fee and other partial interest or rights. Our extensive  
experience includes a variety of properties such as:

- Mixed-use developments
- Office buildings
- Shopping centers and retail facilities
- Hotels and resort facilities
- Industrial properties
- Residential rental apartments
- Residential condominium apartments
- Single-family subdivisions
- Special-purpose properties.

SELECTED CLIENTS

Our clients represent a variety of private and public interests. Selected  
clients include:

Amfac, Inc.  
Anafac Property Development Co.  
Ashford & Wriston  
Bank of Hawaii  
B.P. Bishop Estate  
Estate of James Campbell  
Cades, Schutte, Fleming & Wright  
Case & Lynch  
Castle & Cooke, Inc.  
- Milliani Town, Inc.  
- Oceanic Properties  
Chaminade College  
Citibank, N.A.  
City & County of Honolulu  
- Department of Housing  
& Community Development  
The Equitable Life Assurance Society  
of the United States of America  
Federal Home Loan Bank Board  
Finance Realty  
First Federal Savings  
and Loan Association  
First Hawaiian Bank  
GBC Financial  
Goodwill, Anderson, Quinn & Stifel  
Hawaiian Electric

Hawaiian Telephone  
Honolulu Federal Savings  
and Loan Association  
Kaiser Development Company  
Kokusai-Motors Co., Ltd.  
Loyalty Development, Loyalty  
Enterprises, Loyalty Finance Co.  
Mitsui Trust & Banking Co., Ltd.  
Nature Conservancy  
Pacific Construction Co., Ltd.  
Peat Marwick Main & Co.  
Realty Mortgage Investors of  
the Pacific (RAMPAC)  
Security Pacific Mortgage Corp.  
Servco Pacific Inc.  
Stark Development Company, Ltd.  
State of Hawaii  
- Department of Land &  
Natural Resources  
Department of Transportation  
U.S. Army  
U.S. Navy  
U.S. Department of the Interior

USON Y. EWERT, ASA  
Appraiser

Education

Bachelor of Architecture, Cornell University, 1972

Punahou School, 1967

Certificate in Advanced Real Estate, University of Hawaii Small Business Management Program.

Courses, workshops, seminars, and examinations including:

- AIREA, Exam IA-1 Real Estate Appraisal Principles
- AIREA, Exam IA-2 Basic Valuation Procedures
- AIREA, Standards of Professional Practice
- AIREA, Capitalization Update Seminar
- AIREA, Techniques and Solutions for Contemporary Problems
- AIREA, Capitalization Theory and Techniques, Parts A and B
- AIREA, Case Studies in Real Estate Valuation
- AIREA, Review of R&C and the Recordkeeping Requirements of the FHLBB, 1987
- SREA, Investment Analysis Workshop
- SREA, Application of Market Extractions
- SREA, Construction Costs Estimating Workshop

Professional Associations

Senior Member, American Society of Appraisers in the Real Property Discipline (ASA designation).

- President, Honolulu Chapter No. 16
- Past Vice President and Secretary, Honolulu Chapter No. 16

Candidate, American Institute of Real Estate Appraisers (candidate for MAI designation).

Professional Experience

Appraiser, John Child & Company, Inc. (1977 to present).

Court Testimony

Qualified as an expert witness in the valuation of real property in the Courts of the State of Hawaii and the United States District Courts in Massachusetts and California.



APPENDIX B

WATER QUALITY IMPROVEMENT ANALYSIS REPORT

**TABLE OF CONTENTS**

	Page
LIST OF TABLES	
LIST OF FIGURES	
1. INTRODUCTION.....	1
2. AIR QUALITY STANDARDS.....	1
3. EXISTING AIR QUALITY.....	2
4. CLIMATE & METEOROLOGY.....	2
5. MOBILE SOURCE IMPACT.....	4
5.1 Mobile Source Activity.....	4
5.2 Mobile Source Emission Factors.....	4
5.3 Modeling Methodology.....	5
5.4 Results: 1-Hour Concentrations.....	5
5.5 Results: 8-Hour Concentrations.....	6
5.6 "Downstream" Impacts.....	6
5.7 In-Vehicle CO Levels.....	6
6. STATIONARY SOURCE IMPACT.....	7
6.1 Electrical Generation.....	7
6.2 Solid Waste Disposal.....	7
7. SHORT-TERM IMPACTS.....	7
8. DISCUSSION AND CONCLUSIONS.....	8
8.1 Mobile Source Impacts.....	8
8.2 Stationary Source Impacts.....	8
8.3 Short-Term Impacts .....	8
8.4 Conclusions.....	8
REFERENCES	
TABLES	
FIGURES	

**AIR QUALITY IMPACT REPORT**  
**MAILI KAI PROPERTY**  
**AFFORDABLE HOUSING**  
 January 4, 1988

**J. W. MORROW**  
**ENVIRONMENTAL MANAGEMENT CONSULTANT**  
**KAILUA, HAWAII**

LIST OF TABLES

NUMBER	TITLE
1	Summary of State and Federal Ambient Air Quality Standards
2	Air Monitoring Data, Campbell Industrial Park 1971 - 1985
3	Air Monitoring Data, Campbell Industrial Park 1986
4	0700 HST Wind Rose, Barbers Point Naval Air Station, 1984.
5	Estimates of A.M. Peak-Hour Carbon Monoxide Concentrations in the Vicinity of Farrington Highway and the H-1 Freeway, 1995
6	Estimates of Annual Emissions Due to Electrical Generation and Solid Waste Disposal Mālii Kai Affordable Housing
7	1980 Emissions Inventory, City & County of Honolulu

LIST OF FIGURES

NUMBER	TITLE
1	Barbers Point Naval Air Station, 0700 HST Wind Speed Distribution
2	Barbers Point Naval Air Station, 0700 HST Wind Direction Distribution
3	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: Kaukama Road at Farrington Highway, A.M. Peak Hour (1985)
4	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: Kaukama Road at Farrington Highway, A.M. Peak Hour (1995) Without Project
5	Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: Kaukama Road at Farrington Highway, A.M. Peak Hour (1995) With Project
6	Estimates of Maximum 8-Hour Carbon Monoxide Concentrations: Kaukama Road at Farrington Highway, 1985
7	Estimates of Maximum 8-Hour Carbon Monoxide Concentrations: Kaukama Road at Farrington Highway, 1995 Without Project
8	Estimates of Maximum 8-Hour Carbon Monoxide Concentrations: Kaukama Road at Farrington Highway, 1985 With Project

**AIR QUALITY IMPACT REPORT  
MAILI MAI PROPERTY  
AFFORDABLE HOUSING**

**1. INTRODUCTION**

Janneck, Ltd. is proposing a low-cost affordable housing subdivision consisting of 1,450 single-family units [1]. The project site is a 415-acre parcel at Maili on the Waianae Coast of Oahu located some 27 road miles west-northwest of downtown Honolulu and 9 miles northwest of the Campbell Industrial Park. Construction is planned to commence in early 1990 with project completion expected in 1995.

The purpose of this report is to assess the impact of the proposed development on air quality both on a local and regional basis. The overall project is clearly an "indirect source" of air pollution as defined in the Federal Clean Air Act [2] since its primary association with air pollution is due to its inherent generation of mobile source, i.e., motor vehicle activity. Much of the focus of this analysis therefore is on the project's ability to generate traffic and the resultant impact on air quality. Air quality impact was evaluated for 1985 and future (1995) conditions.

A residential project such as this also has off-site impacts due to increased demand for electrical energy which must be met through the combustion of some type of fuel. Disposal of the refuse generated by the residents will also result in offsite impact as it will most probably be burned in the City's proposed resource recovery facility (HPOWER). Both of these combustion processes result in pollutant emissions to the air which have been addressed.

Finally, during construction of the various buildings and facilities air pollutant emissions will be generated due to vehicular movement, grading and general dust-generating construction activities. These impacts have also been addressed.

**2. AIR QUALITY STANDARDS**

A summary of State of Hawaii and national ambient air quality standards is presented in Table 1 [3, 4]. Note that Hawaii's standards are not divided into primary and secondary standards as are the federal standards.

Primary standards are intended to protect public health with an adequate margin of safety while secondary standards are intended to protect public welfare through the prevention of damage to

soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values [5].

Some of Hawaii's standards are clearly more stringent than their federal counterparts but, like their federal counterparts, may be exceeded once per year. It should also be noted that in April, 1986, the Governor signed amendments to Chapter 59 (Ambient Air Quality Standards) making the state's standards for particulate matter and sulfur dioxide the same as national standards. In the case of particulate matter, however, this uniformity did not last long. On July 1, 1987, the EPA revised the federal particulate standard to apply only to particles 10 microns or less in diameter (PM-10) [6], leaving the state once again with standards different than the federal ones.

In the case of the automotive pollutants (carbon monoxide (CO), oxides of nitrogen (NOx), and photochemical oxidants (Ox)), there are only primary standards. Until 1983, there was also a hydrocarbons standard which was based on the precursor role hydrocarbons play in the formation of photochemical oxidants rather than any unique toxicological effect they had at ambient levels. The hydrocarbons standard was formally eliminated in January, 1983 [7].

The U.S. Environmental Protection Agency (EPA) is mandated by Congress to periodically review and re-evaluate the federal standards in light of new research findings [8]. The last review resulted in the relaxation of the oxidant standard from 160 to 240 micrograms/cubic meter (ug/m3) [9]. The carbon monoxide (CO), particulate matter, sulfur dioxide (SO2), and nitrogen dioxide (NO2) standards are currently under review, but final action has not been taken yet [10].

Finally, the State of Hawaii also has fugitive dust regulations for particulate matter (PM) emanating from construction activities [11]. There simply can be no visible emissions from fugitive dust sources.

**3. EXISTING AIR QUALITY**

The nearest State Department of Health air monitoring station to the project area is located at the Campbell Industrial Park about 14.4 kilometers to the southeast. The State Department of Health has monitored air quality at the park since 1971, and a summary of the data is presented in Table 2. Total suspended particulates (TSP), sulfur dioxide (SO2), and nitrogen dioxide (NO2) were all monitored on a 24-hour basis. Initially, the site was at the Barbers Point Lighthouse, but the proximity to the ocean resulted in very high TSP levels due to salt spray. The station was therefore moved to the Chevron Refinery site about

1.7 kilometers north of the lighthouse on March 17, 1972. In 1976, R02 monitoring was ceased. On August 7, 1979, the monitoring station was moved to a rooftop location at the same Chevron site.

It should also be noted that total suspended particulate monitoring with a high-volume sampler was ceased at the site in October, 1985. In November, 1985, a new PM-10 sampler was installed. This instrument measures respirable particulate matter under 10 microns in aerodynamic diameter. PM-10 and SO2 monitoring data for 1986 are summarized in Table 3.

It is evident from the data in Tables 2 and 3 that both the National Ambient Air Quality Standards (NAAQS) and Hawaii Ambient Air Quality Standards (HAAQS) are being met at those monitoring sites. Because the Campbell Industrial Park monitoring station is situated relatively close to the elevated sources, i.e., the stacks, located at the industrial park, the data collected may not be representative of the highest ambient pollutant levels resulting from the various industrial sources at the park. Computer modeling done in conjunction with the City's resource recovery facility permitting indicated maximum SO2 concentrations occurring some 1.0 to 1.5 kilometers north of the park in the flat terrain as well as on the hillsides also north of the park [12].

Unfortunately, there are no routine monitoring data for the primary automotive pollutant, i.e., carbon monoxide. The nearest CO monitoring site is at the Department of Health building in downtown Honolulu some 43 kilometers east-southeast of the project area. Because the area is presently at an early stage of development, it can be surmised that present CO levels are also relatively low.

#### 4. CLIMATE & METEOROLOGY

Weather conditions in the project area are typical of sites located on the leeward coast of Oahu. Long-term climatic data collected at Barbers Point Naval Air Station indicate mean daily maximum and minimum temperatures of 81 and 69 degrees Fahrenheit, respectively; mean annual rainfall of 20.3 inches; and prevailing winds from the northeast at 9 knots [13]. Annual rainfall is of interest because of its role in particulate matter removal from the atmosphere, while wind speed and direction are determinants of pollutant concentration and potential receptors, respectively. Atmospheric stability is another important factor in determining the potential for air pollution problems. It is largely a function of insolation and wind speed, and an objective methodology for determining it has been developed by Turner [14].

Historical meteorological data from Barbers Point NAS which had been processed using the Turner method were also reviewed [15,16,17]. They confirmed the annual predominance of north-easterly trade winds, but also indicated a significant occurrence of onshore winds primarily associated with a midday seabreeze regime. A screening of the 1967 - 71 Barbers Point surface observations indicated SE to SW winds occurred 643 - 1,032 hours per year. This is equivalent to 6.5 - 11.8% of the time.

Secondly, they indicate that almost 25% of the time slightly to moderately unstable conditions exist. Such conditions are conducive to bringing smoke plumes from elevated sources, e.g., smoke stacks, down to the ground within a relatively short distance downwind. Somewhat surprisingly, the data also show a very significant percentage (45%) of stable air conditions which tend to carry plumes largely intact for great distances. Such conditions can result in high pollutant concentrations if the plume reaches hills which are at approximately the same height as the stack. Such stable conditions can also contribute to high pollutant concentrations if they coincide with peak traffic hours because automotive pollutants are emitted close to the ground.

Finally, since the impact analysis focuses on the a.m. peak hour of traffic, a recent year of meteorological data (1984) was processed to produce a 7:00 a.m. (0700 Hawaiian Standard Time) wind rose as shown in Table 4. The predominance of low velocity northeasterly winds is clearly evident in the table. Winds between east and north northeast comprise about 95% of the data while winds of 6 knots or less comprise about 74%. Figures 1 and 2 depict the same data but show the frequency of occurrence in terms of numbers of hours per year.

#### 5. MOBILE SOURCE IMPACT

5.1 Mobile Source Activity. A traffic assessment was prepared for the proposed development [18] and served as the basis for this mobile source impact analysis. Existing (1985) and projected a.m. peak-hour volumes at the Kaukama Road - Farrington Highway intersection were obtained for use in the air quality impact model.

5.2 Mobile Source Emission Factors. Carbon monoxide (CO) emission factors for vehicles were generated for the years 1985 and 1995 using the MOBILE-3 emissions model [19]. The emission factors were localized by use of the age distribution of registered vehicles in the City & County of Honolulu [20]. Fraction of vehicle miles travelled (VMT) was assumed to be directly proportional to the registration distribution. Emission factors were based on traffic speeds ranging from 20 - 35 mph depending on the volume on each leg of the intersection.

The intersection was assumed to be signalized with green/cycle ratios proportional to approach demands. Queue lengths and emission strengths at intersection approaches were determined by an EPA method [21].

5.3 Modeling Methodology. While emissions burden analysis is one means of evaluating a project's impact, it is generally more important to estimate the ambient impact since air quality standards are expressed as ambient concentrations, and it is the ambient concentrations to which living things are exposed. Computer modeling is normally employed to generate these ambient concentration estimates, most commonly with non-reactive pollutants. This is due to the complexity of modeling pollutants which undergo chemical reactions in the atmosphere and are subject to the effects of numerous physical and chemical factors which affect reaction rates and products. For projects involving motor vehicles as the principal air pollution source, carbon monoxide is normally selected for modeling because it has a relatively long half-life in the atmosphere (about 1 month) [22], and it comprises the largest fraction of automotive emissions.

The EPA guideline model CALINE-4 [23,24] was employed to estimate maximum 1-hour CO concentrations at receptor locations 10 - 30 meters from intersections during the worst-case AM peak hour traffic. Worst-case meteorological conditions were selected accordingly.

Because of the time of day of the analysis (AM peak hour), the currently low level of urbanization in the area which would otherwise contribute to a "heat island" effect and increased turbulence, a stable atmosphere (Pasquill-Gifford Class "F") [14] and 1 meter per second (m/sec) wind speed were assumed as worst case meteorological conditions. A nominal background CO level of 1.0 part per million (ppm) was also input to the model.

Wind direction was based on preliminary modeling with 10 - 45 degree wind-road angles and was selected based on its ability to produce the maximum pollutant concentrations at the intersection under study. Specifically, due to the traffic volumes, predicted queuing, and intersection orientation, a northwest wind direction was used for the "worst-case" analysis.

5.4 Results: 1-Hour Concentrations. The results of the modeling for existing and projected conditions are presented in Figures 3 - 5 for the Kauhama Road - Farrington Highway intersection. It is evident that both state and federal 1-hour CO standards appear to be met even under "worst-case" conditions of traffic, meteorology, and receptor location.

5.5 Results: 8-Hour Concentrations. Estimates of 8-hour concentrations can be derived by applying a "persistence" factor of 0.6 to the 1-hour concentrations. This "persistence" factor is recommended in an EPA publication on indirect source analysis [25] and has been further corroborated by analysis of carbon monoxide monitoring data in Honolulu which yielded the same 8-hour-to-1-hour ratio [26]. When using this approach any 1-hour CO concentration greater than 8.4 mg/m<sup>3</sup> would indicate exceedance of the State's 8-hour standard. Similarly, any 1-hour concentration over 16.7 mg/m<sup>3</sup> would indicate exceedance of the federal 8-hour standard.

Applying this factor to the 1-hour concentration estimates reveals results quite similar to those just described above. (see Tables 6 - 8). Again, no violations of federal or state standards are predicted.

5.6 "Downstream" Impacts. Some fraction of traffic generated by the proposed development will also contribute to near roadway CO levels "downstream" along the Farrington Highway and H-1 Freeway. A.M. peak-hour CO concentrations along highway segments north of the Honokai Hale subdivision, between Honokai Hale and the Palalal Interchange, and between the Palalal and Kunia interchanges were estimated both with and without the Maili Kai project. The results are presented in Table 5. While no violations of federal or state standards are indicated, it is evident that the farther downstream, the higher the CO concentrations. By 1995, in the Palalal--Kunia segment, the a.m. peak-hour CO level is close to the State's 1-hour standard.

5.7 In-Vehicle CO Levels. In-vehicle CO exposures are of interest since it can be expected that some Maili Kai residents will be commuting to workplaces in the more developed parts of Oahu. Operators and passengers can be exposed to levels of carbon monoxide inside vehicles significantly higher than that indicated by the microscale ambient air quality impact analysis. This exposure is, of course, exacerbated as congestion increases. When volume capacity ratios reach the 0.90 - 1.0 range and service levels drop to E and F, this occurs. With vehicles at idle or very low speed, CO emissions increase sharply and the occupants of vehicles are delayed in traffic; thus, for both reasons their CO exposure increases sharply. Unfortunately, there is currently no standardized modeling technique to estimate this exposure. In this particular instance, these conditions might occur during portions of a commute trip to Honolulu.

One recently reported commuter trip from the Eva area to downtown Honolulu resulted in an average carbon monoxide exposure of 12.8 mg/m<sup>3</sup> (11.1 ppm) over a 33-minute trip [27]. Unfortunately, the commute cited began at 7:30 a.m. and thus was near the end of the normal peak traffic period. The CO exposure was comparable to levels found during a previous study of a.m. peak hour commutes along the Pali Highway [28].

## 6. STATIONARY SOURCE IMPACT

**6.1 Electrical Generation.** The estimated 10.4 million kilowatt hours of annual electrical demand by the ultimate development will necessitate the generation of electricity by power plants. Currently, most of Oahu's electrical energy is generated at Hawaiian Electric Company's (HECO) Kahe Power Station located near Nanakuli south of the project site. This is currently a six-unit, approximately 650-megawatt facility firing low-sulfur fuel oil. A seventh 150-megawatt unit was proposed by HECO [29], but more recently two outside companies have proposed building new oil- and coal-fired power plants at Campbell Industrial Park and selling power to the utility [30]. For the purposes of this analysis, oil-firing was assumed. Estimates of annual emissions were computed based on EPA emission factors and the fuel required to meet a 10.4 million kWh demand. The results are presented in Table 6.

**6.2 Solid Waste Disposal.** The refuse generated by the residents of the 1,450 new homes in Maili Kai will require disposal. Presently, about 80% of Oahu's refuse is being landfilled with the remaining 20% being burned at the Waipahu Incinerator [31]. In the future, most refuse will be burned at the City's proposed resource recovery facility. Estimates of annual emissions attributable to the combustion of Maili Kai refuse at that facility are included in Table 6.

## 7. SHORT-TERM IMPACT

The principal source of short-term air quality impact will be construction activity. Construction vehicle activity will increase automotive pollutant concentrations along roads serving the area as well as in the vicinity of the project site itself. Because of the moderate existing off-peak traffic volumes, the additional construction vehicle traffic should not exceed road capacities although the presence of large trucks can reduce a roadway's capacity as well as lower average travel speeds.

The site preparation and earth moving will create particulate emissions as will building and on-site road construction. Construction vehicles movement on unpaved on-site roads will also generate particulate emissions. EPA studies on fugitive dust emissions from construction sites indicate that about 1.2 tons/acre per month of activity may be expected under conditions of medium activity, moderate soil silt content (30%), and a precipitation/evaporation (P/E) index of 50 [32,33].

The soils report for the project site [34] indicated the presence of clay soils which would have silt content of about 30% [35]. The precipitation/evaporation (P/E) Index for the area is 24. Compared to the EPA estimates and conditions, it would appear that there is a greater potential for fugitive dust due to the drier local climate, i.e., P/E Index of 24 versus 50 and similar silt content of the local soils.

Other offsite activities which will have temporary impacts on air quality include concrete batching operations to produce the concrete necessary for building foundations within the project and asphalt batching operations to build onsite roads. At this point in time, the magnitude of these operations have not been quantified and thus a quantitative impact analysis is not possible.

## 8. DISCUSSION AND CONCLUSIONS

### 8.1 Mobile Source Impacts.

At complete buildout the presence of project-generated traffic will clearly increase ambient carbon monoxide levels in the area but, will not create new exceedances of state air quality standards. The traffic will also contribute to downstream impacts along Farrington Highway and the H-1 Freeway. Federal standards do not appear to be threatened by emissions from the additional traffic that will be generated. Currently, the principal means of controlling automotive emissions within the state is dependence on the federal motor vehicle control program [36].

**8.2 Stationary Source Impacts.** The emissions estimates may be compared to the 1980 county emissions inventory in Table 7 in order to provide some perspective on their significance. The project's contribution to county emissions appears to be less than 0.2%.

**8.3 Short-Term Impacts.** Since as noted in Section 7, there is a potential for fugitive dust due to the dry climate and fine soils, it will be important for adequate dust control measures to be employed during the construction period. Dust control could be accomplished through frequent watering of unpaved roads and areas of exposed soil. The EPA estimates that twice daily watering can reduce fugitive dust emissions by as much as 50%. The soonest possible landscaping of completed areas will also help.

8.4 Conclusions. Based on the foregoing analysis, the following conclusions may be drawn:

- The proposed project will result in increased air pollutant emissions due to its inherent traffic generation ability, and its requirements for electrical power and solid waste disposal;
- The addition of project-related traffic will increase ambient concentrations of carbon monoxide in the vicinity of key roads and intersections serving the project but will not cause violations of state or federal air quality standards;
- Annual emissions of criteria pollutants due to electrical generation and solid waste disposal attributable to Mailli Kai will increase county emissions by less than 0.2%; and
- Due to the relatively dry climate and fine soils in the area, dust control measures during construction will be important to prevent violations of state fugitive dust standards.

#### REFERENCES

1. Kaiser Cement Corporation (c/o Phillips Brandt Reddick). Environmental Assessment for Mailli Kai Property, Mailli, Maiana District, Oahu, Hawaii, THK 8-7-10:02 and 14, November 4, 1987.
2. U. S. Congress. Clean Air Act Amendments of 1977 (P.L. 95-95, Section 110, Implementation Plans, August, 1977.
3. U. S. Government. Code of Federal Regulations, Title 40, Protection of Environment, Part 50, National Primary and Secondary Ambient Air Quality Standards.
4. State of Hawaii. Title 11, Administrative Rules, Chapter 59 Ambient Air Quality Standards, as amended, April, 1986.
5. Library of Congress, Congressional Research Service. A Legislative History of the Clean Air Amendments of 1970, Volume 1, p. 411, January, 1974.
6. U.S. Environmental Protection Agency. Revisions to National Ambient Air Quality Standards for Particulate Matter, Federal Register, Vol. 52, p. 2463, July 1, 1987.
7. U. S. Environmental Protection Agency. National Ambient Air Quality Standards for Hydrocarbons: Final Rulemaking, Federal Register, Volume 48, No. 3, p. 628, January, 1983.
8. U. S. Congress. Clean Air Act Amendments of 1977 (P.L. 95-95) Section 109, National Ambient Air Quality Standards, August, 1977
9. U. S. Environmental Protection Agency. National Ambient Air Quality Standards for Photochemical Oxidants: Final Rulemaking, Federal Register, Volume 44, No. 28, p. 8202, February 8, 1979
10. U. S. Environmental Protection Agency. Regulatory Agenda, Federal Register, Volume 50, No. 82, p. 17784, April 29, 1985.
11. State of Hawaii. Title 11, Administrative Rules, Chapter 60, Air Pollution Control.
12. City & County of Honolulu, Department of Public Works. Prevention of Significant Deterioration (PSD) Application for a Solid Waste and Resource Recovery Facility, Honolulu, Hawaii, November 28, 1983 (revised September, 1985).



REFERENCES (Con't)

13. U.S. Air Force, Environmental Technical Applications Center. AWS Climatic Brief: Barbers Point, Oahu, Hawaii.
14. U. S. Environmental Protection Agency. Workbook of Atmospheric Dispersion Estimates, AP-26 (Sixth Edition), 1973.
15. National Climatic Center. Stability Wind Roses for Barbers Point and Honolulu International Airport, 1960-64.
16. National Climatic Center. Hourly surface observations for Barbers Point, Oahu, Hawaii, 1967-71.
17. City & County of Honolulu, Department of Public Works. Revised Environmental Impact Statement for the Proposed Solid Waste Processing/Resource Recovery Facility, August, 1983.
18. Parsons, Brinckerhoff, Quade and Douglas, Inc. Traffic Assessment: Maili Kai, December 21, 1987
19. U. S. Environmental Protection Agency. User's Guide to MOBILE-3 (Mobile Source Emissions Model), EPA-460/3-84-002, June, 1984.
20. City & County of Honolulu, Department of Data Systems. Age Distribution of Registered Vehicles in the City & County of Honolulu (unpublished report), September, 1986.
21. U.S. Environmental Protection Agency. Application of the HIWAY Model for Indirect Source Analysis, EPA-450/3-75-072, August, 1975.
22. Seinfeld, John H. Air Pollution: Physical and Chemical Fundamentals, p. 69, McGraw-Hill Book Company, 1975
23. U.S. Environmental Protection Agency. Guideline on Air Quality Models (Revised), EPA-450/2-78-027R, July, 1986.
24. California Department of Transportation. CALINE4 - A Dispersion Model for Predicting Air Pollutant Concentrations Near Roadways (Final Report), November, 1984.

REFERENCES (Con't)

25. U.S. Environmental Protection Agency. Guidelines for Air Quality Maintenance Planning and Analysis: Indirect Sources Volume 9 (Revised), EPA-450/4-78-001, September, 1978.
26. Morrow, J. W. Air Quality Impact Analysis: Kaka'ako Redevelopment District Plan, July, 1984.
27. City and of Honolulu, Department of Housing and Community Development. West Loch Estates Environmental Impact Statement, October, 1987.
28. Morrow, J. W. Pali Highway Study: Carbon Monoxide Analysis. Study performed as part of a highway constraints study for the City & County of Honolulu Department of General Planning, March, 1985.
29. Hawaiian Electric Company. Environmental Impact Statement Preparation Notice: Kahe Unit 7 Project, July 2, 1987.
30. Kaser, Thomas. "HECO Planning to Buy Power", Honolulu Advertiser, October 3, 1987.
31. City & County of Honolulu, Department of Public Works. Revised Environmental Impact Statement for the Proposed Solid Waste Processing and Resource Recovery Facility, August, 1983.
32. U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, Third Edition, 1978, with Supplements 1 - 14.
33. Thornwaite, C. W. Climates of North America According to a New Classification, Geog. Rev. 21: 633-655, 1931.
34. Walter Lum Associates, Inc. Maili-Kai Soil Reconnaissance Report, Maili, Waianae, Oahu, Hawaii, April 16, 1974.
35. Buckman, H.O. and Brady, N.C. The Nature and Properties of Soils, 6th Edition, 1966.
36. U.S. Environmental Protection Agency. Control of Air Pollution From New Motor Vehicles and New Motor Vehicle Engines, Code of Federal Regulations, Title 40, Part 85, as amended, July, 1987.
37. U.S. Environmental Protection Agency and State of Hawaii Department of Health. Joint Press Release: U.S. EPA and Hawaii Department of Health Announce Results of Preliminary Study on Cane-Burning in Maui, Hawaii, August 20, 1987.

TABLE 1  
SUMMARY OF STATE OF HAWAII AND FEDERAL  
AMBIENT AIR QUALITY STANDARDS

POLLUTANT	SAMPLING PERIOD	FEDERAL STANDARDS		STATE STANDARDS
		PRIMARY	SECONDARY	
1. Total Suspended Particulate Matter (TSP) (micrograms per cubic meter)	Annual Geometric Mean	75	60	60
	Maximum Average in Any 24 Hours	260	150	150
2. PM-10 (micrograms per cubic meter)	Annual	50	50	--
	Maximum Average in Any 24 Hours	150	150	--
3. Sulfur Dioxide (SO2) (micrograms per cubic meter)	Annual Arithmetic Mean	80	--	80
	Maximum Average in Any 24 Hours	365	--	365
	Maximum Average in Any 3 Hours	1,300	1,300	1,300
4. Nitrogen Dioxide (NO2) (micrograms per cubic meter)	Annual Arithmetic Mean	100	100	70
	Maximum Average in Any 8 Hours	10	10	5
5. Carbon Monoxide (CO) (milligrams per cubic meter)	Maximum Average in Any 1 Hour	40	40	10
	Maximum Average in Any 1 Hour	240	240	100
6. Photochemical Oxidants (as O3) (micrograms per cubic meter)	Maximum Average in Any Calendar Quarter	1.5	1.5	1.5
	Maximum Average in Any Calendar Quarter	1.5	1.5	1.5

T A B L E S

TABLE 2  
AIR MONITORING DATA  
CAMPBELL INDUSTRIAL PARK  
1971-85

YEAR	RANGE	TSP			SO <sub>2</sub>			NO <sub>2</sub>		
		MEAN	>AQS	RANGE	MEAN	>AQS	RANGE	MEAN	>AQS	RANGE
1971	18-471	125	54	<5-16	<5	0	<20-49	29	0	
1972	24-155	55	4	<5-7	<5	0	<20-49	21	0	
1973	14-129	50	1	<5-5	<5	0	<20-33	<20	0	
1974	23-132	47	1	<5-10	<5	0	<20-40	25	0	
1975	13-137	52	1	<5-11	<5	0	<5-25	11	0	
1976	12-101	40	1	<5-7	<5	0	<5-29	14	0	
1977	25-134	54	1	<5-18	<5	0	-----	-----	-----	
1978	22-127	48	1	<5-40	<5	0	-----	-----	-----	
1979	23-223	76	10	<5-27	<5	0	-----	-----	-----	
1980	29-158	53	2	<5-10	<5	0	-----	-----	-----	
1981	26-188	51	2	<5-40	<5	0	-----	-----	-----	
1982	15-63	41	0	<5-12	<5	0	-----	-----	-----	
1983	28-193	---	2	<5-95	---	1	-----	-----	-----	
1984	17-112	50	1	<5-45	<5	0	-----	-----	-----	
1985	24-138	57	3	<5-25	<5	0	-----	-----	-----	

NOTES: 1. TSP = total suspended particulates  
 2. SO<sub>2</sub> = sulfur dioxide  
 3. NO<sub>2</sub> = nitrogen dioxide  
 4. >AQS = number of violations of state air quality standard  
 5. All concentrations are in micrograms per cubic meter of air.  
 6. Sampling station was moved from Barbers Point Lighthouse to the Chevron Refinery site due to salt spray from the ocean on 17 March 1972.  
 7. The samplers were elevated to a rooftop on 7 August 1979.  
 8. Source: State Department of Health

TABLE 3  
TSP & SO<sub>2</sub> MONITORING DATA  
BARBERS POINT, OAHU  
1986

MONTH	Particulate Matter-10 <sub>u</sub> (PM-10) 24-Hour Concentrations (ug/m3)			Sulfur Dioxide (SO <sub>2</sub> ) 24-Hour Concentrations (ug/m3)				
	SAMPLES	MIN.	MAX.	MEAN	SAMPLES	MIN.	MAX.	MEAN
Jan 86	5	13	31	19	4	<5	<5	<5
Feb 86	4	21	40	27	4	<5	10	5
Mar 86	4	16	28	20	2	<5	<5	<5
Apr 86	4	27	31	28	5	<5	7	<5
May 86	5	19	20	24	5	<5	6	<5
Jun 86	3	18	42	31	5	<5	<5	<5
Jul 86	5	12	26	19	6	<5	<5	<5
Aug 86	3	24	35	29	5	<5	<5	<5
Sep 86	5	21	31	27	5	<5	<5	<5
Oct 86	5	17	43	28	5	<5	<5	<5
Nov 86	5	19	66	33	5	<5	<5	<5
Dec 86	4	7	40	24	5	<5	<5	<5
ANNUAL	52	7	66	26	56	<5	10	<5

SOURCE: Department of Health

TABLE 4  
0700 HST Wind Rose  
Barbers Point Naval Air Station  
1984

Direction	Speed (kts)							Total
	1-3	4-6	7-10	11-16	17-21	>21		
N	0.00275	0.00000	0.00275	0.00000	0.00000	0.00000	0.00550	
NNE	0.01374	0.02473	0.02198	0.00275	0.00000	0.00000	0.06320	
NE	0.06868	0.19231	0.04945	0.00549	0.00000	0.00000	0.31593	
ENE	0.17033	0.22527	0.10440	0.02198	0.00000	0.00000	0.52198	
E	0.00824	0.02473	0.01923	0.00000	0.00000	0.00000	0.05220	
ESE	0.00275	0.00275	0.00000	0.00549	0.00000	0.00000	0.01099	
SE	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
SSE	0.00000	0.00000	0.00000	0.00275	0.00000	0.00000	0.00275	
S	0.00000	0.00000	0.00275	0.00000	0.00000	0.00000	0.00275	
SSW	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
SW	0.00000	0.00000	0.00549	0.00000	0.00000	0.00000	0.00549	
WSW	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
W	0.00000	0.00000	0.00275	0.00000	0.00000	0.00000	0.00275	
WNW	0.00000	0.00000	0.00000	0.00275	0.00275	0.00000	0.00550	
NW	0.00000	0.00000	0.00000	0.00275	0.00000	0.00000	0.00275	
NNW	0.00000	0.00000	0.00000	0.00275	0.00000	0.00000	0.00275	
<b>Total:</b>	<b>0.26649</b>	<b>0.46979</b>	<b>0.20880</b>	<b>0.04671</b>	<b>0.00275</b>	<b>0.00000</b>	<b>0.99454</b>	
<b>Calms:</b>	<b>0.00549</b>						<b>Total: 1.00003</b>	

TABLE 5

Estimates of A.M. Peak-Hour  
Carbon Monoxide Concentrations  
in the Vicinity of Farrington Highway  
and the H-1 Freeway  
1995

	Concentration (ug/m3)									
	10m	20m	30m	40m	50m	60m	70m	80m	90m	100m
Segment: Kaha--Honokai Hale										
w/o Project	2.2	1.7	1.4	1.1	1.0	0.8	0.7	0.5	0.5	0.3
w/Project	2.6	2.2	1.8	1.5	1.3	1.0	0.8	0.7	0.5	0.3
Segment: Honokai Hale--Palalalai Interchange										
w/o Project	6.0	4.5	3.7	3.0	2.5	2.1	1.7	1.3	1.0	0.7
w/Project	6.7	5.1	4.1	3.4	2.9	2.3	1.8	1.5	1.0	0.7
Segment: Palalalai Interchange--Kunia Interchange										
w/o Project	8.9	6.7	5.5	4.6	3.8	3.0	2.4	1.8	1.4	1.0
w/Project	9.4	7.1	6.0	4.9	4.0	3.2	2.5	2.0	1.4	1.0

TABLE 6  
 Estimates of Annual Emissions Due to  
 Electrical Generation and Solid Waste Disposal  
 Maui Iai Project

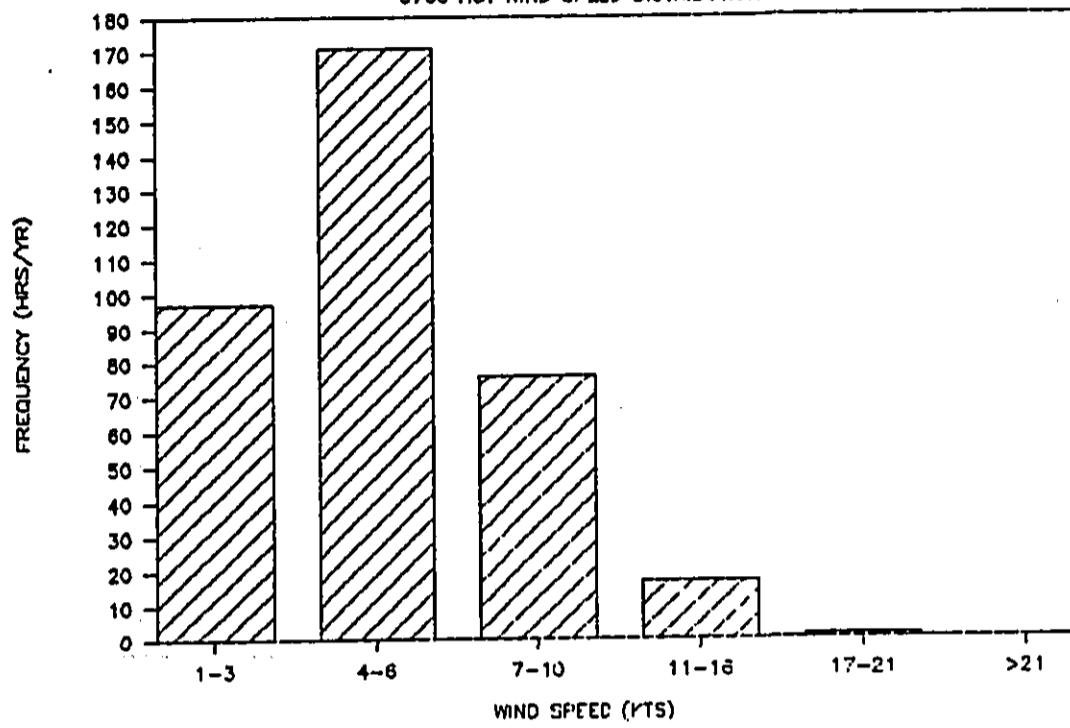
Pollutant	Emissions (T/Yr)	
	Electrical Generation	Solid Waste Disposal
Sulfur dioxide	28.8	1.8
Nitrogen oxides	38.1	8.8
Particulate Matter	2.9	0.7
Carbon monoxide	1.8	7.7
Hydrocarbons	0.4	0.5

TABLE 7  
 1980 EMISSIONS INVENTORY  
 CITY & COUNTY OF HONOLULU

SOURCE CATEGORY	EMISSIONS (Tons/Year)					
	PM	SOx	NOx	CO	HC	
Steam Electric Power Plants	2092	36,736	12,455	1,065	184	
Gas Utilities	14	0	199	0	0	
Fuel Combustion in Agricultural Industry	1088	579	358	0	31	
Refinery Industry	622	7,096	2,149	266	2,584	
Petroleum Storage	0	0	0	0	1,261	
Metallurgical Industries	28	96	40	0	0	
Mineral Products Industry	6,884	1,883	597	0	31	
Municipal Incineration	42	145	2,029	0	184	
Motor Vehicles	1,413	1,014	17,270	239,198	22,853	
Construction, Farms and Industrial Vehicles	184	193	2,507	3,729	338	
Aircraft	382	145	1,751	5,594	1,476	
Vessels	42	386	438	533	123	
Agricultural Field Burning	1,399	0	0	15,982	1,692	
TOTAL:	14,191	48,274	39,792	266,367	30,758	

SOURCE: State Department of Health

FIG. 1: BARBERS POINT NAVAL AIR STATION  
0700 HST WIND SPEED DISTRIBUTION



FIGURES



FIGURE 4  
ESTIMATES OF MAXIMUM 1-HOUR  
CARBON MONOXIDE CONCENTRATIONS  
KAUKAMA ROAD AT FARRINGTON HIGHWAY  
A.M. PEAK HOUR - 1995 WITHOUT PROJECT

77 deg  
▲  
|  
|  
ezimuth

Farrington Highway

5.2	5.2	5.2	5.1	5.1	5.1
3.1	3.0	3.0	2.9	2.9	2.8
2.3	2.3	2.3	2.1	2.1	2.0
			Kaukama		
			Road		

NOTES

CO concentrations = milligrams per cubic meter (mg/m3)  
Receptor spacing = 10 meters  
Wind direction = 80 deg  
Wind speed = 1 meter per second (m/s)  
Atmospheric stability = "F" (P-G Class 6)  
Background CO concentration = 1.0 ppm  
Diffusion model: CALINE-4  
Emissions model: MOBILE-3

FIGURE 5  
ESTIMATES OF MAXIMUM 1-HOUR  
CARBON MONOXIDE CONCENTRATIONS  
KAUKAMA ROAD AT FARRINGTON HIGHWAY  
A.M. PEAK HOUR - 1995 WITH PROJECT

77 deg  
▲  
|  
|  
ezimuth

Farrington Highway

7.0	7.1	7.4	6.1	6.1	6.0
5.4	6.1	7.1	3.3	3.3	3.2
5.2	5.6	6.3	2.4	2.3	2.2
			Kaukama		
			Road		

NOTES

CO concentrations = milligrams per cubic meter (mg/m3)  
Receptor spacing = 10 meters  
Wind direction = 80 deg  
Wind speed = 1 meter per second (m/s)  
Atmospheric stability = "F" (P-G Class 6)  
Background CO concentration = 1.0 ppm  
Diffusion model: CALINE-4  
Emissions model: MOBILE-3



FIGURE 6  
 ESTIMATES OF MAXIMUM 8-HOUR  
 CARBON MONOXIDE CONCENTRATIONS  
 KAUKAMA ROAD AT FARRINGTON HIGHWAY  
 1985

77 deg  
 A  
 |  
 |  
 ezimuth

Farrington Highway

4.2	4.2	4.1	3.1	3.1	3.1
2.3	2.3	2.3	1.9	1.8	1.8
1.7	1.7	1.7	1.4	1.4	1.4
Kaukama Road			Kaukama Road		
4.1	4.1	4.1	3.0	3.0	3.0
2.2	2.1	2.1	1.7	1.7	1.7
1.5	1.5	1.5	1.2	1.2	1.2

NOTES  
 CO concentrations = milligrams per cubic meter (mg/m3)  
 Receptor spacing = 10 meters  
 Background CO concentration = 1.0 ppa  
 Diffusion model: CALINE-4  
 Emissions model: MOBILE-3

FIGURE 7  
 ESTIMATES OF MAXIMUM 8-HOUR  
 CARBON MONOXIDE CONCENTRATIONS  
 KAUKAMA ROAD AT FARRINGTON HIGHWAY  
 1995 WITHOUT PROJECT

77 deg  
 A  
 |  
 |  
 ezimuth

Farrington Highway

4.2	4.2	4.1	3.1	3.1	3.1
2.3	2.3	2.3	1.9	1.8	1.8
1.7	1.7	1.7	1.4	1.4	1.4
Kaukama Road			Kaukama Road		
4.1	4.1	4.1	3.0	3.0	3.0
2.2	2.1	2.1	1.7	1.7	1.7
1.5	1.5	1.5	1.2	1.2	1.2

NOTES  
 CO concentrations = milligrams per cubic meter (mg/m3)  
 Receptor spacing = 10 meters  
 Background CO concentration = 1.0 ppa  
 Diffusion model: CALINE-4  
 Emissions model: MOBILE-3

FIGURE 8  
 ESTIMATES OF MAXIMUM 8-HOUR  
 CARBON MONOXIDE CONCENTRATIONS  
 MAUKANA ROAD AT FARRINGTON HIGHWAY  
 1995 WITH PROJECT

77 deg  
 A  
 I  
 I  
 ezlauch

Farrington Highway

4.2	4.3	4.4	3.7	3.7	3.6
3.2	3.7	4.3	2.0	2.0	1.9
3.1	3.4	3.8	1.4	1.4	1.3
Kaukapa			Road		

NOTES  
 CO concentrations - milligrams per cubic meter (mg/m<sup>3</sup>)  
 Receptor spacing - 10 meters  
 Background CO concentration - 1.0 ppm  
 Diffusion model: CALINE-4  
 Emissions model: MOBILE-3

APPENDIX C  
BOTANICAL SURVEY REPORT

Table of Contents

	<u>Page</u>
SUMMARY .....	1
INTRODUCTION .....	1
SURVEY METHODS .....	2
DESCRIPTION OF THE VEGETATION .....	3
1. Grassland .....	4
2. Kiawe forest .....	4
3. Koa-haoale scrub .....	5
DISCUSSION AND RECOMMENDATIONS .....	6
LITERATURE CITED .....	6
APPENDIX 1. PLANT SPECIES LIST .....	7

BOTANICAL SURVEY

MAILI KAI PROPERTY

MAILI, WAIANAE DISTRICT, O'AHU

by

George K. Linney

Winona P. Char

CHAR & ASSOCIATES

Botanical/Environmental Consultants  
Honolulu, Hawaii

Prepared for: FBR HAWAII  
January 1988

**BOTANICAL SURVEY  
MAILI KAI PROPERTY  
MAILI, WAIANAЕ DISTRICT, O'AHU**

**SUMMARY**

A botanical survey was conducted on the site of the Maili Kai Property, Waianae District, O'ahu, in December 1987. The vegetation is largely weedy with evidence of repeated burnings in many areas. Where fires are frequent or recent, the vegetation consists of grassland; where fires are less frequent, a koa-haole scrub replaces the grass. Less disturbed areas support a forest of kiawe. In some areas the original limestone substrate is exposed, as it must have been throughout the area before the arrival of Western man. The limestone was formed by ancient coral reefs during the Pleistocene when sea-levels were higher. Many of the sinkholes have been filled with rubble. Little of the native vegetation remains on these limestone areas but otherwise they are more or less natural, and represent a different, though now insignificant, vegetation type. Only 103 species of vascular plants were found on the site, of which 89 are exotic (or introduced) species; 2 are believed to be Polynesian introductions; 8 are considered indigenous to the islands; and 4 are endemic. No threatened or endangered plant species designated by federal and/or state agencies occur on the project site.

**INTRODUCTION**

The Maili Kai Property consists of about 415 acres on the northern slopes of Pu'u o Hulu Ridge and the adjacent limestone plain. Approximately 180 acres will be reclassified from "Agriculture" to "Residential" and "Low Density Apartment". No

development is planned for those areas above the 200 ft. contour. These lands are zoned "Conservation". The remaining acreages will remain in "Agriculture".

The level areas of the site show repeated disturbance from excavation and/or burning; the slope areas are less disturbed. After disturbance, annual weeds are the first to colonize the bare soil. However, these were not much in evidence on the site at the time of the survey. Those that were present were found as seedlings of 1-2 weeks age. They apparently had only started germinating after a heavy rain storm inundated the area just before the survey. Many weedy species that should have been expected in the area were not located. Most of the site had progressed to vegetation of later successional stages: grassland, scrub, and forest. Grasses displace the annual weeds and are themselves displaced by woody species of increasing stature, unless disturbance interrupts the process. In the climatic conditions that exist over the site and general region, kiawe forest is the final stable vegetation type. Disturbance, especially by fire, destroys the trees and opens the area while also providing a rich, fertilizing layer of ash. A number of grasses are adapted to exploit such conditions and are favored by the repeated burning. As long as such disturbance continues, the grassland remains, or is constantly being restored. This is the situation over much of the level land. With cessation of disturbance, the area would all progress to scrub and finally forest.

**SURVEY METHODS**

Prior to undertaking the field survey, a search was made of the pertinent literature to familiarize the investigators with other biological studies conducted in the general area.

Existing topographic maps as well as aerial photographs were

examined to determine access, terrain characteristics, and potential logistical and technical problems. Access onto parts of the project site was primarily by Kaukama Road, which is paved. From there, a number of overgrown bull-dozed roads transit the property. These dirt roads, or footpaths in some cases, can be seen on the aerial photographs of the site. The eastern-most (mauka) portion of the site was accessed from a private, coral-lined road which branches off Hakimo Road.

The survey was focused principally on the level areas and on the slopes below 200 ft. elevation as development would take place in these areas. A number of limited transects and binocular observations were made for the areas above the 200 ft. contour. These areas will retain their "Conservation" status; they are too steep to be developed.

Species were identified in the field; plants which could not be positively identified were collected for later determination in the laboratory and herbarium. The species recorded are indicative of the season (rainy vs. wet) and environmental conditions under which this survey was made. Surveys taken at different times of the year and under varying environmental conditions, would no doubt yield slight variations in the species list, especially of the weedy annual taxa.

#### DESCRIPTION OF THE VEGETATION

The greater part of the level area and the slopes below 200 ft. elevation shows evidence of fire, some recent. Grasslands composed of buffel grass occupy the areas adjacent to the unlined and lined drainage channels. Kiave forest, which may vary in density from open, scattered trees to closed-canopy stands, is the most abundant vegetation type on the site. On the steep slopes of Pu'u o Hulu Ridge, above 200 ft. MSL, vegetation consists of koa-haole scrub with a mixture of various grass

species, although barren, rocky outcroppings, ledges, and steep ridge faces predominate.

Areas with a thin layer of soil and which would support standing water during the rainy season where surveyed intensively since Marsippen villosa, a candidate endangered species, occurs in such areas on the nearby Radio Transmitting Facility at Luakalei (Botanical Consultants 1984). However, no plants of Marsippen or any other threatened or endangered species were encountered on the project site.

Three vegetation types were recognized on the site and are described below. A list of all those species inventoried during the survey are presented in Appendix 1.

1. Grassland - Most of the level areas adjacent to the drainage ways are grassland consisting of almost pure stands of buffel grass (Cenchrus ciliaris), 1-2 ft. high. Some areas, showing signs of recent burning, consist of nothing else. Along dirt tracks, and especially where rubbish is dumped, a number of annual weeds and even ornamentals are present. Where fires are a few years past, scrubby species such as 'uhaloa (Waltheria indica var. americana), 'ilima (Sida fallax), abutilon (Abutilon incanum), wild basil (Ocimum basilicum), pluchea (Pluchea symphytifolia), koa-haole (Leucaena leucocephala), klu (Acacia farnesiana), and young kiave (Prosopis pallida) are present. The farther removed the last major disturbance to the area, the larger is the proportion and stature of the scrubby component.

2. Kiave forest - In many places, young to mature kiave forests have completely supplanted the grassland. Mature forests have a closed canopy (i.e., the crowns of the surrounding trees touching or interlocking) with little in the way of understory, though wild basil tends to persist in many places. Where there are openings in the canopy, Guinea grass (Panicum maximum) is

of koa-haule with a few scattered trees of kiave. Ground cover is sparse and consists of Natal redbud (Rhynchelytrum repens), buffel grass, and pilli (Heteropogon contortus). Both Natal redbud and pilli are typical of rocky ledges with thin soil. Alena (Boerhavia diffusa) and a number of insignificant weedy species are also found only on the rocky ledges and outcroppings.

#### DISCUSSION AND RECOMMENDATIONS

The proposed project will not have a significant impact on the flora of the area, as it is composed largely of exotic species, the majority of them weedy. Of the 103 species inventoried on the site during the survey, 89 (86.4%) are exotic; 2 (1.9%) are of Polynesian introduction; 8 (7.8%) are considered indigenous; and 4 (3.9%) are endemic.

The native species (i.e., indigenous and endemic) are found in similar environmental conditions throughout the islands. Some of the more "ornamental" natives which have colorful flowers and interesting foliage, such as the Hawaiian cotton, 'ilima, pa'u-o-Hi'i'aka, and 'ili'e could be used for landscaping in the common areas such as the park and open spaces. Plant stock is available from nursery firms specializing in native material.

#### LITERATURE CITED

- Botanical Consultants. 1984. Flora and Fauna Report of the Radio Transmitting Facility, Lualualei, Oahu, Hawaii. Prepared for U.S. Navy, PACDIV. Dec. 1984. Contract No. N62742-84-C-0082.
- Wagner, W.H., Jr. and F.S. Wagner. 1987. Revised Checklist of the Hawaiian Pteridophytes. Manuscript.
- Wagner, W.L., B. Herbst, and S. Sohmer. In prep. Manual of the Flowering Plants of the Hawaiian Islands. Bishop Museum Press, Honolulu.

6

present in a dense stand. In the area where the natural limestone substrate is exposed, a number of species are encountered that are rarely if ever present elsewhere on the site. These include the viney koali (Ipomoea cairica), and shrubby 'ilie'e (Plumbago zeylanica), as well as weeds such as achyranthes (Achyranthes aspera), chili pepper (Capsicum annuum), malvastrum (Malvastrum coromandelianum), rouge plant (Mivinia humilis), and lion's ear (Leonotis nepetifolia). As the soil is too thin in these areas to support buffel grass, finger-grass (Chloris barbata) predominates. Though the soil is too thin for buffel grass, the area is still forested with small kiave growing in cracks in the limestone.

On the lower ridge slopes, below 200 ft. MSL, the vegetation is dense kiave forest with koa-haule on talus and red soil in places. The deep soil and apparently greater moisture availability due to runoff from the steep slopes above, supports a dense growth of wild basil and the green panic grass (Panicum maximum var. trichoglume). At the eastern-most (mauka) part of the site, extensive bull-dozing of the slopes has exposed a great deal of red soil. Since the recent heavy rains, this area is being colonized by a number of weedy exotics, some apparently transported from the vicinity of the auto graveyard just off Hakimo Road, others from upslope. In time these will be replaced by woody plants. Where the land levels out, the panic grass is replaced by buffel grass, though patches of Guinea grass seem to mark out wetter areas along drainage paths. In the transition zone between level land and lower slope, two native shrubs are found that occur nowhere else on the site: nehe (Lipochaeta lamarum) and ma'o, or Hawaiian cotton (Gossypium sandwicense). They are characteristic of similar habitats elsewhere on O'ahu, from Makap'u to Ka'ena Point, though much of their natural habitat is now urbanized or has been used for grazing cattle.

3. Koa-haule scrub - Above the 200 ft. contour, the slope increases steeply and basalt ledges replace the loose boulders. Here the soil is too shallow to support more than an open scrub

5

APPENDIX 1. PLANT SPECIES LIST. MAILI KAI PROPERTIES, MAILI,  
WAIANAЕ DISTRICT, O'AHU.

A list of all the vascular plants found on the project site follows. Plants are organized by groups: ferns and fern allies and flowering plants. The flowering plants are further divided into monocots and dicots. Within each group, the plants are arranged alphabetically by family, genus, and species. For each species, the scientific name with author citation is given; an accepted English or Hawaiian name is provided, when known. Finally, the biogeographic status is indicated by a letter code. Taxonomy and nomenclature of the flowering plants follows Wagner et al. (in prep.); ferns and fern allies follows Wagner and Wagner (1987).

An explanation of the abbreviations used (other than author citation) is provided below:

SCIENTIFIC NAME

s.l. = in a broad sense (sensu lato)

sp. = correct species name not determined due to insufficient material

STATUS

E = endemic, native only to the Hawaiian Islands

I = indigenous, considered native to the islands but also found elsewhere

P = Polynesian, not native, thought to have been introduced by the early Polynesians

X = exotic or introduced, not native, brought to the islands after Western contact either intentionally or accidentally

SPECIES LIST

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>BIOGEOGRAPHIC STATUS</u>
<b>FERNS AND FERN ALLIES</b>		
Adiantaceae		
<u>Doryopteris decora</u> Brack.	'iwa'iwa	E
<b>FLOWERING PLANTS</b>		
<b>MONOCOTS</b>		
Cannaceae		
<u>Canna indica</u> L.	Indian shot	X
Commelinaceae		
<u>Commelina benghalensis</u> L.	commelina	X
<u>Rhoeo spathacea</u> (Sw.) Stearn	oyster plant	X
Cyperaceae		
<u>Cyperus rotundus</u> L.	nut sedge, nutgrass	X
Gramineae		
<u>Bothriochloa pertusa</u> (L.) A. Camus	hurricane grass	X
<u>Brachiaria</u> sp.		X
<u>Cenchrus ciliaris</u> L.	buffel grass	X
<u>Chloris barbata</u> (L.) Sw.	finger grass	X



SCIENTIFIC NAME	COMMON NAME	STATUS
Buddlejaceae		
<u>Buddleia asiatica</u> Lour.	buddleia	X
Cactaceae		
<u>Opuntia ficus-indica</u> (L.) Mill.	panini	X
Capparaceae		
<u>Cleome gynandra</u> L.	spider plant	X
Chenopodiaceae		
<u>Atriplex semibaccata</u> R. Br.	Australian saltbush	X
<u>Atriplex suberecta</u> Verdoorn	saltbush	X
<u>Chenopodium murale</u> L.	chenopodium	X
Compositae		
<u>Ageratum conyzoides</u> L.	maile hohono	X
<u>Bidens cynapiifolia</u> H.B.K.	beggarticks	X
<u>Bidens pilosa</u> L.	Spanish needle	X
<u>Crassocephalum crepidioides</u> (Benth.) S. Moore	crassocephalum	X
<u>Emilia fosbergii</u> D. H. Nicolson	red-flowered emilia	X
<u>Galinsoga parviflora</u> Cav.	galinsoga	X
<u>Lipochaeta lamarum</u> (Gaud.) DC.	nehe	E
<u>Pluchea symphytifolia</u> (Miller) Gillis	pluchea	X
<u>Sonchus oleraceus</u> L.	common sowthistle	X
<u>Tridax procumbens</u> L.	coat buttons	X
<u>Verbesina encelioides</u> (Cav.) B. & H.	golden crownbeard	X

SCIENTIFIC NAME	COMMON NAME	STATUS
<u>Cynodon dactylon</u> (L.) Pers.	Bermuda grass	X
<u>Digitaria ciliaris</u> (Retz.) Koel.	crab grass	X
<u>Digitaria insularis</u> (L.) Mez ex Ekman	sour grass	X
<u>Digitaria radicata</u> (Presl.) Miq.	crab grass	X
<u>Echinochloa colonum</u> (L.) Link	jungle rice	X
<u>Eleusine indica</u> (L.) Gaertn.	goose grass	X
<u>Eragrostis tenella</u> (L.) Beauv. ex R. & S.	Japanese love-grass	X
<u>Heteropogon contortus</u> (L.) Beauv. ex R. & S.	pili	P
<u>Panicum maximum</u> Jacq.	Guinea grass	X
<u>Panicum maximum</u> Jacq. var. <u>trichoglume</u> Eyles ex Robyns	green panic grass	X
<u>Rhynchelytrum repens</u> (Willd.) C. E. Hubb.	Natal redtop	X
<u>Setaria verticillata</u> (L.) Beauv.	bristly foxtail	X
Liliaceae s.l.		
<u>Aloe vera</u> L.	aloe vera	X
DICOTS		
Aizoaceae		
<u>Trianthema portulacastrum</u> L.	trianthema	X
Amaranthaceae		
<u>Achyranthes aspera</u> L.	achyranthes	X
<u>Alternanthera pungens</u> H.B.K.	khaki weed	X
<u>Amaranthus spinosus</u> L.	spiny pigweed	X
<u>Amaranthus viridis</u> L.	slender amaranth	X

SCIENTIFIC NAME	COMMON NAME	STATUS
<b>Labiatae</b>		
<u>Hyptis pectinata</u> (L.) Poit.	comb hyptis	X
<u>Leonotis nepetaefolia</u> (L.) R. Br.	lion's ear	X
<u>Ocimum gratissimum</u> L.	basil	X
<u>Stachys arvensis</u> L.	staggerweed	X
<b>Leguminosae</b>		
<u>Acacia farnesiana</u> (L.) Willd.	klu	X
<u>Chamaecrista nictitans</u> (L.) Moench.	partridge pea, lau-ki	X
<u>Crotalaria incana</u> L.	rattlepod	X
<u>Desmanthus virgatus</u> (L.) Willd.	virgate mimosa	X
<u>Desmodium triflorum</u> (L.) DC.	beggarweed	X
<u>Indigofera suffruticosa</u> Mill.	indigo	X
<u>Indigofera spicata</u> Forssk.	prostrate indigo	X
<u>Leucaena leucocephala</u> (Lam.) deWit	koa-haole	X
<u>Macroptilium atropurpureum</u> (DC.) Urb.	wild bush-bean	X
<u>Mimosa pudica</u> L.	sleepinggrass	X
<u>Prosopis pallida</u> (Humb. & Bonpl. ex Willd.) H.B.K.	kiawe	X
<u>Senna surattensis</u> (N.L. Burm.) Irwin & Barneby	kolomona	X
<b>Malvaceae</b>		
<u>Abutilon grandifolium</u> (Willd.) Sweet	ma'o	X
<u>Abutilon incanum</u> (Link) Sw.	abutilon	I?
<u>Gossypium sandvicense</u> Parl.	ma'o, huluhulu	E
<u>Malva parviflora</u> L.	cheeseweed	X
<u>Malvastrum coromandelianum</u> (L.) Garcke	malvastrum	X

12

SCIENTIFIC NAME	COMMON NAME	STATUS
<u>Vernonia cinerea</u> (L.) Less	ironweed	X
<u>Xanthium strumarium</u> L.	cocklebur	X
<b>Convolvulaceae</b>		
<u>Ipomoea cairica</u> (L.) Sweet	koali	I
<u>Ipomoea indica</u> (J. Burm.) Merr.	koali awahi'a	I
<u>Ipomoea obscura</u> (L.) Ker-Gawl.	yellow bindweed	X
<u>Ipomoea triloba</u> L.	pink bindweed	X
<u>Jacquemontia sandwicensis</u> Gray	pa'u-o-Hi'i'aka	E
<u>Merremia aegyptia</u> (L.) Urban	hairy merremia	P?
<b>Crassulaceae</b>		
<u>Kalanchoe pinnata</u> (Lam.) Pers.	air plant	X
<b>Cucurbitaceae</b>		
<u>Momordica charantia</u> L.	bittermelon	X
<b>Euphorbiaceae</b>		
<u>Chamaesyce hirta</u> (L.) Millsp.	hairy spurge	X
<u>Chamaesyce hypericifolia</u> (L.) Millsp.	spurge	X
<u>Chamaesyce prostrata</u> (Ait.) Small	prostrate spurge	X
<u>Euphorbia heterophylla</u> L.	euphorbia	X
<u>Phyllanthus debilis</u> Klein ex Willd.	phyllanthus	X
<u>Ricinus communis</u> L.	castorbean	X

11

C-7

SCIENTIFIC NAME	COMMON NAME	STATUS
<b>Proteaceae</b>		
<u>Grevillea robusta</u> A. Cunn. ex R. Br.	silk-oak	X
<b>Rubiaceae</b>		
<u>Spermacoce assurgens</u> Ruiz & Pavon	borreria	X
<b>Sapotaceae</b>		
<u>Chrysophyllum oliviforme</u> L.	chrysophyllum	X
<b>Solanaceae</b>		
<u>Capsicum annuum</u> L.	chili pepper	X
<u>Lycopersicon pimpinellifolium</u> Mill.	currant tomato	X
<u>Nicandra physalodes</u> (L.) Gaertn.	apple of Peru	X
<u>Nicotiana glauca</u> Grah.	tree tobacco	X
<u>Solanum americanum</u> Mill.	popolo	I?
<u>Solanum seaforthianum</u> Andr.	potato vine	X
<b>Sterculiaceae</b>		
<u>Waltheria indica</u> L. var. <u>americana</u> (L.) R. Br. ex Hosaka	'uhaloa, hi'aloa	I?
<b>Verbenaceae</b>		
<u>Stachytarpheta jamaicensis</u> (L.) Vahl	stachytarpheta	X

SCIENTIFIC NAME	COMMON NAME	STATUS
<u>Sida fallax</u> Walp.	'ilima	I
<u>Sida rhombifolia</u> L.	sida	X
<u>Sida spinosa</u> L.	sida	X
<b>Moraceae</b>		
<u>Ficus microcarpa</u> L. f.	Chinese banyan	X
<b>Nyctaginaceae</b>		
<u>Boerhavia diffusa</u> L.	alena	I
<b>Oxalidaceae</b>		
<u>Oxalis corniculata</u> L.	yellow wood-sorrel	X
<b>Passifloraceae</b>		
<u>Passiflora foetida</u> L.	love-in-a-mist	X
<b>Phytolaccaceae</b>		
<u>Rivina humilis</u> L.	rouge plant	X
<b>Plumbaginaceae</b>		
<u>Plumbago zeylanica</u> L.	'illie'e	I
<b>Portulacaceae</b>		
<u>Portulaca oleracea</u> L.	common purslane	X
<u>Portulaca pilosa</u> L.	portulaca	X

TABLE I

Relative abundance and general habitat preferences of exotic birds on property proposed for development at Mailli, Maianae, Oahu.

COMMON NAME	SCIENTIFIC NAME	RELATIVE ABUNDANCE	HABITAT
Cattle Egret	<u>Bulbucus ibis</u>	R = 5	G
Gray Francolin	<u>Francolinus pondicerianus</u>	U = 4	T
Erckel's Francolin	<u>Francolinus erckelli</u>	U = 3	T
Spotted Dove	<u>Streptopelia chinensis</u>	C = 6	P
Zebra Dove	<u>Geopelia striata</u>	A = 16	P
Rock Dove	<u>Columbia livia</u>	R = 3	P
Common Myna	<u>Acridotheres tristis</u>	C = 9	P
Northern Cardinal	<u>Cardinalis cardinalis</u>	U = 2	T
Red-crested Cardinal	<u>Paroaria coronata</u>	R = 3	P
Red-vented Bulbul	<u>Pycnonotus cafer</u>	U = 2	P
Japanese White-eye	<u>Zosterops japonicus</u>	U = 4	T
House Sparrow	<u>Passer domesticus</u>	A = 12	P
House Finch	<u>Carpodacus mexicanus</u>	U = 3	P
Nutmeg Mannikin	<u>Lonchura punctulata</u>	C = 7	G
Java Sparrow	<u>Padda oryzivora</u>	R = 2	G

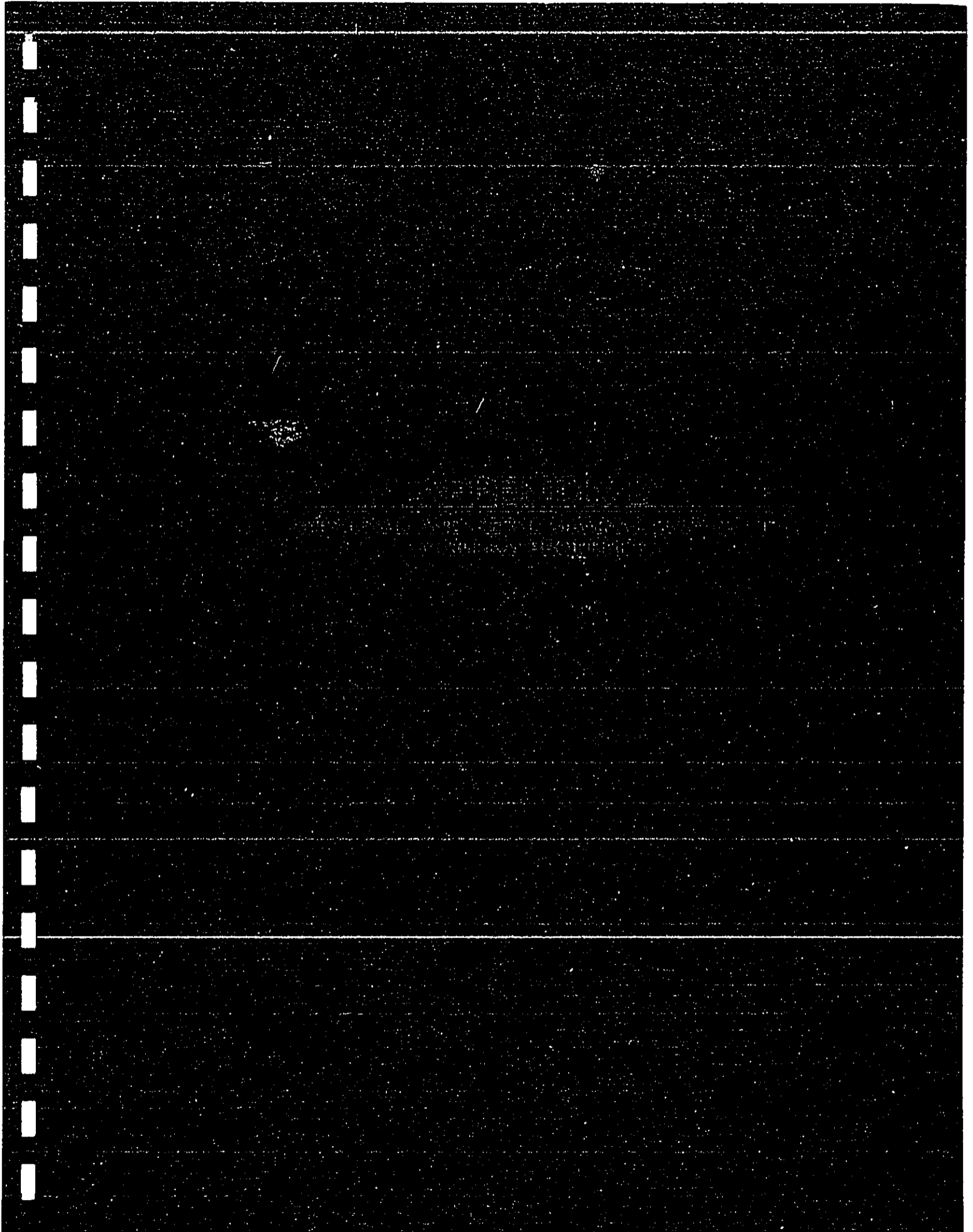
KEY TO TABLE I

Relative Abundance = Average number of individuals observed during walking survey or average frequency on eight minute counts in appropriate habitat.

- A = Abundant (ave. 10+) on 8 min. counts
- C = Common (ave. 5-10) on 8 min. counts
- U = Uncommon (ave. less than 5) on 8 min. counts
- R = Rare (recorded number which follows is total)

Habitat Preference = Area most likely to occur

- G = Grassland
- P = Parkland (grass and scattered trees)
- T = Thickets of dense vegetation



AVIFAUNAL AND FERAL MAMMAL SURVEY OF MAILI KAI  
PROPERTY, MAILI, WAIANAЕ DISTRICT, OAHU

AVIFAUNAL AND FERAL MAMMAL SURVEY OF MAILI KAI  
PROPERTY, MAILI, WAIANAЕ DISTRICT, OAHU

INTRODUCTION

The purpose of this report is to summarize the finding of a one day (7 January 1988) bird and mammal field survey conducted at Maili Kai property, Maianae, Oahu. Also included are references to pertinent literature. Finally, the report provides some suggestions as to the possible changes in the faunal community that may occur following development along with recommendations regarding the preservation of key habitats.

Prepared for

Phillips Brandt Reddick

By

Phillip L. Bruner  
Assistant Professor of Biology  
Director, Museum of Natural History  
BYU-H  
Laie, Hawaii 96762

12 January 1988

The objectives of the field survey were to:

- 1- Document what bird and mammal species occur on the property or may likely occur given the type of habitats available.
- 2- Provide some baseline data on the relative density of each species and where possible, within the constraints of the available time, determine the extent to which each species is dependent on the resources located on the property.
- 3- Compare these findings with published and/or unpublished data.

- 4- Assess the possible changes in the bird and mammal communities that might occur as a result of habitat alteration due to the proposed development.

#### GENERAL SITE DESCRIPTION

The project site is comprised of 415 acres. Second growth trees and grass cover virtually all of the property. The eastern edge of the property is bounded by a steep volcanic ridge Puu O Hulu Kai and Puu O Hulu Uka. Most of the property is relatively flat in contour with a park land appearance of scattered trees and patches of open grass. No bodies of standing water occur on the property but recent rains gave evidence that ephemeral wet areas are created by run off water from Puu O Hulu Kai and Puu O Hulu Uka.

Weather during the field survey was clear and relatively cool. Winds were from the NE at 10-20 mph.

#### STUDY METHODS

Field observations were made with the aid of binoculars and by listening for vocalizations. Attention was also paid to the presence of tracks and scats as indicators of bird and mammal activity. Existing roads around and through the property were followed and at various points (see Fig. 1) eight minute counts were made of all birds seen or heard. Between these count stations walking tallies of birds seen and heard were also kept. These counts provide the basis for the population estimates given in this report. Data on habitat preferences come from these observations plus information provided in Berger (1972), Hawaii Audubon Society (1984) and Pratt et al. (1987). Annual counts of birds in central and leeward Oahu by Hawaii Audubon Society were also consulted in order to acquire a more complete picture of the birdlife activity in the area.

Observations of feral mammals were limited to visual sightings and evidence in the form of scats and tracks. No attempts were made to trap mammals in order to obtain data on their relative density and distribution.

Scientific names used herein follow those given in the most recent American Ornithologist's Union checklist (A.O.U. 1983) and Hawaii's Birds (Hawaii Audubon Society 1984).

#### RESULTS AND DISCUSSION

##### Resident Endemic (Native) Birds:

No endemic birds were recorded during the survey. Given the present nature of the property the only likely endemic bird that might occur would be the Short-eared Owl (Asio flammeus sandwichensis). Bremer (1987) reports this species on only three of the last ten annual surveys of the Maipio and central Oahu area. Quarterly waterbird counts on Oahu by State of Hawaii Department of Land and Natural Resource personnel do not provide data for this specific site since no permanent wetlands are to be found here. It is possible that temporary flooding by heavy rains may attract the Black-necked Stilt (Himantopus mexicanus knudseni) which often take advantage of these opportunities to forage.

##### Migratory Indigenous (Native) Birds:

Pacific Golden Plover (Pluvialis dominica fulva)- A total of only 2 plovers were recorded during the field survey. Plovers prefer open areas such as mud flats and lawns. The high grass and brushy nature of this site make it unacceptable to plover. The two birds seen were observed along a road at the western sector of the property. Time did not permit sufficient observations to determine whether these plovers were territorial or transient. Johnson et al. (1981) and Bruner (1983) have shown plover are extremely site-faithful on their wintering grounds and many establish foraging territories which they defend vigorously. Such behavior makes it possible to acquire a fairly good estimate of the abundance of plover in any one area. These populations likewise remain relatively stable over many years.

No other migratory species were recorded during the survey nor were any expected given the present habitat. Flooding of the site might create some temporary mud flats which may attract Ruddy Turnstone (Arenaria interpres) and Sanderling (Calidris alba). Studies of site-faithfulness in these species reveal that environmental changes markedly alter territorial and site-faithfulness responses (Myers et al. 1981).



of Puu O Hulu Kai and Puu O Hulu Uka. The Common (Ring-necked) Pheasant (Phasianus colchicus) was not recorded but likely occurs on the property.

Feral Mammals:

The only feral mammal observed during the survey was the Small Indian Mongoose (Herpestes auropunctatus). Scats and tracks of both dogs and cats were also found. No rats or mice were recorded but it would be highly unusual if these ubiquitous mammals did not occur on the property. Without a trapping program it is difficult to conclude anything about the relative abundance of mongoose, rats, mice, cats and dogs. However, it is likely that their numbers are similar to what one would find elsewhere in similar habitat on Oahu.

Records of the endemic and endangered Hawaiian Hoary Bat (Lasiurus cinereus semotus) are sketchy but the species has been recorded from central Oahu (Tomich 1986). None were observed on this field survey.

Resident Indigenous (Native) Birds:

No resident indigenous birds were recorded during the survey.

Exotic (Introduced) Birds:

A total of 15 species of exotic birds were recorded during the field survey. Table One shows the relative abundance and typical habitat preferences of these species. Bremer (1987) provides a more comprehensive list of exotic birds which occur in the Maipio and Central Oahu area. This list would also apply to the Maili area. The most abundant species during the one day field survey was the Zebra Dove (Geopelia striata). The absence of Japanese Bush Warbler (Cettia diphone) and White-rumped Shama (Copsychus malabaricus) as well as the relatively low numbers of Red-crested Cardinal (Paroaria coronata) was unexpected. Red-vented Bulbul (Pycnonotus cafer), an exotic species confined to Oahu has only recently spread to the Maiana area (Williams and Giddings 1984). The presence of both Gray Francolin (Francolinus pondicerianus) and Erckel's Francolin (Francolinus erckelii) was unexpected particularly Gray Francolin which is uncommon on Oahu (Pratt et al. 1987). Both species were recorded along the steep western slope

#### CONCLUSION AND RECOMMENDATIONS

A one day field survey can at best provide a limited perspective of the wildlife present in any given area. Not all species will likely be observed and information on their use of the site must be sketched together from brief observations and the available literature. The number of species and the relative density of each species may vary throughout the year due to available resources and reproductive success. Species which are migratory will quite obviously be a part of the ecological picture only at certain times during the year. Exotic species sometimes prosper for a time only to later disappear or become a less significant part of the ecosystem (Williams 1987). Thus only long term studies can provide the insights necessary to acquire both a broad view as well as a more definitive perspective of the bird and mammal populations in a particular area. However, when brief field studies are coupled with data gathered from other similar habitats the value of the conclusions drawn are significantly increased.

In terms of broad conclusions related to bird and mammal activity on the project site the following are

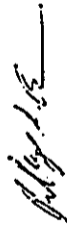
#### offered:

- 1- The present environment provides a fairly diverse range of habitats which are utilized by the typical array of exotic birds one would expect in this sector of Oahu.
- 2- In order to obtain more data on mammals, a trapping program would be required. The brief observations of this survey did not reveal any unusual mammal activity.
- 3- The steep rocky brush covered slopes of Puu O Hulu Kai and Puu O Hulu Uka provide a refuge for two exotic francolin species. The grass and seed bearing trees provide abundant resources for doves, sparrows, finches and cardinals.
- 4- A change of land use of the type proposed will likely alter the present habitat by creating even more diversity of living spaces than are available at present. The planting of fruit bearing trees and the creation of open areas will provide new habitats which will likely result in an increase of species like plover and Common Myna (Acridotheres tristis). Mammal populations may also change following development. The loss of the dense cover provided by high grass and brush will likely reduce mongoose and rat/mice

populations. Although not recorded on the survey game birds such as Common (Ring-necked) Pheasant (Phasianus colchicus) will also be impacted by a loss of cover with the changes in habitat types due to development. This species is widespread and relatively common in second growth habitats on Oahu.

Recommendations:

- 1- The steep slopes of Puu O Hulu Kai and Puu O Hulu Uka provide a refuge for birds such as francolin. This area should be protected from disturbance due to development.
- 2- The planting of a wide range of trees would increase the biological diversity of the site for birds.



Phillip L. Bruner  
Assistant Professor of Biology  
Director, Museum of Natural History  
BYU-H  
Laie, HI 96762  
12 January 1988

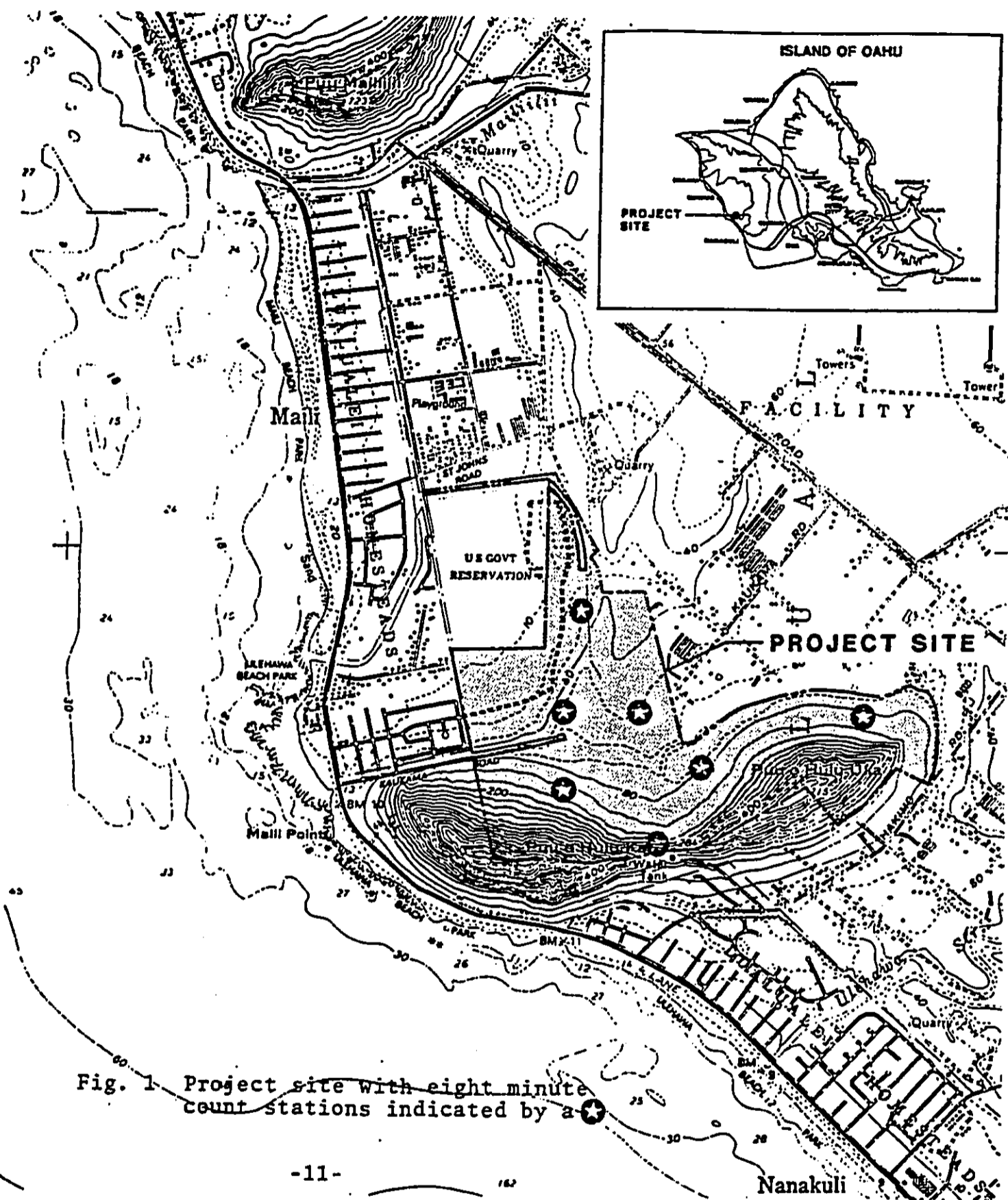


Fig. 1 Project site with eight minute count stations indicated by a \*

-11-

**LOCATION MAP**

SOURCE: U.S.G.S. QUAD. 1968

**MAILI KAI PROPERTY**

NORTH LINEAL SCALE (FEET) MAILI, OAHU

2000 1000 0 2000

D-7

- American Ornithologist's Union. 1983. Check-list of North American Birds. 6th edition. American Ornithologist's Union, Washington, D.C.
- Berger, A.J. 1972. Hawaiian Birdlife. The Univ. Press of Hawaii, Honolulu. 270 pp.
- Bremer, D. 1987. The Maipio, Oahu, Christmas bird count: 1986 results and a review of the first decade 1977-1986. 'Elepaio 47 (5): 53-58.
- Bruner, P.L. 1983. Territorial behavior of wintering Pacific Golden Plover in Hawaii. ms. (Paper presented at the 100th meeting of the Amer. Ornith. Union).
- Hawaii Audubon Society. 1984. Hawaii's Birds. Third Edition. Hawaii Audubon Society, Honolulu. 96pp.
- Johnson, O.W., P.M. Johnson, and P.L. Bruner. 1981. Wintering behavior and site-faithfulness of Golden Plovers on Oahu. 'Elepaio 41 (12): 123-130.
- Myers, J.P., P.O. Connors, F.A. Pitelka. 1981. Optimal Territory size and the Sanderling compromises in a variable environment. in Foraging Behavior: Ecological, Ethological, and Psychological Approaches (A.C. Kamil and T.A. Sargent Eds.), Garland STPM Press, N.Y. 135-158pp.
- Pratt, H.D., P.L. Bruner, and D.G. Berrett. 1987. A field guide to the birds of Hawaii and the tropical Pacific. Princeton Univ. Press 500pp.
- Tomich, P.Q. 1986. Mammals in Hawaii. Bishop Museum Press. Honolulu. 375pp.
- Williams, R.N. 1987. Alien Birds on Oahu 1944-1985. 'Elepaio 47 (9): 87-92.
- Williams, R.N. and L.V. Giddings. 1984. Differential range expansion and population growth of bulbuls in Hawaii. Wilson Bull. 96:647-655.

APPENDIX B

ARCHAEOLOGICAL RECORD RESEARCH REPORT  
PROJECT

PAUL H. ROSENDAHL, Ph.D., Inc.  
Consulting Archaeologist

Report 401-122887

401-122887

ii

SUMMARY

During the period December 15-23, 1987, Paul H. Rosendahl, Ph.D., Inc. (PHRI) conducted a surface archaeological reconnaissance survey (100% ground coverage) of the 41.5+ acre Maili Kai Property project area in the lower Luahala Valley, Waianae District, Island of Oahu (TMK:8-7-10:2.14). The basic purpose of the survey was to identify and evaluate all sites of possible archaeological significance present within the project area. Approximately one hundred eighty-eight (188) man-hours of labor were expended on the survey field work. A total of twenty-six sites was found; twelve sites were newly identified, and 14 of 25 previously recorded sites were relocated.

ARCHAEOLOGICAL RECONNAISSANCE SURVEY  
FOR ENVIRONMENTAL IMPACT STATEMENT (EIS)  
MAILI KAI PROPERTY

Land of Luahala, Waianae District  
Island of Oahu (TMK:8-7-10:2.14)

Eleven previously recorded sites were not relocated; it has been determined that these sites have been destroyed. As noted by previous archaeological survey (Cordy 1976), large-scale ranching, land clearing, and quarrying--from 1851 to the present--have extensively altered the Maili Kai Property project area. Land clearing and quarrying in particular have been destructive to the natural and cultural environments. One result of the destruction is that 24 of the 26 sites in the project area date to the 20th century. Two of the 24 sites date to the early to late 20th century and the other 22 sites date from 1930 to the present. Only two small sites, rock features without associated artifacts, may predate the 20th century.

After completion of field work, survey findings and preliminary conclusions--including tentative evaluations and recommendations--were discussed with Dr. Ross Cordy, chief archaeologist in the State Department of Land and Natural Resources-Historic Sites Section (January 4, 1988). Consistent upon formal review of the written final report, Dr. Cordy tentatively concurred with the evaluations and recommendations presented here regarding the sites in the project area, and the nature and scope of appropriate limited further work within the project area.

by  
James D. Mayberry, M.A.  
Supervisory Archaeologist  
  
and  
Paul H. Rosendahl, Ph.D.  
Principal Archaeologist

Due to their marginal nature, lack of time depth, and disturbed condition, the sites in the project area have been evaluated as having minimal scientific research information potential, and no interpretive potential or cultural significance. Limited subsurface testing, primarily to determine if pre-20th century components might possibly be present, has been recommended for five sites. Contingent upon the results of this data recovery work, it is considered most likely that such additional limited data collection would constitute appropriate and adequate recovery of archaeological data present, that no further archaeological work would be necessary, and that none of the sites would have to be preserved; therefore, there would be no adverse impact upon any significant cultural resources by development activities within the project area.

Prepared for  
PHRI Hawaii  
Financial Plaza of the Pacific  
130 Merchant Street, Suite 1111  
Honolulu, Hawaii 96813

January 1988

CONTENTS

	Page
INTRODUCTION.....	1
Background.....	1
Scope of Work.....	1
Project Area Description.....	2
Previous Archaeological Work.....	4
Field Work Procedures.....	5
FINDINGS.....	7
Site Descriptions - Newly Identified Sites.....	7
Site Descriptions - Relocated Previously Recorded Sites.....	12
Unrelocated Previously Recorded Sites.....	17
CONCLUSION.....	20
Discussion.....	20
General Significance Assessments and Recommended General Treatments.....	22
REFERENCES CITED.....	26

TABLES

Table	Page
1 Summary of Identified Sites.....	27
2 Summary of General Significance Assessments and Recommended General Treatments.....	23

ILLUSTRATIONS

Figure	Page
1 Project Area Location Map.....	3
2 Site Location Map.....	3
3 Site T-5, Sketch Map..... (at end)	8
4 Site T-9, Sketch Map.....	10
5 Site T-21, Sketch Map.....	13
6 Site Ch-0a-16, Sketch Map.....	16
7 Sites Ch-0a-23, Sketch Map.....	18



## INTRODUCTION

## BACKGROUND

At the request of Mr. Matthew E. Grady, Project Manager for PBR Hawaii, Paul H. Rosendahl, Ph.D., Inc. (PHRI) recently conducted a surface archaeological reconnaissance survey of the Maili Kai Property project area located in Maili, in the Land of Lualualei, Waianae District, Island of Oahu (TMK:8-7-10:2,14). Field work was conducted from December 15-23, 1987. At the conclusion of the field work, preliminary findings--including tentative conclusions and evaluations, were discussed with Dr. Ross Cordy, chief archaeologist with the Department of Land and Natural Resources-Historic Sites Section (DLNR-HSS) (January 5, 1988).

The overall objective of the reconnaissance survey was to provide information appropriate to and sufficient for the preparation of an Environmental Impact Statement (EIS) being prepared, in accordance with Chapter 343 of the Hawaii Revised Statutes, in support of an Application for a Development Plan Amendment from agriculture to residential. The present document is the final report on the survey; it includes (a) background information, (b) description of the project area, (c) description of field procedures, (d) description of findings, (e) discussion of results, and (f) significance evaluations and recommended general treatments for each site.

## SCOPE OF WORK

The basic purpose of the reconnaissance survey was to identify--to discover and locate on available maps--all sites and features of possible archaeological significance. A reconnaissance survey is extensive rather than intensive in scope, and is conducted to determine the presence or absence of archaeological resources within a specified project area. Reconnaissance survey indicates both the general nature and variety of archaeological remains present, and the general distribution and density of such remains. A reconnaissance survey permits a general significance assessment of the archaeological resources, and facilitates the formulation of realistic recommendations and estimates for such further archaeological work as might be necessary or appropriate. Such further work could include intensive survey--further data collection involving detailed recording of sites and features, and selected test excavations; and possibly subsequent mitigation--data recovery research excavations; and positive planning and development, and/or preservation of sites and features with significant scientific research, interpretive, and/or cultural values.

The specific objectives of the present survey were four-fold: (a) to identify (find and locate) all sites and site complexes present within the

project area; (b) to evaluate the potential significance of all identified archaeological remains; (c) to determine the possible impacts of proposed development upon the identified remains; and (d) to define the scope of any subsequent archaeological work that might be necessary or appropriate.

The reconnaissance survey was carried out in accordance with the minimum requirements for reconnaissance-level survey recommended by the Society for Hawaiian Archaeology (SHA). These standards are currently being used by DLNR-HSS and the State Historic Preservation Office (SHPO) as guidelines for the review and evaluation of archaeological reconnaissance survey reports submitted in conjunction with various development permit applications.

## PROJECT AREA DESCRIPTION

The Maili Kai Property project area (TMK:8-7-10:2,14), comprised of 415 acres owned by the Kaiser Cement Corporation, varies in elevation from 12-200 ft; it is bounded on the west by a residential area, on the north and east by a gravel-pit and agricultural operations, and on the south by the steep upper slopes of Puu-O-Hulu-Makai (Figure 1). The project area includes portions of Land Grant 4751 to H.M. von Holt (1903) and Land Court Application 130.

The climate in the project area is typical of leeward Oahu--average annual precipitation measures c. 20 inches, and average temperatures in the area range from 72-80 degrees F. The soils and terrain in the project area are very poor in terms of suitability for agriculture. Much of the terrain slopes steeply; c. 60 percent of the soil is comprised of rocky talus material, and the remaining 40 percent is comprised of soils difficult to work (very plastic and sticky when wet and very hard when dry).

Vegetation in the project area is characteristic of Oahu's Waianae coast. Present are dense stands of *Muaea* (*Prosopis pallida* [Humb. and Bonpl. ex Willd.] HBK) and *Ko-hoole* (*Leucaena glauca* [L.] Benth.); other shrubs and grasses cover all but the steepest slopes. Based on botanical surveys conducted at the Lualualei U.S. Naval Magazine, there are no known endangered/threatened species of vascular plants in the project area. Wildlife in the project area is also characteristic of the Waianae coast. Present are exotic (introduced) birds such as doves, house finches, Japanese White-eye (*Zosterops palpebrosus japonicus*), and cardinals; also present are the common Indian mongoose (*Herpestes erpunctatus*), rats (*Rattus*), and presumably, feral cats (*Felis catus*) and dogs (*Canis familiaris*). There are no known endangered/threatened species of wildlife inhabiting the project area.

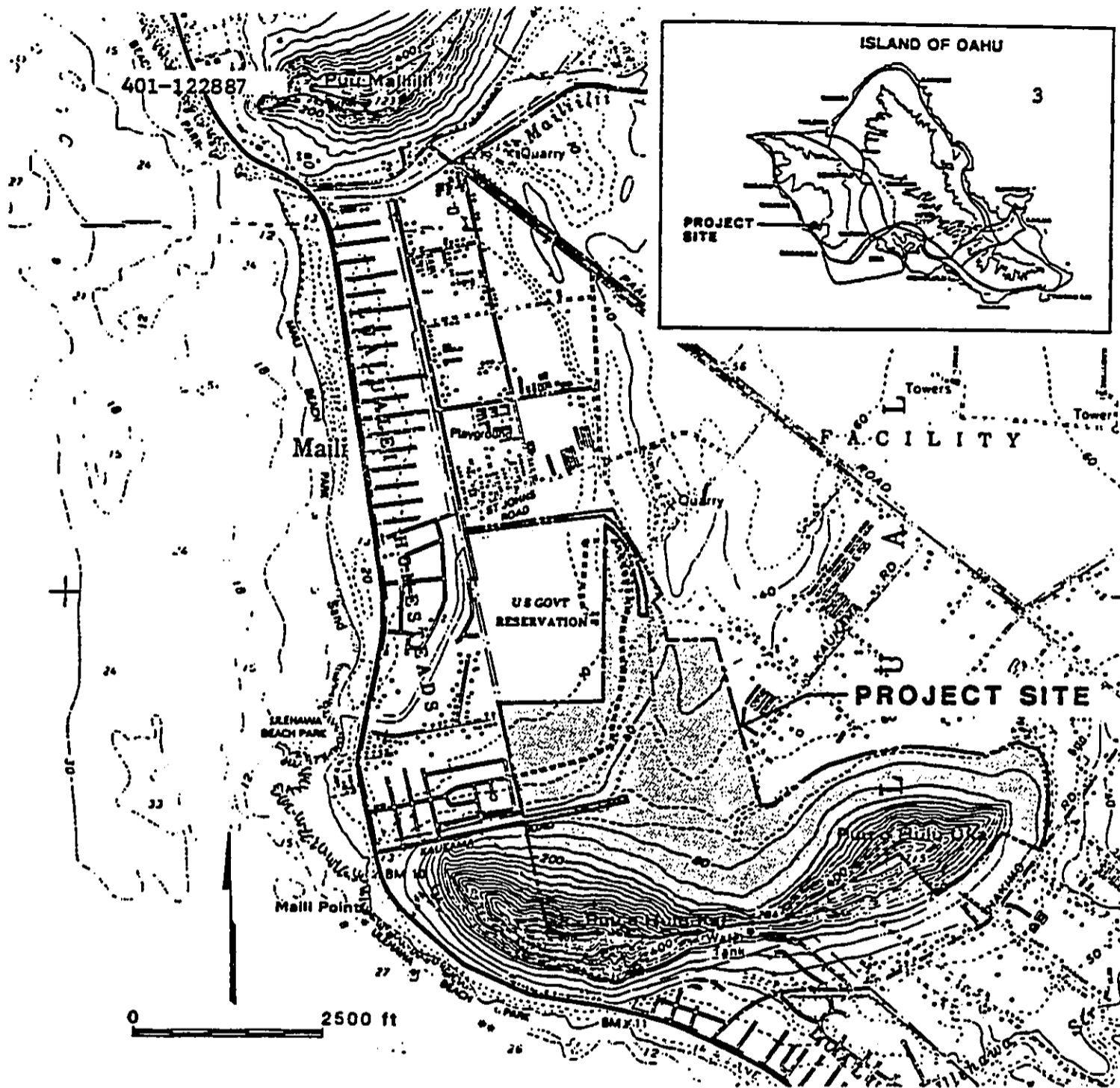


Figure 1. PROJECT AREA LOCATION MAP

ARCHAEOLOGICAL RECONNAISSANCE SURVEY  
 FOR ENVIRONMENTAL IMPACT STATEMENT (EIS)  
 MAILI KAI PROPERTY

Land of Lualualei, Waianae District  
 Island of Oahu (TMK:8-7-10:2,14)

FHRI 87-401

December 1987

## PREVIOUS ARCHAEOLOGICAL WORK

Although Luualai Valley—which includes the Mailli Kai Property project area—like the Waianae Coast in general is known as the scene of long-term prehistoric and historic occupations (Green 1980), there is very little archaeological data on the area. Historical documentary research, done as part of recent archaeological investigations in Luualai Valley conducted by B.P. Bishop Museum for the U.S. Navy (Kelly n.d.), has shown that agricultural and livestock activities in the project area predate AD 1851 and has accelerated in scope throughout the 19th century. By 1900, these activities, especially cattle ranching, had produced extensive environmental changes; the valley floor was covered by dense *klava* thickets; a series of water delivery systems, including large reservoirs, had been constructed; and many aboriginal (early historic and prehistoric) structures including heiau had been demolished, and their stones reused for corrals and property-line walls (A. Haun, pers. comm.).

Other disturbances would follow; more water catchment and retention systems were built in the 1930s, and rock-gathering operations from 1930 to WWII involved massive bulldozing of the valley floor and mountain slopes (Wayne Ferrin, pers. comm.). In addition, the landscape of Luualai Valley has from the 1920s to the present been altered by the U.S. military (Kelly n.d.). During WWII major shore defenses were constructed in and on the slopes of Puu-O-Hulu-Makai. Thus, by the time of initial archaeological field work in the project area (1970s), there was little evidence in the area of conditions that prevailed prior to 1850.

In 1975, Barrera (1975) surveyed c. 70 acres in the present project area. He recorded six sites (Ch-Oa-1 thru -6) in what the present study refers to as Survey Area A. Five of these sites were small stone structures, four of which dated to the 20th century. The sixth site, Ch-Oa-6, consisted of subsurface midden material of unknown age. Ch-Oa-1, thought to predate 1900, was interpreted as "...quite probably an ancient Hawaiian religious structure" (Barrera 1975:9). When this site was subsequently excavated (Cordy 1975), it was found to be "...not an ancient religious structure [but] rather a quite recent structure of unknown function (probably built no earlier than 1930-1940)" (Cordy 1975:11).

In 1976, Cordy (1976) surveyed 130 acres corresponding to Survey Area B of the present project area. He noted that "...much of this land parcel had been bulldozed in the recent past for [rock] quarrying purposes" (Cordy 1976:20). This quarrying occurred in addition to earlier 20th century land-disturbance from cattle ranching (Cordy 1976:21). Of the 19 sites newly identified by Cordy, 15 were found to be "...either walls [Ch-Oa-7 thru -9, -11], highly disturbed sites [Ch-Oa-11, -13], or seemingly recent (ca. AD 1890-1970) sites [Ch-Oa-7 thru -9, -17 thru -22, -24, -25, -27 -29]" (Cordy 1976:21).

Existing data from previous archaeological research in the Mailli Kai Property project area thus stressed the marginal nature of the cultural resources present—resources which have survived the impacts of the past 130 years and which date no earlier than 1890, and most no earlier than the 1920s and 1930s (Cordy 1976:23).

## FIELD WORK PROCEDURES

The reconnaissance survey field work was conducted Dec. 15-23, 1987, under the direct supervision of PHRI Supervisory Archaeologist James D. Hayberry, with the assistance of PHRI Field Archaeologists John Beckstrom, Mikele Fager, and Constance Stecker. PHRI Principal Archaeologist, Dr. Paul H. Rosenblat, provided overall supervision and direction for the project. One hundred eighty-eight (188) man-hours of labor (23.5 man-days) were expended in conducting the field work.

One-hundred percent of the project area was inspected by means of high- to medium-intensity pedestrian sweeps. Prior to the survey, the project area was divided into three survey areas (A-C) (see Figure 2, at end); in Survey Area A sweeps were oriented north-south; in Survey Area B sweeps were oriented north-south, except in the southern portion of the area, where sweeps were oriented east-west; and in Survey Area C sweeps were oriented roughly east-west. As per agreement with the DLMR and PHRI Hawaii, portions of the project area within the State Conservation District land use boundary areas—on the summit and upper slopes of Puu-O-Hulu-Makai, were not surveyed; this area will be preserved as is during project development; no impacts are foreseen to cultural or environmental properties there.

Distance between sweeping crew members was 8-15 m depending on vegetation, terrain, and extent of disturbance encountered. Identified sites were assigned a sequential temporary field number prefixed by "T-", and the numbers were marked on the site flags. Certain T-designated sites, after initial recordation, proved not to be sites, but rather were either natural stone features (T-11 and -13), linear bulldozer scars (T-3 and -10), previously recorded sites (T-14 thru 16), or were of recent age (T-1). Thus T- designations for these "sites" were dropped. All identified and reidentified sites were plotted on 1"=400' scale aerial photographs and 1:400 and 1:200 scale maps provided by PHRI Hawaii and were recorded on standard PHRI site record forms. Recordation included (a) mapping all sites to scale using tape and compass, (b) at least one black-and-white 35 mm photograph of each site (PHRI Field Roll Nos. 401-1 and -2) and (c) tagging of each site with an aluminum strip bearing the site number, PHRI project number (87-401), and the date. Finally, strips of pink plastic flagging tape bearing the same information as on the aluminum strip were wrapped around trees adjacent to the site to aid site reidentification.

The reconnaissance survey was performed under a number of constraints. Environmental conditions in the Mailli Kai Property project

area reflect the long-term disturbances the area has been subjected to: most of the slope areas and virtually all of the valley floor have been significantly altered by bulldozing and other land-clearing operations. Not only has this left widespread scars on the ground surface in the form of rock piles and dozer trails, but it has encouraged the proliferation of such disturbance species as lime and kos-haole, which presently cover much of the area in almost impenetrable thickets. Such growth has been abetted by long term cattle grazing, especially on the valley floor. All of this makes for difficult survey conditions, as visibility is almost nil in the dense thickets while understory growth has also covered rock piles, walls, and other architectural remains often rendering their identification difficult. Much of the area has been the scene of massive illegal dumping further affecting visibility of ground surface, especially along the margins of the project area.

Despite these constraints, one-hundred percent coverage of the project area was accomplished. Survey crews used cane knives to clear transect sweeps and, with constant references to compass bearings and previously flagged transect lines, kept their sweeps on line. All rock piles and alignments (bulldozer scars, for the most part) were inspected. Records of previously recorded sites were used in the field to assess if any of the dozer piles were remains of previous sites (as was the case with Sites Ch-0a-7, -9, and -12).

### FINDINGS

The present survey identified 12 previously unknown archaeological sites and relocated 14 previously recorded sites. All sites are summarized in Table 1 according to site number, formal type, tentative functional interpretation, and nature and degree of significance. Site locations are indicated on Figure 2 (at end). Formal features present at the sites include agricultural sheds/corrals, a charcoal kiln, a well, reservoirs, boundary walls, rock mounds, enclosures, and platforms. Functional types present at the site include: agricultural, kiln, well, water storage, boundary, temporary habitation, and bridge.

### SITE DESCRIPTIONS - Newly Identified Sites

#### Site T-2 - Complex

Site T-2, which covers 616 sq m (22.0 m E-W by 28.0 m N-S), consists of one standing structure, two collapsed structures (a shed and a corral), and associated post-WWII trash. Judging by the cow bones and the corral, the site appears to be a locus of recent livestock activities. Site T-2 is archaeologically very marginal; its recent age and poor condition preclude the need for further investigation.

#### Site T-4 - Complex

Site T-4 is a cement and rock charcoal kiln (5.2 m in diameter) associated with two collapsed wood and tin structures and a small rock cairn. Informant information (Mr. Wayne Perrin) indicates the kiln is one of two which were operated in the area by the Yamashita Brothers about the time of WWII. Site T-4, which covers 720 sq m, has minimal research potential; no further work for it is envisioned.

#### Site T-5 - Sinkwell and Well

Site T-5 is a limestone sinkhole (2.2 m in diameter) which is still used as a well (as indicated by modern pump parts and a hose present in the sink)(Figure 3). This type of site, as in the nearby West Beach project area, is often associated with pre-20th century activity. Site T-5 includes a 3.6 m long stone wall 4-7 courses high. This wall partially encloses the lip of the sink; its apparent function is to keep trash out of the well. The wall appears to have been built in two episodes; its lower portion is partially buried by .50 m of recent alluvium and debris. Shovel testing of the bases of the sink and wall are in order.

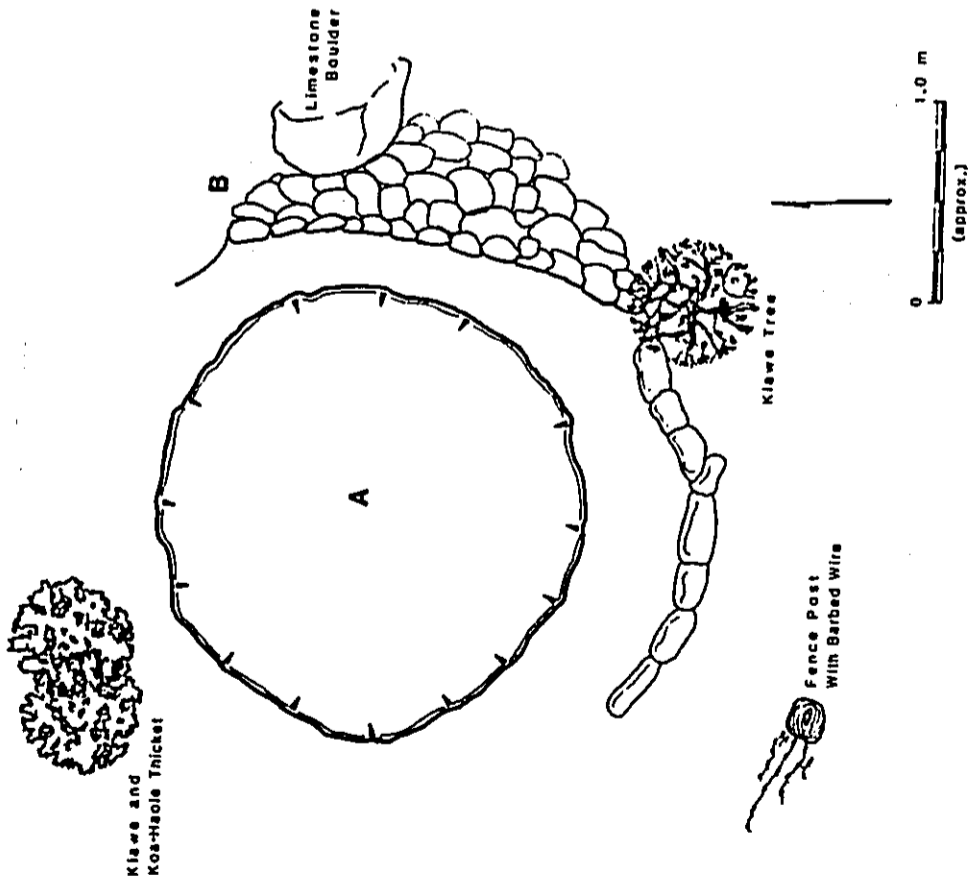


FIGURE 3. SITE T-5, FEATURES A AND B

Site T-6 - Complex

Site T-6 is comprised of two modified natural sinkholes (Reservoirs A and B) located near Mailili Stream, in an area where the water table is quite high (marshy conditions were recorded in December 1987). These sinkholes, which are fairly proximate to each other, are surrounded by a stone wall on three sides and a possible wall remnant (an earthen berm) on the fourth side. This stone wall encloses an area of c. 4,300 sq m. Reservoir A is the larger of the two sinkholes; it measures c. 100 sq m and is at least 5.6 m deep. The bottom of Reservoir A is filled-in with silt; three of its sides are reinforced/ faced with stone and cement. On its SE edge is a concrete slab with several channels in it--apparently the slab is a structure (pumphouse?) foundation. Reservoir B measures c. 40 sq m in area and is 1.35 m deep (maximum). Like Reservoir A, it is adjacent to a channelled concrete slab, and two of its walls are faced with stone and cement.

The relationship between Reservoirs A and B is unclear, as are the details of this type of water system. Informant Mr. Wayne Perrin said there were two such "plantation reservoirs." A 1928 USGS area map depicts one reservoir, and it is shown as being closer to Puu-O-Hulu-Makai than to Site T-6. Documentary evidence (Kelly n.d.) suggests Site T-6 was one of several water catchment and delivery systems constructed in the 1930s and 1940s.

Site T-7 - Boundary Wall

Site T-7 is a stone wall (core-rubble type) which measures c. 900 m long by 0.6-1.7 m high by c. 0.5 m wide. The wall runs mostly E-W along the project area boundary located at the base of Puu-O-Hulu-Makai. Judging by method of construction and the fact that the wall is located in the same location on a 1928 USGS area map, the wall dates to at least the early 20th century. Further dating of the site is probably impossible; no further work at the site is anticipated.

Site T-8 - Rock Mounds

Site T-8 is a complex of two small rock mounds located in an area 9.0 m by 6.0 m (54 sq m) on the lower talus slope of Puu-O-Hulu-Makai (c. 125 ft [38 m] elevation). Both mounds (A and B) consist of unshaped basalt rocks and boulders stacked 1 to 3 courses (Mound A) and 1 to 5 courses (Mound B) high. Mound A covers c. 2.0 sq m and Mound B covers c. 7.5 sq m. No artifacts were found associated with the mound. Dates and functions of the mounds are unknown.

Site T-9 - Stone Enclosure and Wall

Site T-9, c. 70 sq m in area, is a small rock enclosure and wall located on the talus of Puu-O-Hulu-Makai (Figure 4). The enclosure, a small roughly C-shape alignment of basalt rocks stacked 1 to 4 courses

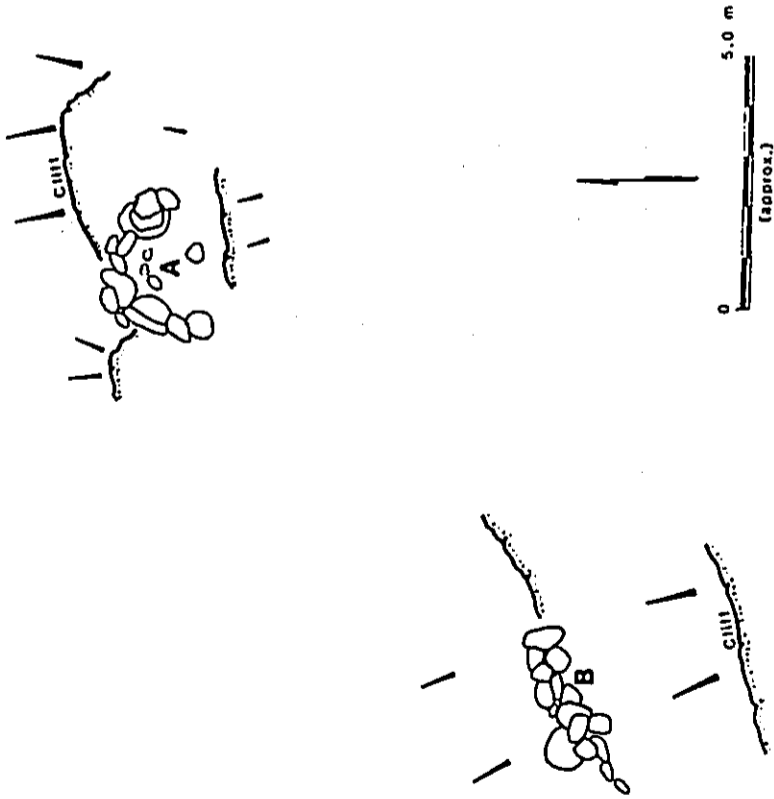


FIGURE 4. SITE T-9, FEATURES A AND B

high, and the wall are situated at the upper edge of a steep drop-off. Both the enclosure and the wall incorporate large immovable basalt boulders as well as smaller, portable stones. Ages and functions of these two features are unknown; further limited testing of this site is recommended.

Site T-12 - C-Shape Enclosure

Site T-12 is a small (1.75 x 2.0 m) C-shape enclosure of unshaped dry-laid basalt boulders located on the steep talus of Puu-O-Hulu-Makai. The C-shape rests on the crest of a large basalt boulder. Although its exact age and function are unknown, large-calibre bullet cartridges present at the site suggest the site may date to WWII and may be associated with large bunkers and other defensive works located further west, at the crest of Puu-O-Hulu-Makai.

Site T-17 - Boundary Wall

Site T-17 is a wall of core-rubble construction comprised of unshaped limestone rocks. It varies in height from 1.0-1.5 m and in width from 0.3-0.6 m, and it runs for 350 m along the western project boundary. Site T-17 is depicted on a 1928 USGS map, and thus, it dates to at least the early 20th century. Portions of T-17 have been heavily affected by nearby gravel operations. As it is difficult to deduce the actual age of such affected features, no further work is recommended for T-17.

Site T-18 - Boundary Wall

Site T-18 is a wall identical in structure to Sites T-17 and T-7 walls. Its height varies from 0.8-1.6 m; its width varies from 0.3-0.8 m, and it extends for 900 m on the north and east edges of the Maili Kai Property. Like Site T-17, Site T-18 too is on a 1928 USGS map of the Maili area; thus, the site probably also dates to at least the early 20th century. Portions of T-18 are being repaired or are being added on to, as it still marks a property line (Sites T-7 and T-17 are also being repaired or added on to). No further work is anticipated at Site T-18.

Site T-20 - C-Shape and Enclosure

Site T-20 is comprised of a stone-wall enclosure and an associated C-shape; it covers 240 sq m. Both the enclosure and the C-shape are constructed of unshaped rough limestone rocks, and both are 1 to 4 courses high. At present, the age and function of Site T-20 is unclear. Based on information supplied by Mr. Wayne Perrin, T-20 may have evolved either during extensive moss-rock operations conducted c. WWII, or during land-clearing conducted sometime earlier.

Site T-21 - Platform

Site T-21 is a large (40.0 m diameter, c. 1.5 m high) circular platform comprised of unshaped limestone and basalt rocks and boulders (Figure 5). The platform consists of a circular outer "wall" of rocks; the space which this wall encloses has been filled-in and capped with other rocks. No structure or walls are present on or within the platform. Three large and two small depressions were noted on the platform's otherwise flat (but unstable) surface. The only artifacts or features associated with the platform were a small pile of rocks 2.0 m east of the platform and a single pre-1965 soda bottle.

At present, age and function of Site T-21 remain problematic; however, three possibilities exist: a) that Site T-21, like Site T-20 is associated with the moss-rock gathering in the mid-20th century; b) that Site T-21 represents agricultural clearing which took place in the early 20th century; and c) that Site T-21 is an aboriginal, or at least pre-1900, structure of unknown, possibly ceremonial function. At present, the unstable nature of the rocks and lack of evident internal features suggest possibilities (a) and (b) are more likely. Suggested for Site T-21 are shovel testing around the perimeter of the site and removal of rocks in a "trench" through the platform. Shovel-testing will determine the presence or absence of aboriginal habitational or ceremonial midden deposits, which may aid in dating the site. Trenching through the platform (specifically from one or two edges to the center) may uncover (if any) internal walls or other features.

SITE DESCRIPTIONS - Relocated Previously Recorded Sites

Fourteen (14) previously recorded sites were relocated during the Haili Kai reconnaissance survey. All of these (Ch-Oa-7, -8, -9, -12, -13, -16, -19 thru -24, -28, -29) were first noted during a survey conducted in 1975 (Cordy 1976). Several of these previously recorded sites exhibited evidence they had been disturbed, mostly by bulldozing, since they were first recorded. At Ch-Oa-7, much of the enclosure wall, depicted in Cordy's report, has been knocked over (Cordy 1976). All of Ch-Oa-9, an associated rock wall, has also been knocked over. Site Ch-Oa-22, a bridge and trench, has been essentially destroyed--the bridge is gone and the trench (or channel) has been, for the most part, filled-in with large limestone rocks and boulders. Ch-Oa-29, in 1975 a platform and a C-shape enclosure, now consists only of a platform; the C-shape has apparently been destroyed by bulldozing.

Site Ch-Oa-7 - Rock Mound and Wall

Ch-Oa-7 is a small rock mound associated with a rock wall. It is located in the northern portion of the project area, at the base of a small (2-3.0 m high) limestone escarpment running north to south. The

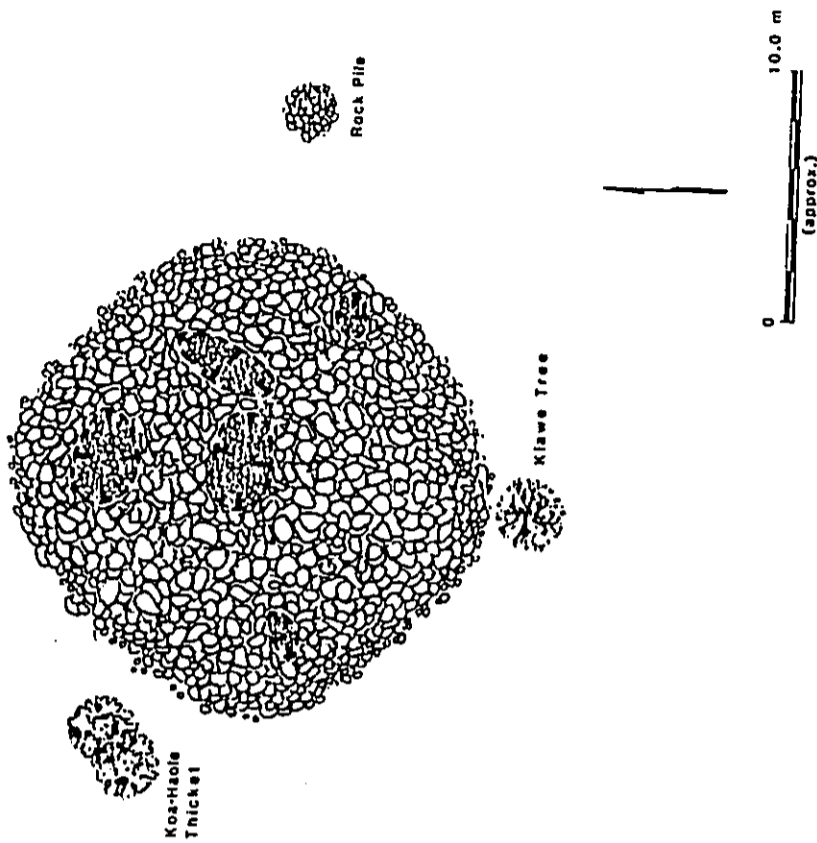


FIGURE 5. SITE T-21

rock mound, which may be nothing but a bulldozed pile of boulders, measures c. 3.0 m by 4.0 m by c. 0.3 m high. 5.0 m south of the rock mound is the rock wall comprised of unshaped limestone blocks used in a core-rubble-type construction. This wall extends 20.0 m. No pre-modern artifacts were noted in the site area. As Ch-Oa-8, associated with Ch-Oa-7, has been tentatively dated to before 1910, Ch-Oa-7 may also date to the early 20th century.

Site Ch-Oa-8 - Boundary Wall

Ch-Oa-8 is a discontinuous stone wall that runs along the crest of a low limestone escarpment and extends c. 200 m N-S from a point 20 m NE of Ch-Oa-7. This wall is also a core-rubble-type wall of unshaped limestone rocks; it is 3-4 courses high (c. 0.5 m high) and varies in width from 0.4 to 0.7 m. Bulldozer cuts—several 80-100 m wide—are present in the wall. Site Ch-Oa-8 has been dated to c. 1910 (Cordy 1976); it probably once functioned as a property-line marker. No further work is anticipated for the site.

Site Ch-Oa-9 - Wall

Ch-Oa-9 is a rock wall associated with Ch-Oa-7 and -8 (it butts Ch-Oa-8 on the east). Ch-Oa-9 measures c. 7.0 m by 3.0 m by 0.3 m high—half of what it measured when it was first recorded. Bulldozing has apparently knocked the wall down, so that at present it more resembles a low rock mound than a wall. No further work is anticipated at Ch-Oa-9.

Site Ch-Oa-12 - Mounds

Ch-Oa-12 consists of two low (0.75 to 1 m high) circular mounds comprised of unshaped limestone rocks. These mounds are located c. 15-20 m NW of the northern terminus of Ch-Oa-8; they may represent property boundary cairns associated with the property line wall, Ch-Oa-8. They may also be nothing more than bulldozer rock piles. Ch-Oa-12 does not warrant further work.

Site Ch-Oa-13 - Enclosure

Ch-Oa-13 is comprised of a large, somewhat C-shaped stone wall enclosure (or semi-enclosure) and a smaller wall, which runs inside of and parallel to the larger wall. The walls enclose an area of 4,000 sq m (80 by 50 m). Present in each of the walls are five bulldozer cuts 4.0-5.0 m wide. Both walls are of core-rubble-type construction. The larger outer wall averages 0.5 to 0.8 m high by 1.5 m wide, and the internal wall averages 0.5 m in high by 0.3 m wide. At present, the age and function of Ch-Oa-13 is unknown; it may date to the early 20th century and be associated with either land-clearing (for cattle) or moss-rock gathering.

It may also have been used as a livestock corral, though there is no wall which connects the ends of the C-shape. No further work is scheduled at Ch-Oa-13.

Ch-Oa-16 - C-shape Enclosure

Ch-Oa-16 is a small, low C-shape enclosure comprised of unshaped limestone rocks (Figure 6); it measures c. 5.0 m by 2.5 m. The enclosure walls are 1.0 m high by 0.5 m wide. While structures such as Ch-Oa-16 have been associated with aboriginal occupations, the fact that Ch-Oa-16 is present in the midst of an area long used for 20th century mass rock gathering suggests the site does not predate the rock gathering. If it did predate the gathering, it is likely the enclosure, having been scavenged for rocks, would not exist. Ch-Oa-16, like sites Ch-Oa-19 thru -24, -28 and -29, probably dates to c. WWII. If it were not for the early 20th century rock gathering, the site would probably be determined to post date WWII. Further testing at Ch-Oa-16 may resolve this dating issue.

Site Complex Ch-Oa-19 thru -22 - Rock Mounds, Platform, Bridge

These four sites occupy approximately 1,224 sq m (c. 34.0 m N-S by c. 36.0 m E-W). Ch-Oa-19 is a mound of stacked unshaped limestone rocks measuring 0.5 m high. It is 7.5 m by 3.0 m in area and is located c. 9.0 m NW of Ch-Oa-20. Ch-Oa-20 consists of two small low rock mounds (#1 and #2). Mound #1 is irregularly shaped, c. 8.0 x 5.0 m (maximum dimensions), and is comprised of loosely piled unworked limestone rocks stacked 0.4-0.5 m high. It is located c. 2-4.0 m NE of Mound #2, a roughly oval mound of rocks (4.0 x 2.0 m) stacked 0.3 m high. Ch-Oa-21 is located 6.0 m SE of Ch-Oa-20. It also is a mound of unshaped limestone rocks; however, it is much larger than -19 or -20. Ch-Oa-21 measures 12.0 m E-W by 8.0 m N-S (96 sq m) by .80 m in high. This mound may be a platform. It consists of an oval alignment of roughly vertical unworked limestone rocks 1-2 courses high, filled-in and capped with unshaped blocks and cobbles. The center of the mound is lower than the mound's SE edge; the center appears to have been scavenged for rocks. No walls or other structures were noted within the mound. Ch-Oa-22 is c. 14 m SW of Ch-Oa-21. Ch-Oa-22, which has been essentially destroyed, originally consisted of a stone bridge and a shallow trench. At present the trench has been filled-in with loose limestone boulders and the bridge is absent.

All sites discussed in the preceding paragraph have been interpreted as forming some sort of complex (Cordy 1976), and all are probably as closely associated temporally and functionally as they are physically. Although their ages and functions are unclear, Sites Ch-Oa-19 thru -22 probably post date WWII. They are in an area which during c. WWII was cleared and scavenged for rocks; if they had predated WWII, the features, having been scavenged for rocks, probably would not exist. No further work is scheduled at this complex.



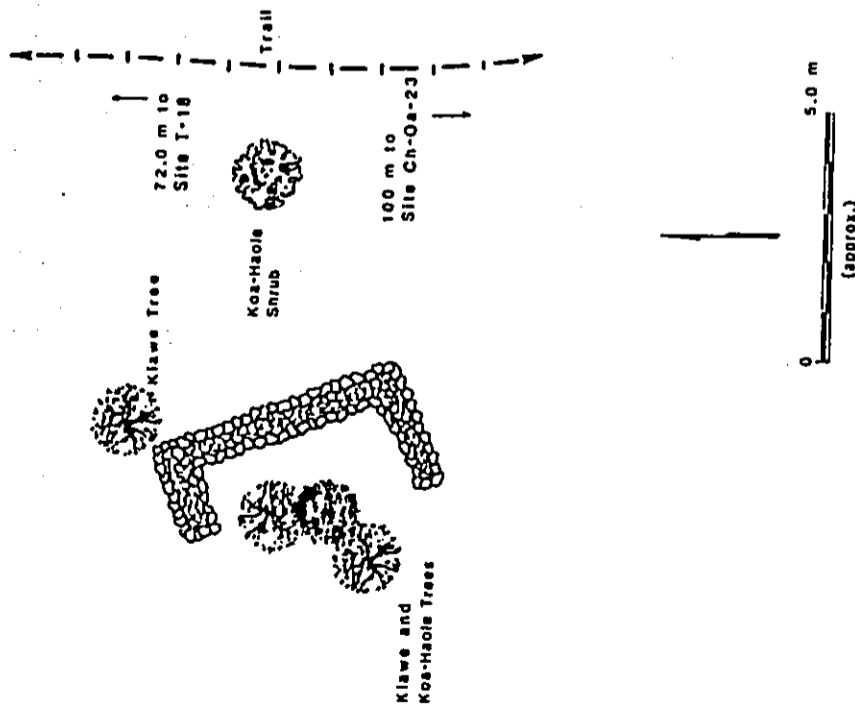


FIGURE 6. SITE CH-OA-16

Site Ch-Oa-23 - Rock Mound/Platform

Ch-Oa-23 is a flat-topped rock mound/platform similar to Ch-Oa-21, which is located a short distance away (Figure 7). This site too consists of an oval alignment of vertically placed unshaped limestone rocks which surrounds an area filled-in and capped to a height of 1.0 m with loosely stacked limestone rocks. Ch-Oa-23 measures 9.0 by 9.0 m and is assumed to date from the land-clearing and rock-gathering operations of the early 20th century (1900-1950).

Site Ch-Oa-24 - Rock Mound/Platform

Ch-Oa-24, 40.0 m south of Ch-Oa-23, is another rock mound/platform almost identical in size and form to Ch-Oa-21 and -23 (Figure 7). It is 1.0 m high and measures 9.0 (E-W) by 10.0 m (N-S). Ch-Oa-24 is probably associated with the extensive land-clearing operations conducted c. WWII.

Site Ch-Oa-28 - Rock Platform

Ch-Oa-28 is a rock mound/platform located c. 180.0 m south of Ch-Oa-24; it is very similar in size and shape to Ch-Oa-23 and -24. Ch-Oa-28 measures 6.0 m (N-S) by 5.0 m (E-W) by c. 1.5 m high. It is probably of the same age and function as Ch-Oa-23 and -24.

Site Ch-Oa-29 - Rock Mound/Platform

Ch-Oa-29 is a rock mound platform similar to Ch-Oa-23, -24, and -28. This rock mound/platform measured 6.0 m (E-W) by 5.5 m (N-S) by 1.0 m high. It too probably dates from the first half of the 20th century, originating with the land-clearing operations of that period. Although a C-shape enclosure associated with this rock mound was reported in 1975 (Cordy 1976), no C-shape was present during the present investigations.

UNRELOCATED PREVIOUSLY RECORDED SITES

Eleven sites previously recorded in the project area were not relocated. These sites include Ch-Oa-1 thru -6, recorded in 1975 (Bartera 1975) and Ch-Oa-11, -17, -18, -25 and -27, recorded in 1976 (Cordy 1976).

Sites Ch-Oa-1 thru -5, excavated in 1975, were shown to date no earlier than the 1930s. All of these sites were adjacent to a residential area and were easily accessible from Kaukama and an unnamed dirt road. Also, all were located in Survey Area A, which exhibits abundant evidence of recent bulldozing. It seems therefore, that the sites have been destroyed by either scavenging of rocks from the structures or by bulldozing or grading (destroyed sometime between 1975-1987). As these sites represented a very marginal data base, probably no cultural resources of any significance were adversely affected.

have met a fate similar to Ch-Oa-17. Ch-Oa-25, a rectangular stone platform 25.0 m sq and 0.8 m high, has also vanished without a trace--it too is assumed to have been bulldozed sometime between 1975-1984. Ch-Oa-27 was a 300 m long trail running E-W along the lower slope of Fuu-O-Hulu-Makai--an area which presently not only exhibits recent bulldozing scars, but a large drainage channel which has been excavated in the western 1/2 of Ch-Oa-27. The bulldozing and the channel excavation have obliterated the site.

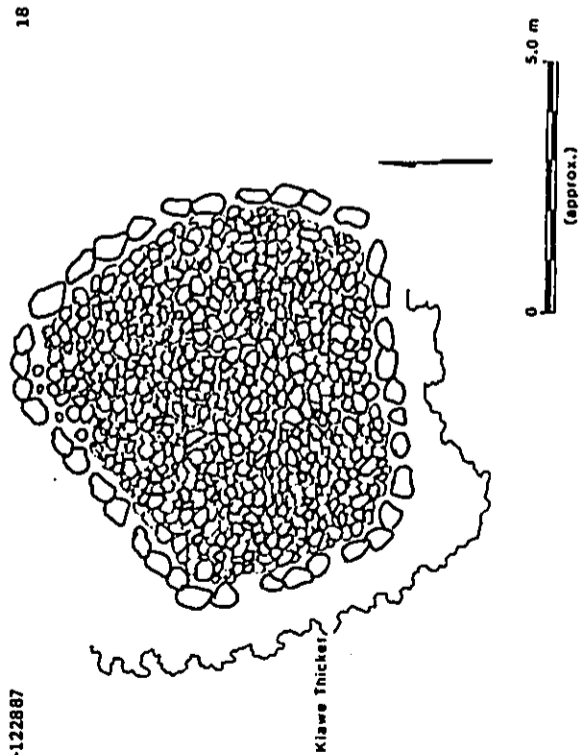


FIGURE 7. SITE Ch-Oa-23

Ch-Oa-6, recorded by Barrera, was a subsurface midden scatter exposed by bulldozing (Barrera 1975). No trace of this site was found during the present study; this suggests that further land-disturbance finished the destruction of it. The other unrelucted sites (Ch-Oa-1-6, -11, -17, -18, -25, and -27) all were located in what the present study refers to as Survey Area B (Cordy 1976). These sites were in areas that had been or were being quarried by bulldozers at the time of their recordation. As such activities, plus massive (and illegal) trash dumping, are still ongoing, it seems likely that these activities are responsible for the sites' destruction (sometime between 1975 and 1987). Ch-Oa-11 was a stone wall 40.0 m in length which was found in 1975 already damaged by bulldozers; Ch-Oa-17 was a "central enclosure" of two stone alignments covering an area of c. 24.0 m sq. Not only are fresh bulldozer marks apparent in the former area of the site, but T-18, a nearby rock wall still used as a property line marker shows signs of recent repairing--it may be that stones from T-17 were scavenged to repair it.

Ch-Oa-18, a stone enclosure of c. 25.0 m sq was located near Ch-Oa-17; no trace of it was found during the present survey, and it is assumed to

## CONCLUSION

## DISCUSSION

Twelve sites were newly identified and 14 previously recorded sites were relocated during the reconnaissance survey of the Maili Kai Property project area. This total of 26 sites can be divided into the following temporal and functional or formal categories:

- I. Stone Walls and Mounds (1900-1920s) (n=7)
  1. Stone walls (T-7, -17, -18; Ch-0a-8, -9)
  2. Wall complex (wall, mound) (Ch-0a-7)
  3. Mounds (2) (Ch-0a-12)
- II. Land clearing and Ranching(?) Sites (1900-1950s) (n=13)
  1. Reservoir complex (T-6)
  2. Bridge and trench (Ch-0a-22)
  3. C-shape enclosures
    - a. Small enclosures (T-20; Ch-0a-16)
    - b. Large enclosure (Ch-0a-13)
  4. Rock mounds (Ch-0a-19, -20)
  5. Rock mounds/platforms (T-21; Ch-0a-21, -23, -24, -28, -29)
- III. Mid to Late 20th Century Sites (1940-1980s) (n=4)
  1. Agricultural/ranching complex (T-2)
  2. Charcoal kiln complex (T-4)
  3. Sinkwall (T-5)
  4. C-shape enclosure (T-12)
- IV. Sites of Indeterminate Age and Function (n=2)
  1. Rock mounds (2) (T-8)
  2. Rock wall and small C-shape (T-9)

The above sites represent several patterns of past land usage in the lower Lualaba Valley. All but two sites are tentatively associated with a number of economic activities dating to the 20th century. For purposes of discussion, the 26 sites can be considered according to the four previously designated categories.

I. Stone Walls and Mounds (1900-1920s)

These are apparently property boundary markers from the early 20th century (1900-1920) and include stone walls shown on a 1928 USGS Topographic Map (Sites T-7, -17, and -18). Also in this group are Ch-0a-7, -8, -9, and -12, all located along the HW boundary of the project area. Ch-0a-8, a stone wall, has been dated to c. 1900 (Cordy 1976:3) and Ch-0a-7, -9, and -12 are associated with it (Cordy 1976:21) and are assumed to date to the turn of the century.

II. Land-clearing and Ranching(?) Sites (1900-1950s)

This largest group of sites is tentatively dated to the first half of the 20th century (1900-1950), a time of intensive agricultural, ranching and land-clearing activities in the Maili Kai Property project area. The size and presumed function of these sites varies; Site T-6 is a complex of two reservoirs (modified sinkholes?) and adjacent cement foundations (pumphouses?) surrounded by a stone wall enclosing an area of c. 4,500 m sq. Documentary (Kelly, n.d.) and informant (Wayne Perrin, pers. comm.) information suggests this site dates to the 1930s and 1940s.

Site Ch-0a-22 is essentially destroyed. In 1975, it consisted of a stone bridge (since demolished) over a channel or trench in the limestone bedrock (since filled-in). Sites T-20 and Ch-0a-16 are small C-shape stone-walled enclosures, covering areas of 240 sq m and 12 sq m, respectively. Ch-0a-13, another C-shape enclosure, is much larger (8,000 sq m) and may have been a livestock corral, although no fourth wall exists. The functions of the smaller C-shapes are unknown. As they are in bulldozed, land-cleared areas, it is assumed they post-date the period of bulldozing and land clearing activities. Otherwise they would have been destroyed by the activities.

None of the ovoid or rectangular rock mounds and platforms (a platform being a flat topped, vertically-sided mound) in this group exhibit indications of internal structuring in the form of walls or raised platforms. They are thought to be the result of land clearing and rock-gathering operations. The smallest of these mounds, Ch-0a-19 and -20, are nothing but large piles of rocks. Larger (averaging 80 sq m) mound/platforms include Ch-0a-21, -23, -24, -28, -29; and T-21. T-21 is the largest, at 400 m sq. None of the mounds exceed 1.5 m in height; none are associated with other structures or material culture predating 1960. The research potential and cultural significance of this second group of sites is minimal. Limited testing at two or three sites, perhaps at Ch-0a-16, -23; and at T-21, may assist in documenting their date and function.

III. Mid to Late 20th Century Sites (1940-1980s)

The third group of sites, which can be dated with some certainty to the mid to late 20th century (1940-present), represent several activities. Site T-2 is an agricultural/ranching "complex" (two sheds, a corral, and two trash dumps containing bottles from the 1950's). Site T-4 is a cement and masonry charcoal kiln and two collapsed sheds known to have operated in the 1950 and 1960s (Wayne Perrin, pers. comm.). T-12 is a small rock-walled C-shape with an abundance of large cartridges; it is probably a rifle pit from the WWII era. Site T-5 is a sinkhole/well with a dry-laid masonry rim wall. The presence of modern pump parts and a plastic garden hose in and around the sinkhole suggests it was in use into the 1980s. As an older portion of the rim wall, partially buried under recent alluvium, may predate the 20th century, T-5 is the only site from this group recommended for further work in the form of limited (shovel) testing.

Table 2.  
SUMMARY OF GENERAL SIGNIFICANCE ASSESSMENTS  
AND RECOMMENDED GENERAL TREATMENTS  
MAILI KAI PROPERTY PROJECT AREA

Site Number	Significance Category			Recommended Treatment		
	A	X	C	FDC	NFW	PAI
T-5	+	-	-	+	-	-
T-9	+	-	-	+	-	-
T-21	+	-	-	+	-	-
Ch-Oa-16	+	-	-	+	-	-
Ch-Oa-23	+	-	-	+	-	-
Subtotal:	5	0	0	5	0	0
T-2	-	+	-	-	+	-
T-4	-	+	-	-	+	-
T-6	-	+	-	-	+	-
T-7	-	+	-	-	+	-
T-8	-	+	-	-	+	-
T-12	-	+	-	-	+	-
T-17	-	+	-	-	+	-
T-18	-	+	-	-	+	-
T-20	-	+	-	-	+	-

IV. Sites of Indeterminate Age or Function

The final category of sites are those of indeterminate age and function. This category includes Sites T-8 and -9--both located on the upper talus slope of Puu-O-Hulu-Makai. Site T-8 is a pair of small rock mounds. These mounds may be historic boundary cairns, but no property line is known to exist in the immediate area. The absence of associated material culture limits the usefulness of further investigations at this site. Site T-9, a small rock wall and rough C-shape, is also lacking in material culture. However, the presence of adjacent soil deposits at this site, deposits which may contain cultural material, presents an opportunity for limited testing.

In summary, only four or five of the 26 sites extant in the Maili Kai Property Project Area warrant further investigation: T-5, with its possibly 19th century (or older) wall; T-21 and/or Ch-Oa-23, due to their well-preserved condition, enigmatic nature, and representativeness; Ch-Oa-16, because of its superficial similarity to aboriginal C-shapes used elsewhere as temporary habitations and because it is also representative of other sites known from the area--most of which are now destroyed; and T-9, because of its potential (however slight) for buried deposits. The remaining 16 sites are seen as possessing no significant archaeological cultural values due to a number of factors: limited size and marginal nature (Ch-Oa-7, -8, -9, -12; T-7, -8, -17, and -18); degree of disturbance (Ch-Oa-13 and -22); recent origin or repetitive data base (Ch-Oa-19, -20, 21, -24, -28, -29; and T-20) and contemporary (1940-1980) status (T-2, -4, -6, and -12).

GENERAL SIGNIFICANCE ASSESSMENTS  
AND RECOMMENDED GENERAL TREATMENTS

To facilitate State and County review, general significance assessments and recommended general treatments for all sites identified during the reconnaissance survey are summarized in Table 2. Significance categories used in the evaluation process are based on the National Register criteria contained in the Code of Federal Regulations (36 CFR Part 60). The State Department of Land and Natural Resources-Historic Sites Section (DLNR-HSS) uses these criteria to evaluate eligibility for both the Hawaii State and National Register of Historic Places. Sites determined to be potentially significant for information content (Category A, Table 2) fall under Criterion D, which defines significant resources as ones which "...have yielded, or may be likely to yield, information important in prehistory or history." Sites potentially significant as representative examples of site types (Category B, Table 2) are evaluated under Criterion C, which defines significant resources as those which "...embody the distinctive characteristics of a type, period, or method of construction.... or that represent a significant and distinguishable entity whose components may lack individual distinction."

General Significance Categories:

- A=Important for information content, further data collection necessary (PHRI-research value);
- X=Important for information content, no further data collection necessary (PHRI-research value, DLNR-HSS=not significant);
- B=Excellent example of site type at local, region, island, State, or National level (PHRI=interpretive value); and
- C=Culturally significant (PHRI-cultural value).

Recommended General Treatments:

- FDC=Further data collection necessary (intensive survey and testing, and possibly subsequent data recovery/mitigation excavations);
- NFW=No further work of any kind necessary, sufficient data collected, archaeological clearance recommended, no preservation potential;
- PAI=Preservation with some level of interpretive development recommended (including appropriate related data recovery work); and
- PAI=Preservation "as is," with no further work (and possible inclusion into landscaping), or appropriate data recovery/disinterments.

Table 2. (Cont.)

Site Number	Significance Category			Recommended Treatment		
	A	B	C	FDC	NEV	PID PAI
Ch-Oa-7	-	+	-	-	+	-
Ch-Oa-8	-	+	-	-	+	-
Ch-Oa-9	-	+	-	-	+	-
Ch-Oa-12	-	+	-	-	+	-
Ch-Oa-13	-	+	-	-	+	-
Ch-Oa-19	-	+	-	-	+	-
Ch-Oa-20	-	+	-	-	+	-
Ch-Oa-21	-	+	-	-	+	-
Ch-Oa-22	-	+	-	-	+	-
Ch-Oa-24	-	+	-	-	+	-
Ch-Oa-28	-	+	-	-	+	-
Ch-Oa-29	-	+	-	-	+	-
Subtotal:	0	21	0	0	21	0
Total:	5	21	0	5	21	0

Sites with potential cultural significance (Category C, Table 2) are evaluated under guidelines prepared by the Advisory Council on Historic Preservation (ACHP) entitled "Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review" (ACHP 1985). The guidelines define cultural value as "...the contribution made by an historic property to an ongoing society or cultural system. A traditional cultural value is a cultural value that has historical depth" (1985:1). The guidelines further specify that "[a] property need not have been in consistent use since antiquity by a cultural system in order to have traditional cultural value" (1985:7).

Based on the findings of the reconnaissance survey field work, the cultural remains identified within the Maili Kai Property project area appear to be, for the most part, of minimal significance in terms of potential information content. None of the sites appear to be significant in terms of potential interpretation or cultural values. As discussed with Dr. Ross Cordy of DLR-MSS, most of the 26 sites recorded during the reconnaissance survey represent repetitive data sets. In addition to their disturbed condition and marginal significance, the repetitive nature of the resources embodied in the Maili Kai Property sites suggests that (a) further data collection from only one or two sites in each of the following groups would constitute sufficient mitigation, (b) no further archaeological work would be necessary for most of the sites, and (c) none of the sites need to be preserved.

Group I Sites (no further work necessary)

Group II Sites (limited subsurface testing): T-21, Ch-Oa-16 and -23

Group III Sites (limited subsurface testing): T-5

Group IV Sites (limited subsurface testing): T-9

Testing at Sites T-5, T-9, and Ch-Oa-16 will investigate the possibility that older, pre-20th century components are present at the sites, either as subsurface deposits (T-9), architectural remains (T-5) or both (Ch-Oa-16). Testing at Sites T-21 and Ch-Oa-23, while pursuing goals similar to the above, will necessitate removal of rocks in "trenches" through the mound/platforms prior to subsurface testing. If, in the course of further testing, data collected contradicts the current interpretations of their age and function (i.e., yields evidence of pre-20th century cultural resources), then testing of one or more sites from each group may be in order.

Finally, it is recommended that a qualified archaeologist selectively monitor initial grubbing activity and/or vegetation clearing within the project area. The general significance evaluations and recommended general treatments presented in this report are based on the findings of the surface reconnaissance survey field work only, which involved no subsurface testing. Therefore, these evaluations and recommendations are given with the general qualification that during any development activity involving the extensive modification of the land surface, there is always the possibility—however remote—that previously unknown or unexpected subsurface cultural features, deposits, or burials might be encountered. In such a situation, immediate archaeological consultation should be sought.

## REFERENCES CITED

## AHP (Advisory Council on Historic Preservation)

1985 Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review. Washington, D.C.: Advisory Council on Historic Preservation. (Draft report) (August)

Barrere, William Jr.

1975 Archaeological Site Survey at Ma'ili, Oahu. Manuscript on file: Department of Land and Natural Resources-Historic Sites Section.

## CFR (Code of Federal Regulations)

36 CFR Part 60 National Register of Historic Places. Washington, D.C.: Dept. Interior, National Park Service.

Cordy, Ross

1975 Archaeological Excavation of Ch-Os-1 (Ma'ili, Oahu). Manuscript on file: Department of Land and Natural Resources-Historic Sites Section.

1976 An Archaeological Survey of Kaiser Pacific Properties Land, Ma'ili Kai, Oahu. Manuscript on file; Department of Land and Natural Resources-Historic Sites Section.

Green, Roger C.

1980 Makaha Before 1880 AD: Makaha Valley Historical Project Summary Report No. 5, Pacific Anthropological Records No. 31. Dept. Anthropology, Bernice P. Bishop Museum, Honolulu, Hawaii.

Kelly, Marion

n.d. Notes on the History of Lualualei. Manuscript report prepared for U.S. Navy, Bernice P. Bishop Museum.

Table 1.

## SUMMARY OF IDENTIFIED SITES - MAILI KAI PROPERTY PROJECT AREA

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	Significance Evaluation			Comments
			R	I	C	
T-2	Complex (5) <sup>#</sup>	Agricultural	L	L	L	Modern structures; 1950s agricultural area (two sheds, corral, two trash piles)
T-4	Complex (3)	Industrial (charcoal kiln)	L	L	L	Approx. 1930-60s charcoal kiln; two associated sheds
T-5	Sinkwell with Wall	Well	L	L	L	May have 20th century and pre-20th century components
T-6	Complex (5)	Water Storage	L	L	L	May date to c. WWII or earlier; two reservoirs, two foundation slabs (pumphouse(?), wall
T-7	Wall	Boundary	L	L	L	Shown on 1928 USCS quad map
T-8	Rock Mounds (2)	Unknown	L	L	L	Poss. aboriginal
T-9	Enclosure and Wall	Unknown	L	L	L	Poss. aboriginal
T-12	C-shape Enclosure	Unknown	L	L	L	Poss. military (date to WWII)
T-17	Wall	Boundary	L	L	L	On 1928 USCS quad map
T-18	Wall	Boundary	L	L	L	On 1928 USCS quad map
T-20	C-shape and Enclosure	Habitat(?) (temporary)	L	L	L	Probably related to rock-gathering operation; c. WWII

\*Significance Evaluation--Nature: R = scientific research, I = interpretive, C = cultural;

(PHRI Value Modes)

Degree: H = high, M = moderate, L = low.

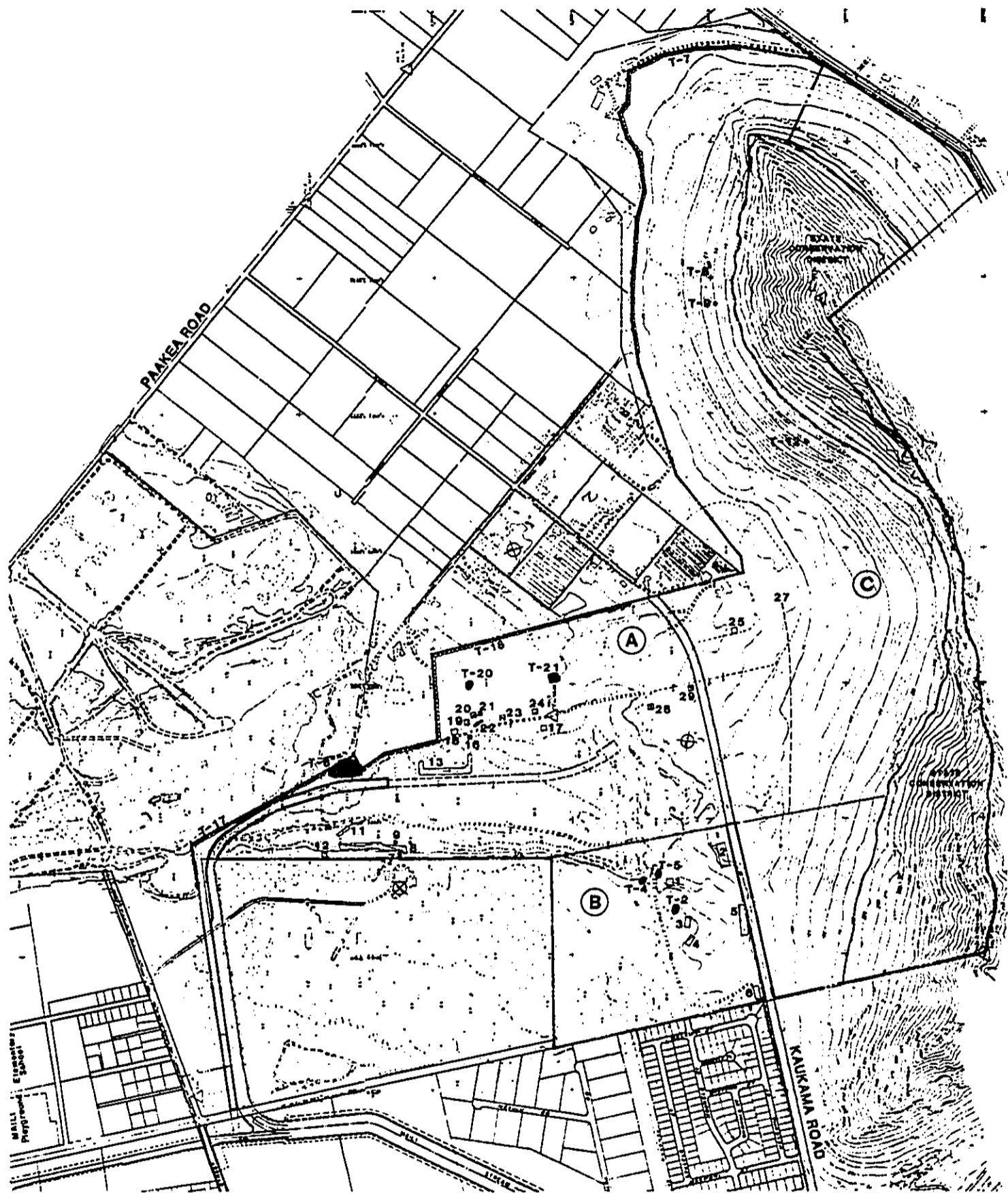
<sup>#</sup>Number of component features within complex.

Table 1. (Cont.)

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	Significance Evaluation			Comments
			R	I	C	
I-21	Rock Mound Platform	Unknown	L	L	L	May be related to rock-gathering or land clearing operation; c. WWII
Ch-0a-7	Rock Mound and Wall	Boundary	L	L	L	Predates 1910(?) (Cordy 1976)
Ch-0a-8	Wall	Boundary	L	L	L	Predates 1910(?) (Cordy 1976)
Ch-0a-9	Wall	Unknown	L	L	L	1890-1970(?) (Cordy 1976)
Ch-0a-12	Mounds (2)	Boundary(?)	L	L	L	1890-1970(?) (Cordy 1976); poss. boundary markers or land-clearing piles
Ch-0a-13	Enclosure (with internal walls)	Ranching(?)	L	L	L	1890-1970(?) (Cordy 1976); poss. corral
Ch-0a-16	C-shape Enclosure	Unknown	L	L	L	1890-1970(?) (Cordy 1976)
Ch-0a-19	Rock Mound	Unknown	L	L	L	1890-1970(?) (Cordy 1976); poss. land-clearing pile
Ch-0a-20	Rock Mounds (2)	Unknown	L	L	L	1890-1970(?) (Cordy 1976); poss. land-clearing pile
Ch-0a-21	Rock Mound/Platform	Unknown	L	L	L	1890-1970(?) (Cordy 1976); poss. land-clearing pile; center of mound may have been scavenged for rocks

Table 1. (Cont.)

Site Number	Formal Site/Feature Type	Tentative Functional Interpretation	Significance Evaluation			Comments
			R	I	C	
Ch-0a-22	Bridge and Trench	Bridge	L	L	L	1890-1970(?) (Cordy 1976); bridge destroyed; trench mostly filled-in
Ch-0a-23	Rock Mound/Platform	Unknown	L	L	L	1890-1970(?) (Cordy 1976); poss. land-clearing pile
Ch-0a-24	Rock Mound/Platform	Unknown	L	L	L	1890-1970(?) (Cordy 1976); poss. land-clearing pile
Ch-0a-28	Rock Platform	Unknown	L	L	L	1890-1970(?) (Cordy 1976); poss. land-clearing pile
Ch-0a-29	Rock Mound/Platform	Unknown	L	L	L	1890-1970(?) (Cordy 1976); poss. land-clearing pile



December 1987

**LEGEND:**

- PDR Temporary Site Numbers (T-)
- PDR Previously Recorded - Relocated (Ch-Oa-)
- PDR Previously Recorded - Not Relocated (Ch-Oa-)
- Survey Area

**FIGURE 2.**  
**SITE LOCATION MAP**  
**MAILI KAI PROPERTY**

NORTH      LINEAL SCALE (FEET)      MAILI, OAHU

2000 1000 0 2000



APPENDIX F  
FAMILY ASSESSMENT

PROJECT NO. JCO  
 DATE: 12/21/87  
 DRAWN BY: [illegible]

**TRAFFIC ASSESSMENT**

MAILI KAI  
 December 21, 1987

Kaiser Cement Corporation proposes to construct approximately 1450 dwelling units in Mailli. This study assesses the traffic impacts of the proposed project at the intersection of Farrington Highway and Kauhama Road, the primary access for the development.

Kauhama Road meets Farrington Highway in an unsignalized T-intersection. The right-of-way on Kauhama Road is 60 feet, the width of the existing pavement is approximately 44 feet. In the vicinity of Kauhama Road, Farrington Highway has a right-of-way of 90 feet, which allows two travel lanes in each direction. A separate eastbound left turn lane and short, channelized westbound right turn lane are provided at Kauhama Road.

Existing conditions on Farrington Highway near Kauhama Road are based on 1985 traffic data from the State Department of Transportation. The completion of the project is expected in year 1995. Traffic volumes are expected to increase, as shown in Table 1. The increase includes traffic generated by the Eva Town Center and the expansion of the Sheraton Makaha facilities.

The project traffic is based on trip rates compiled by the Institute of Transportation Engineers in the informational report, Trip Generation, Third Edition. Table 2 presents these rates, while Table 3 shows the number of vehicles expected to be generated by the proposed 546 single-family units, including duplexes, and 904 multi-family apartment units.

Table 2  
 TRIP RATES

	Single-Family	Multi-Family
Daily (Enter & Exit)	10.0	6.1
AM Peak Hour		
Enter	0.21	0.1
Exit	0.55	0.4
PM Peak Hour		
Enter	0.63	0.47
Exit	0.37	0.23

Table 3  
 PROJECT TRIP GENERATION

	Single-Family	Multi-Family	Total
Daily (Enter & Exit)	5,460	5,514	10,974 vpd
AM Peak Hour			
Enter	115	90	205 vph
Exit	300	362	662 vph
PM Peak Hour			
Enter	344	425	769 vph
Exit	202	208	410 vph

Abbreviations: vpd - vehicles per day, vph - vehicles per hour

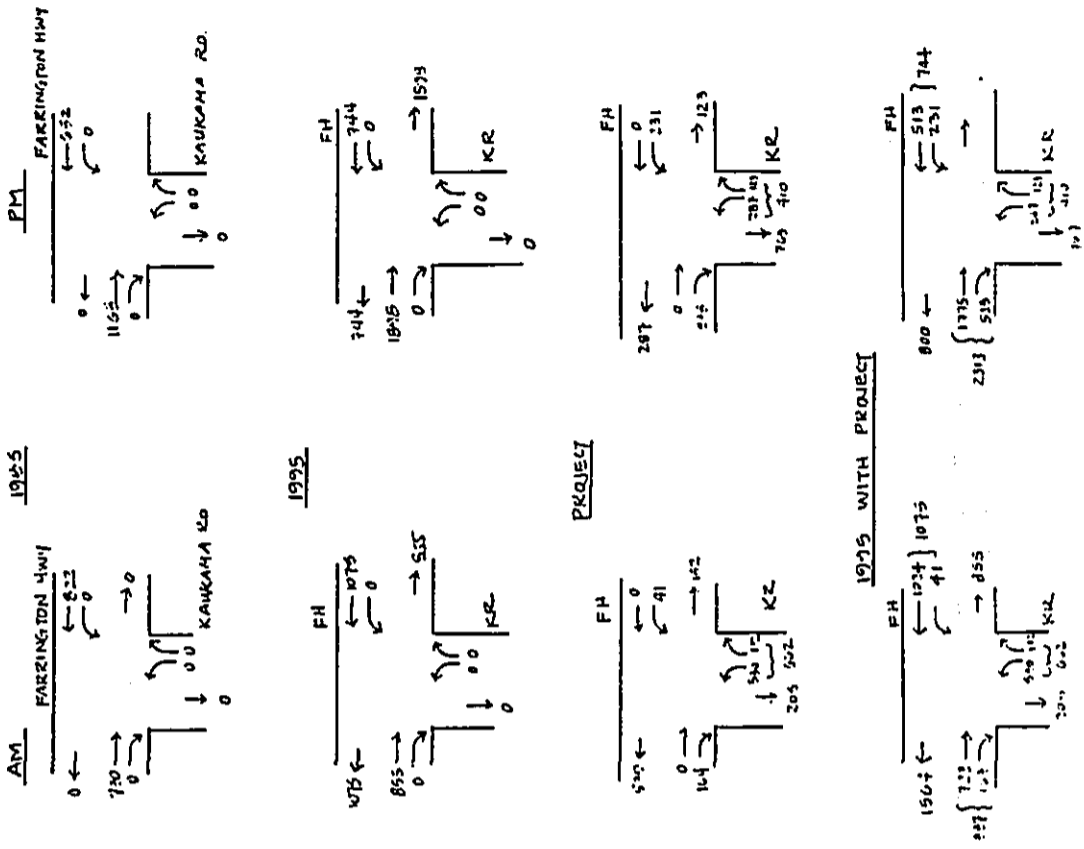
Table 1  
 FARRINGTON HIGHWAY TRAFFIC VOLUMES  
 (Vehicles per Hour)

	Eastbound	Westbound
1985		
AM Peak Hour	820	730
PM Peak Hour	650	1,170
1995		
AM Peak Hour	1,080	860
PM Peak Hour	740	1,900

**Parsons Brinckerhoff** Computation Sheet

Page \_\_\_\_\_ of \_\_\_\_\_  
 Made by SMA  
 Date 12/15/87  
 Checked by \_\_\_\_\_  
 Date \_\_\_\_\_

Subject MAIL KAI IS  
TRAFIC ASSIGNMENT



The study estimated that 80 percent of the AM peak hour project traffic would arrive or travel towards the east, while the other 20 percent would be headed in the west direction. For the PM peak hour, 70 percent would arrive from the east and the remaining 30 percent would travel towards the west.

The Farrington Highway and Kaukama Road intersection was analyzed by methodology described in the 1985 Highway Capacity Manual. With the project, the intersection of Farrington Highway and Kaukama Road would require signalization. Kaukama Road would need to be striped for four lanes, two in each direction. Moreover, the Kaukama Road approach should be striped to provide a left turn lane and an optional lane for left and right turn movements. The right turn lane on the Farrington Highway westbound approach should be lengthened.

When approximately 15 percent of the dwelling units are completed, traffic signals at the Farrington Highway/Kaukama Road intersection would be warranted by the peak hour criteria in the U.S. Department of Transportation, Federal Highway Administration, Manual on Uniform Traffic Control Devices for Streets and Highways, 1978 as amended. However, because a mountain ridge creates a sight distance problem in the westbound direction, earlier installation of the signals are recommended. In addition, advance warning signs for westbound traffic, including flashing lights when this approach has the red phase, may be needed when the Farrington Highway/Kaukama Road signals are installed.

APPENDIX C  
ENGINEERING RECORD

January 15, 1988

**MAILI KAI DEVELOPMENT  
PRELIMINARY ENGINEERING REPORT**

PRELIMINARY ENGINEERING REPORT

FOR

MAILI KAI DEVELOPMENT  
MAILI, OAHU, HAWAII

TAX MAP KEY: 8-7-10: 02 AND 04

JANUARY, 1988

**A. PROJECT GRADING**

**1. Existing Conditions**

The 415-acre project site presently is undeveloped except for the extensions of Kaukama Road, Maili Stream Channel, and a 12-inch water main as shown on EXHIBIT B, Existing Infrastructure Plan. The existing slopes and contours are shown on EXHIBIT A, Slopes/Surface Drainage Plan.

**2. Proposed Improvements**

All proposed site grading will maintain the present storm drainage pattern. Single-family lots will generally be graded to provide reasonably level pads for construction of homes. Single-family lots along the lower slopes of Puu O Hulu Ridge will not, generally, be graded as flat pads but planned for housing to fit the terrain.

Grading on multi-family and apartment parcels will be minimized to provide adequate area for buildings, parking and landscaping. Grading for the golf course and park will also be minimized as much as possible without restricting the appropriate function for the area. No grading work is anticipated in the Conservation area along the Puu O Hulu Ridge.

Grading will be done in accordance with the City's Grading Ordinance and recommendations of a soils engineer.

Erosion control measures including temporary desilting basins, berms, swales, grassing and watering will be employed during grading operations. These measures will be included in preparation of an erosion control plan which will be submitted for City review and approval.

Appropriate grading permits will be secured from the City prior to commencement of the grading operations.

PREPARED BY:

COMMUNITY PLANNING, INC.  
700 BISHOP STREET, SUITE 608  
HONOLULU, HAWAII 96813

**B. STORM DRAINAGE SYSTEM**

**1. Existing Conditions**

With the exception of about 25 acres, the project site presently drains to the Maili Stream Channel by way of an existing channel extension and a 6'x4' box drain as shown on EXHIBIT B, Existing Infrastructure Plan. The Maili Stream Channel is an existing concrete rectangular channel which crosses Farrington Highway and discharges storm runoff into the Pacific Ocean.

About 25 acres along the southeast corner of the project site presently flows to existing Hakimo Road and Ulehawa Stream in the adjoining Lualualei Valley.

Of the remainder 390 acres, about 110 acres of the project site located north and south of existing Kaukama Road drains to the existing 6'x4' box culvert in Malpaloa Road. The existing pipe drainage system in Kaukama Road of 18- to 78-inch diameter is designed for a total runoff of 300 cfs from the slope area on the south side of about 75 acres. This pipe system is presently terminated at an open ditch that directs the flow to the 6'x4' box drain. Based on the City's modified curve on Plate 6 for the Ewa area, the peak discharge from the 110 acres is about 520 cfs.

The storm runoff from the major portion of the site of about 280 acres flows to the existing Maili Channel Extension. Based on the City's modified curve for Plate 6, the peak discharge from this area is about 1,100 cfs.

2. Proposed Improvements

The existing 6'x4' box drain and Maili Stream Channel are adequate to convey storm runoff from the project site to the ocean.

The proposed improvements include construction of street drain systems in accordance with City Standards with discharge to the 6'x4' box drain or the Maili Stream Channel Extension, whichever is appropriate. The Maili Stream Channel will be extended further into the project by an open swale in the planned golf course to the proposed Kaukama Road Extension. Also, ditches will be built along the back boundary of the hillside lots to intercept storm runoff and convey same to the streets' pipe system.

For temporary erosion control, appropriately sized ponding basins will be constructed on-site for desilting storm runoff prior to discharge into the existing 6'x4' box drain and Maili Stream Channel.

A drainage master plan will be prepared and submitted for City concurrence prior to grant of tentative subdivision approval.

C. WASTEWATER SYSTEM

1. Existing Conditions

A 36-inch interceptor sewer line from the Waianae Wastewater Treatment Plant was extended to the Maili Kai property and terminates at the boundary with an 18-inch diameter sewer pipe as shown on the Existing Infrastructure Plan, EXHIBIT B. Once conveyed and processed at the treatment plant, the sewage effluent is discharged by deepwater outfall into the ocean off the Waianae Coast.

2. Proposed Improvements

Proposed on-site collection and conveyance sewer systems will be designed and constructed to City and County Standards.

A wastewater master plan will be prepared and submitted for City concurrence prior to grant of tentative subdivision approval.

The proposed development of 1,435 residential units, 9-hole golf course and 11.5-acre park will generate approximately 400,000 gallons per average day of wastewater based on the following computations:

Single-Family Units -	
531 @ 320 gpd	= 169,920 gpd
Apartment Units -	
904 @ 224 gpd	= 202,496
Park and Golf Clubhouse	= 27,584 gpd
Total Wastewater Generated	= 400,000 gpd

Since the sewer was extended earlier for a former development of about 1,830 units, the existing 36-inch interceptor and 21- and 18-inch sewer main is assumed adequate for transport of the wastewater to the Waianae Treatment Plant. Upon completion of its present expansion in 1988, the treatment plant will have adequate capacity to handle the entire project's average daily flow of 400,000 gpd.

D. WATER SYSTEM

1. Existing Conditions

A 12-inch water main presently traverses the project site as shown on the Existing Infrastructure Plan, EXHIBIT B. The water main is presently a part of the 350-foot Board of Water Supply's system, whose 1.5 million gallon reservoir is located on the Puu O Huhu Ridge above the project site. Water for the system is presently pumped by the Board of Water Supply from its deepwell facilities in Kunia. Recently, however, the Board of Water Supply is proposing to develop wells in Makaha to provide water for the Waianae Coast.

Based on an earlier groundwater development study by John F. Mink, it was concluded that local water resource exists in the property as groundwater in a limestone aquifer at shallow depth. However, this water is too brackish for domestic and ordinary farm uses but may be acceptable for salt-tolerant plants. Tests at the time of the study in 1984, revealed that salinity of the groundwater was about 1,000 to 2,000 mg/l.

2. Proposed Improvements

The present Board of Water source and storage facilities are inadequate to serve the project's estimated potable average water demand of 700,000 gallons per day (gpd). That demand is based on the following computations:

Single-Family Residential Units -	
531 @ 500 gpd	= 265,600 gpd
Apartment Units -	
900 @ 400 gpd	= 361,600 gpd
Park -	
71.5 Acres @ 4000 gpd	= 46,000 gpd
Golf Clubhouse	= 26,900 gpd
Total Water Demand	= 700,000 gpd

For potable water, the Developer proposes to jointly develop source facilities with the Board of Water Supply by participation in funding of construction of new deepwells and transmission mains in the Makaha/Waianae area. These facilities should be completed by 1990 or prior to occupancy of the project units.

For storage, the Developer proposes to construct a 1.0 million gallon reservoir to meet the project's potable water requirements. Adjoining land at the present BWS Puu O Hulu Reservoir is anticipated as the probable site for the additional 1.0 MG reservoir.

Existing water mains, on the other hand, appear to be adequate to convey water to the project site. If determined later to be inadequate by BWS, the Developer will construct relief water mains as required to service the project development.

Construction of on-site potable water distribution and fire fighting facilities will be in accordance with the Honolulu Board of Water Supply and Fire Department Standards.

A potable water master plan will be prepared and submitted for Board of Water Supply concurrence prior to grant of tentative subdivision approval.

For irrigation of the golf course, the Developer proposes to develop private on-site wells. The brackish water would be stored and pumped into the irrigation pipe system from lined ponds located in the golf course. If salinity is too high

for proposed grass and landscaping requirements, the brackish water may be treated to provide better quality irrigation water. Based on 4,000 gallons per acre, the estimated average irrigation water demand is 404,000 gallons per day for the 101 acres. Although the brackish water system will remain private, appropriate permits will be secured from the Board of Water Supply for construction and use of the wells.

**EXHIBIT A**  
**MAILI KAI PROPERTY**  
 MAILI, OAHU

**SLOPES/SURFACE DRAINAGE**

- LEGEND**
- SLOPES**
- 1 SLOPES LESS THAN 5%
  - 2 6-10%
  - 3 11-15%
  - 4 16-20%
  - 5 20% AND GREATER
- DRAINAGE**
- 1 SURFACE DRAINAGE





G-4

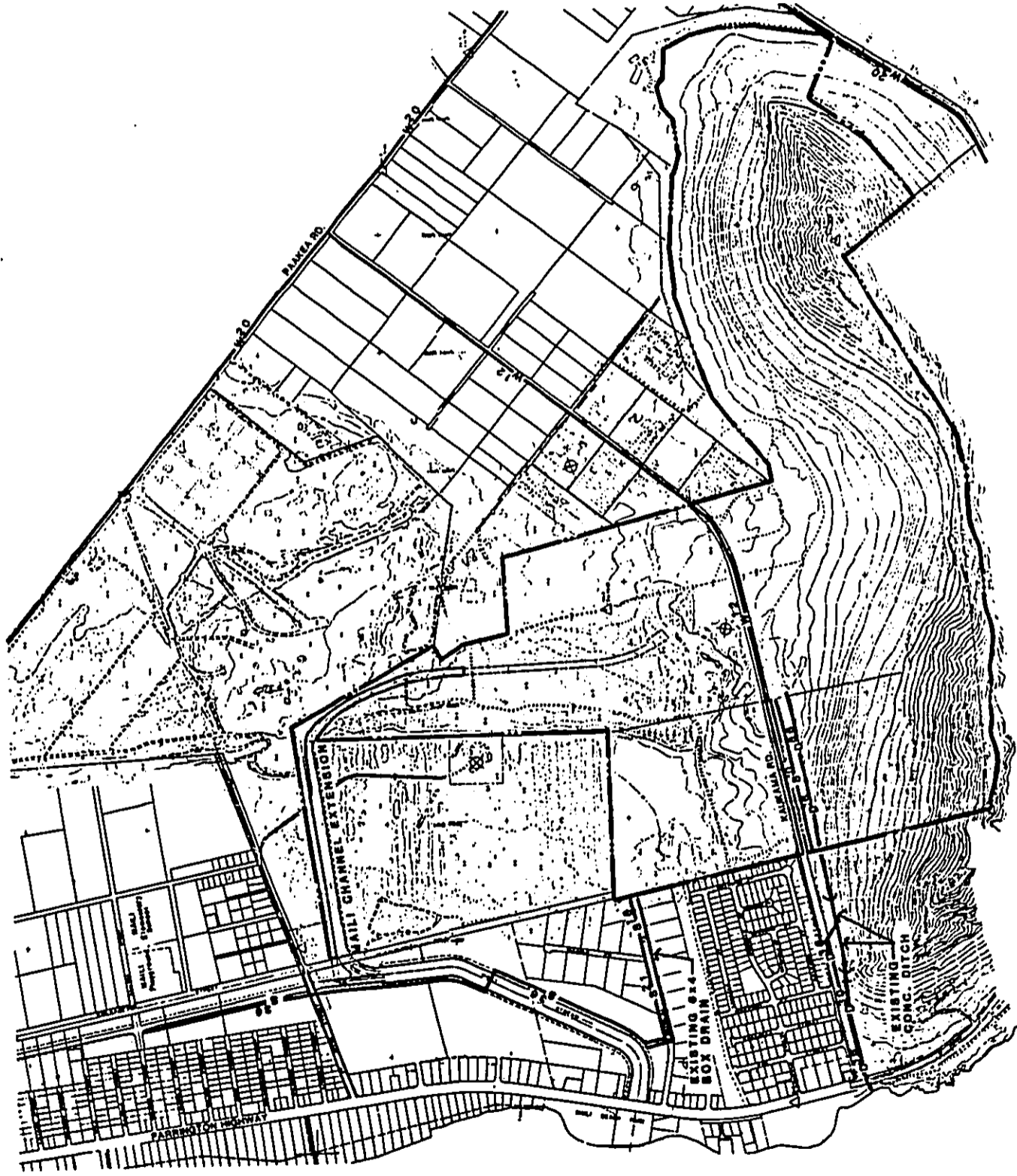


**EXHIBIT B**  
**MAILI KAI PROPERTY**  
MAILI, OAHU

**EXISTING INFRASTRUCTURE**

**LEGEND**

	DRAIN LINE
	SEWER LINE
	WATER LINE



APPENDIX H

AGRICULTURAL SIGNIFICANCE OF THE LANDS  
ON THE WALTER PROPERTY

GORDON A. CHAPMAN  
CONSULTING SERVICES

**TABLE OF CONTENTS**

Section	Page No.
I. INTRODUCTION . . . . .	1
A. Purpose of Report . . . . .	1
B. Description of Proposed Project and Project Location . . . . .	1
II. ENVIRONMENTAL SETTING OF PROJECT SITE . . . . .	3
A. Existing Land Use . . . . .	3
B. Property Topography/Slope Analysis . . . . .	10
C. Project Area Climatological Characteristics . . . . .	12
D. Project Area Water Resources . . . . .	12
E. Project Area Land Costs . . . . .	13
III. AGRICULTURAL SIGNIFICANCE OF PROPERTY . . . . .	14
A. Physical Characteristics . . . . .	14
1. Soils . . . . .	14
2. Agronomic Characteristics . . . . .	19
IV. POTENTIAL AGRICULTURAL USES OF PROPERTY . . . . .	22
A. Possible Crops . . . . .	22
B. Forage Crop Production . . . . .	22
C. Seed Production . . . . .	23
D. Floral and Nursery Products . . . . .	23
E. Livestock . . . . .	24
1. Cattle . . . . .	24
2. Hogs . . . . .	25
3. Poultry . . . . .	25
V. CONCLUSIONS . . . . .	26
REFERENCES . . . . .	28

**AGRICULTURAL SIGNIFICANCE OF THE LANDS**

ON THE

**MAHIA KAI PROPERTY**

Prepared for:  
PBR HAWAII

Prepared by:  
Gordon A. Chapman  
Consulting Services

April 1988

819 16th Avenue, Honolulu, Hawaii 96816 (808) 732-7119

**LIST OF FIGURES**

Figure No.	Description	Page No.
1.	Proposed Master Plan . . . . .	2
2.	Location Map . . . . .	4
3.	State Land Use . . . . .	5
4.	Waianae Development Plan Land Use . . . . .	6
5.	Waianae Development Plan Public Facilities . . . . .	7
6.	County Zoning . . . . .	8
7.	Slopes and Surface Drainage . . . . .	11
8.	Soils Classifications . . . . .	15
9.	Detailed Land Classification . . . . .	17
10.	Agricultural Lands of Importance To the State of Hawaii . . . . .	21

**LIST OF TABLES**

Table No.	Description	Page No.
1.	Existing Land Use Classifications . . . . .	9
2.	Slope Analysis . . . . .	10
3.	Inventory of Agricultural Lands . . . . .	19

AGRICULTURAL SIGNIFICANCE OF THE LANDS ON THE

MAILI KAI PROPERTY

I. INTRODUCTION

A. Purpose of Report

The purpose of this report is to identify and discuss the agricultural significance (potential) of the Maili Kai property, located in Maili, Waianae, Oahu, Hawaii. A complete property description is provided below. The significance of the subject lands as part of the agricultural resources of the State of Hawaii have been evaluated by examining the potential agricultural uses of the land. These uses have been determined by evaluating three sets of factors: (1) the physical, agronomic and environmental characteristics of the land; (2) economic variables such as the existence and locations of markets for goods that can feasibly be produced on the land, the cost of inputs required to produce the goods and the supply of similar products from other sources; and (3) the current and future demand of agricultural producers for land having the same physical, agronomic and environmental characteristics as the subject lands.

B. Description of Proposed Project and Project Location

Kaiser Cement Corporation, an entity of Hanson Trust, fee owner of the subject lands, is proposing to develop detached single family and clustered multifamily housing units on the Maili Kai property, thereby assisting in the provision of affordable housing

in the area. The proposed project also includes a public park and a 9-hole golf course with multiple tees and associated clubhouse (Figure 1). The proposed housing project, which would primarily be directed to the gap group market, would occupy approximately 164 acres of the ± 415 acre site while the golf course would occupy about 101 acres.

Maili Kai is approximately 27 miles from downtown Honolulu. The towns of Nanakuli and Waianae are approximately 3.5 miles southeasterly and northwesterly respectively from the proposed project site (Figure 2). As noted above, the Maili Kai property encompasses about 415 acres and is comprised of two tax map parcels (TMK: 8-7-10:02, 14). To fully identify and discuss the agricultural significance of the proposed project site, the analyses presented below consider the entire ± 415 acre parcel.

II. ENVIRONMENTAL SETTING OF PROJECT SITE

A. Existing Land Use

The Maili Kai property is presently vacant and contains no structures. Abandoned vehicles and miscellaneous debris are scattered throughout the property.

Existing State Land Use, Waianae Development Plan Land Use, Waianae Development Plan Public Facilities and County Zoning classifications are shown on Figures 3, 4, 5 and 6 respectively and are summarized in Table 1.

TABLE 1

Existing Land Use Classifications

<u>State Land Use:</u>	Urban	± 227 Acres
	Agriculture	± 101 Acres
	Conservation	± 87 Acres
		± 415 Acres

Development Plan Designation:

a. Land Use Map:	Residential	± 46 Acres
	Agriculture	± 280 Acres
	Preservation	± 87 Acres
	Public Facility	± 2 Acres
		± 415 Acres

b. Public Facilities Map: No Designation

County Zoning:

Residential (R-5)	± 34 Acres
Agriculture (Ag-2)	± 294 Acres
Preservation (P-1)	± 87 Acres
	± 415 Acres

Historically, the Waianae area, including Mailli, is generally thought of as "the end of the road." In the mid-nineteenth century a few cattle ranches operated in the area and later, sugar was introduced into the area, making it the second largest settlement outside of Honolulu. Sugar dominated the social and economic life of the Waianae prospered because of sugar and cattle ranching, Mailli because of the lack of water, did not grow until the early 1900's when cattle ranching did become a factor. In 1912, the U.S. Navy established the Lualualei munitions depot

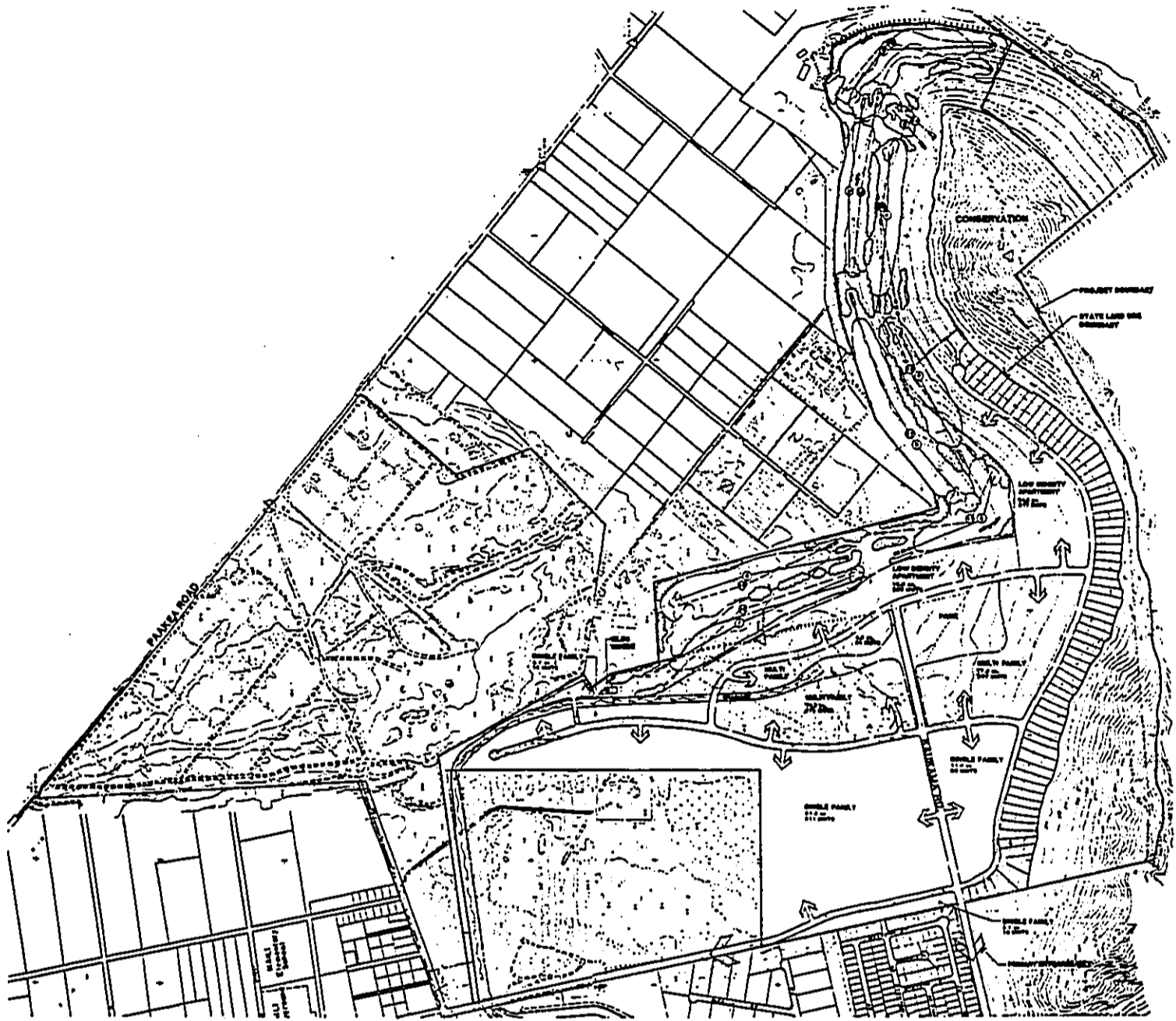
and transmitting station. Rock gathering operations on the site from 1930 to WW II involving massive bulldozing of both the lower and upper slopes have scarred the land permanently. Development of the Mailli area has been slow and generally continues to lag behind that of neighboring towns of Nanakuli and Waianae.

B. Property Topography/Slope Analysis

The proposed project property is irregularly shaped and slopes gently upward from the northern boundary at about 25 feet Mean Sea Level (MSL) to approximately 200 feet MSL and then rises steeply to the top of Puu O Huihu Ridge at a maximum elevation of about 850 feet MSL (Figure 7). General slope analysis of the site (Table 2) indicates that approximately 288 acres (70 percent of the site) are of slopes less than 20 percent and the remaining 127 acres (30 percent of the site) are of slopes greater than 20 percent.

TABLE 2

Slope Analysis		
CATEGORY	ACRES	PERCENT OF SITE
Less than 5%	± 170	41
6% to 10%	± 48	12
11% to 15%	± 16	1
16% to 20%	± 54	13
Greater than 20%	± 127	30
TOTALS	± 415	100



**LAND USE**

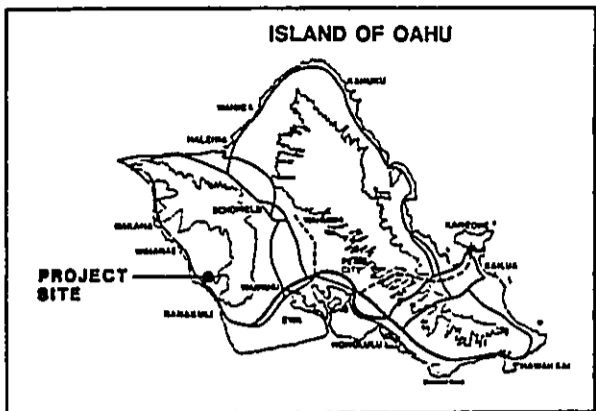
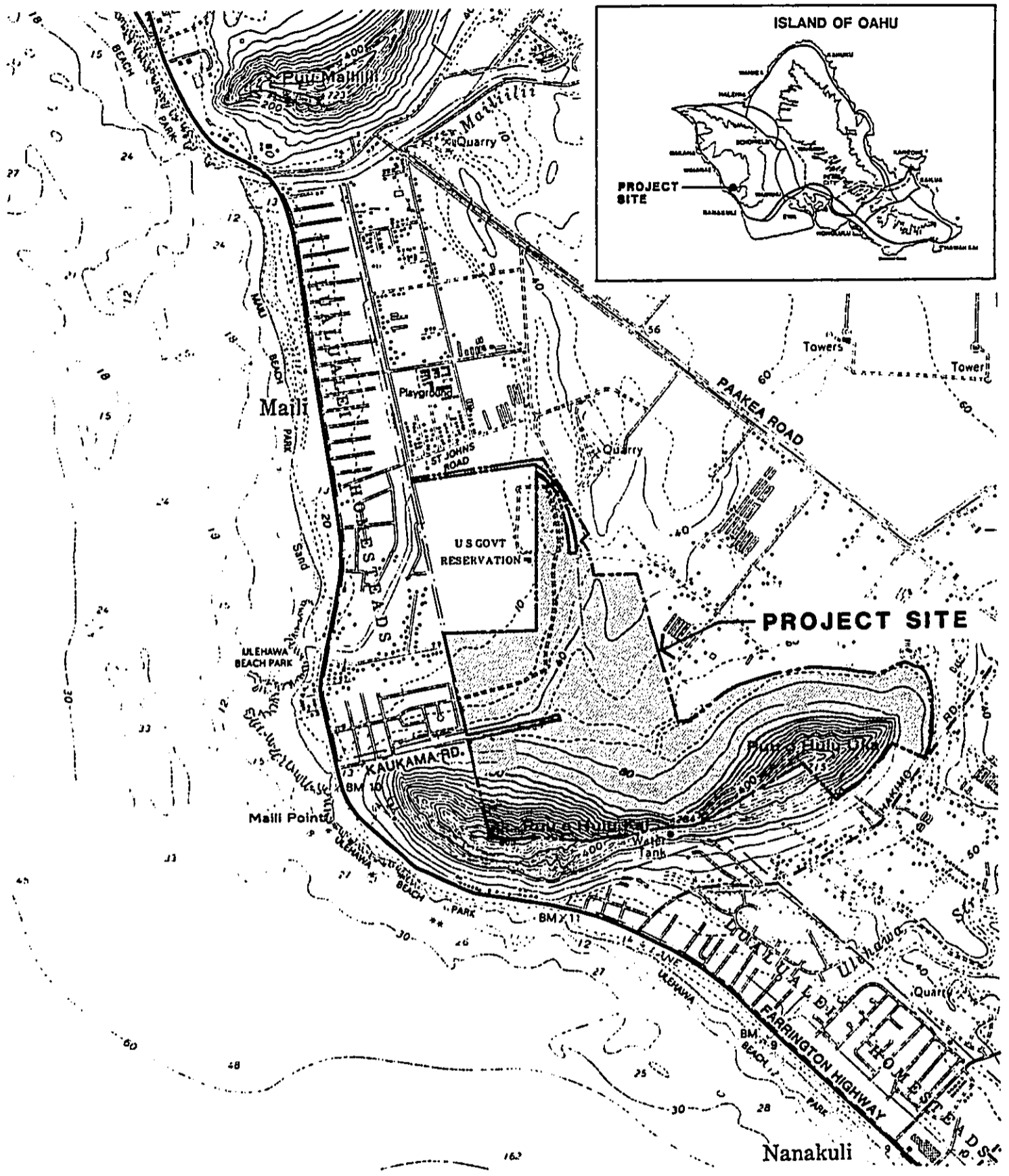
CONSERVATION	187.0 ac.
AGRICULTURE (GOLF COURSE)	101.0 ac.
URBAN	
OPEN SPACE (GOLF COURSE)	227.0 ac.
<b>TOTAL:</b>	<b>515.0 ac.</b>

**PROPOSED MASTER PLAN**

**FIGURE 1  
MAILI KAI PROPERTY**

MAILI, OAHU

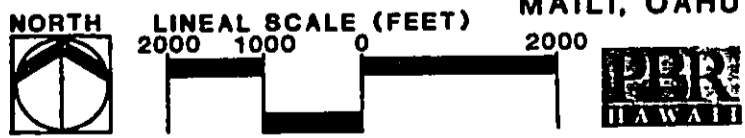
DATE SUBMITTED: 10/15/88  
 PROJECT: MAILI KAI PROPERTY  
 PREPARED BY: PBR



**LOCATION MAP**

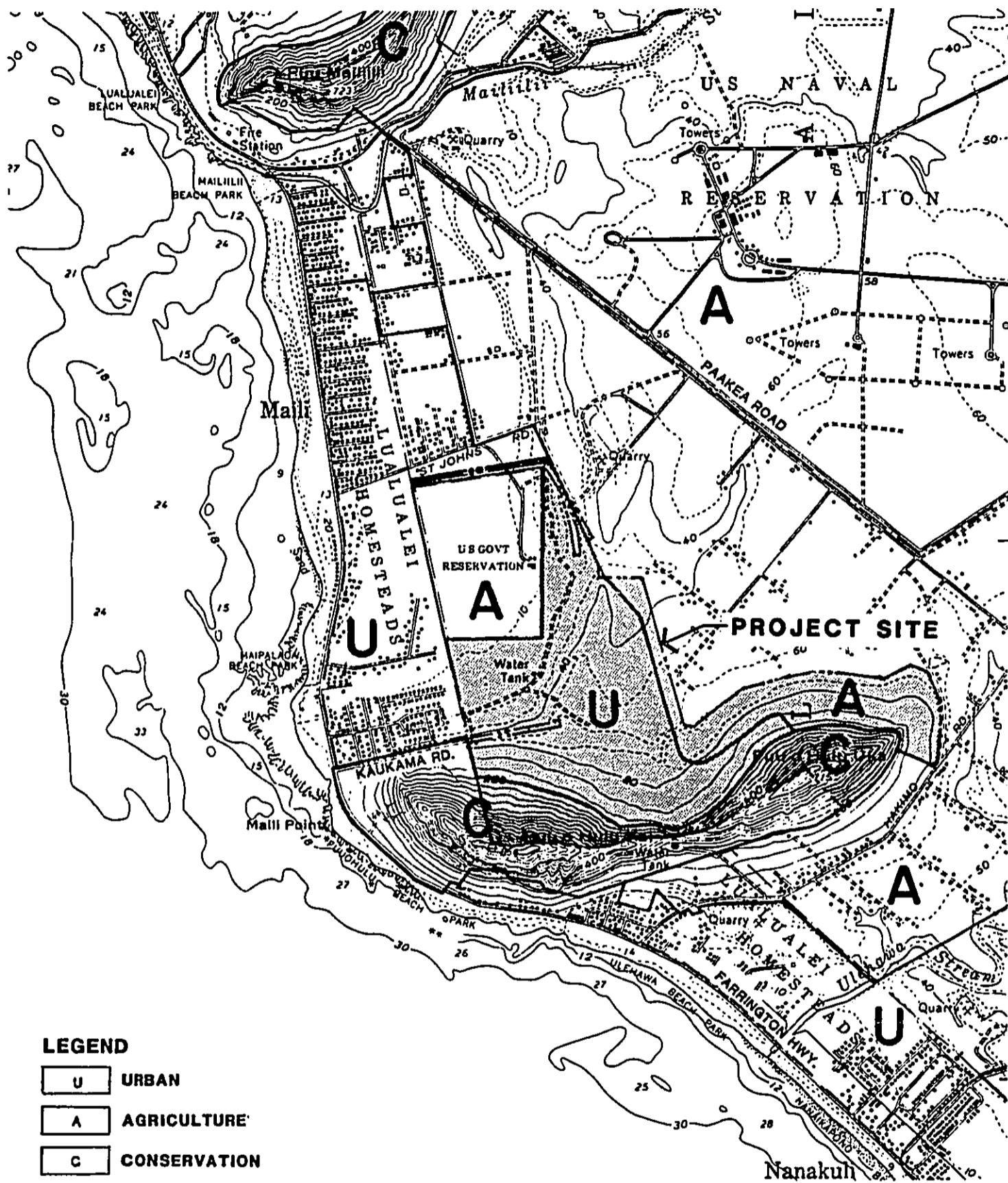
SOURCE: U.S.G.S. QUAD, 1983

**FIGURE 2  
MAILI KAI PROPERTY**



H-6





**LEGEND**

- U URBAN
- A AGRICULTURE
- C CONSERVATION

**STATE LAND USE CLASSIFICATION**

SOURCE: STATE LAND USE COMMISSION  
DEPARTMENT OF PLANNING & ECONOMIC DEVELOPMENT

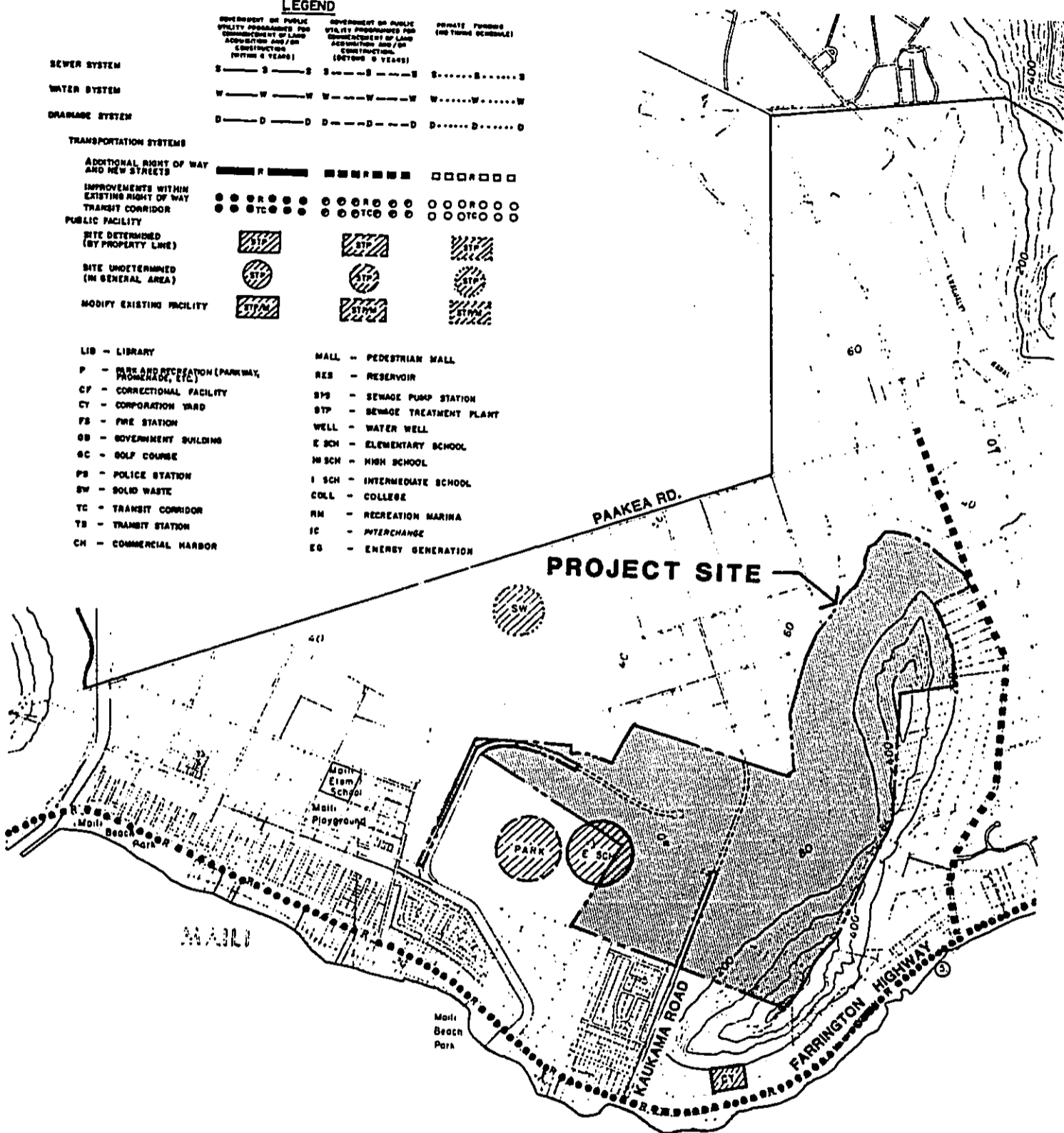
**FIGURE 3  
MAILI KAI PROPERTY**

NORTH LINEAL SCALE (FEET) MAILI, OAHU

2000 1000 0 2000



- LEGEND**
- |  |   |   |                                  |
|--|---|---|----------------------------------|
| SEWER SYSTEM   | GOVERNMENT OR PUBLIC UTILITY PROGRAMS FOR CONSTRUCTION AND/OR IMPROVEMENTS (WITHIN 5 YEARS) | GOVERNMENT OR PUBLIC UTILITY PROGRAMS FOR CONSTRUCTION AND/OR IMPROVEMENTS (BEYOND 5 YEARS) | PRIVATE FUNDS (NO TIME SCHEDULE) |
| WATER SYSTEM   | S — S — S   | W — W — W   | D — D — D                        |
| DRAINAGE SYSTEM  | W — W — W   | W — W — W   | W — W — W                        |
| TRANSPORTATION SYSTEMS                                       | D — D — D   | D — D — D   | D — D — D                        |
| ADDITIONAL RIGHT OF WAY AND NEW STREETS                      | — R —   | — R —   | — R —                            |
| IMPROVEMENTS WITHIN EXISTING RIGHT OF WAY TRANSPORT CORRIDOR | ● ● ● ● ●   | ○ ○ ○ ○ ○   | ○ ○ ○ ○ ○                        |
| PUBLIC FACILITY  | LIB   | RES   | STP                              |
| SITE DETERMINED (BY PROPERTY LINE)                           | [Hatched Box]   | [Hatched Box]   | [Hatched Box]                    |
| SITE UNDETERMINED (IN GENERAL AREA)                          | [Dotted Circle]   | [Dotted Circle]   | [Dotted Circle]                  |
| MODIFY EXISTING FACILITY                                     | [Hatched Box]   | [Hatched Box]   | [Hatched Box]                    |
- 
- |   |                              |
|---|------------------------------|
| LIB - LIBRARY                                     | MALL - PEDESTRIAN MALL       |
| P - PARK AND RECREATION (PARKWAY, PROMENADE, ETC) | RES - RESERVOIR              |
| CF - CORRECTIONAL FACILITY                        | SPS - SEWAGE PUMP STATION    |
| CY - CORPORATION YARD                             | STP - SEWAGE TREATMENT PLANT |
| FS - FIRE STATION                                 | WELL - WATER WELL            |
| GB - GOVERNMENT BUILDING                          | E SCH - ELEMENTARY SCHOOL    |
| GC - GOLF COURSE                                  | H SCH - HIGH SCHOOL          |
| PS - POLICE STATION                               | I SCH - INTERMEDIATE SCHOOL  |
| SW - SOLID WASTE                                  | COLL - COLLEGE               |
| TC - TRANSIT CORRIDOR                             | RM - RECREATION MARINA       |
| TB - TRANSIT STATION                              | IC - INTERCHANGE             |
| CH - COMMERCIAL HARBOR                            | EG - ENERGY GENERATION       |



**WAIANAE DEVELOPMENT PLAN PUBLIC FACILITIES**

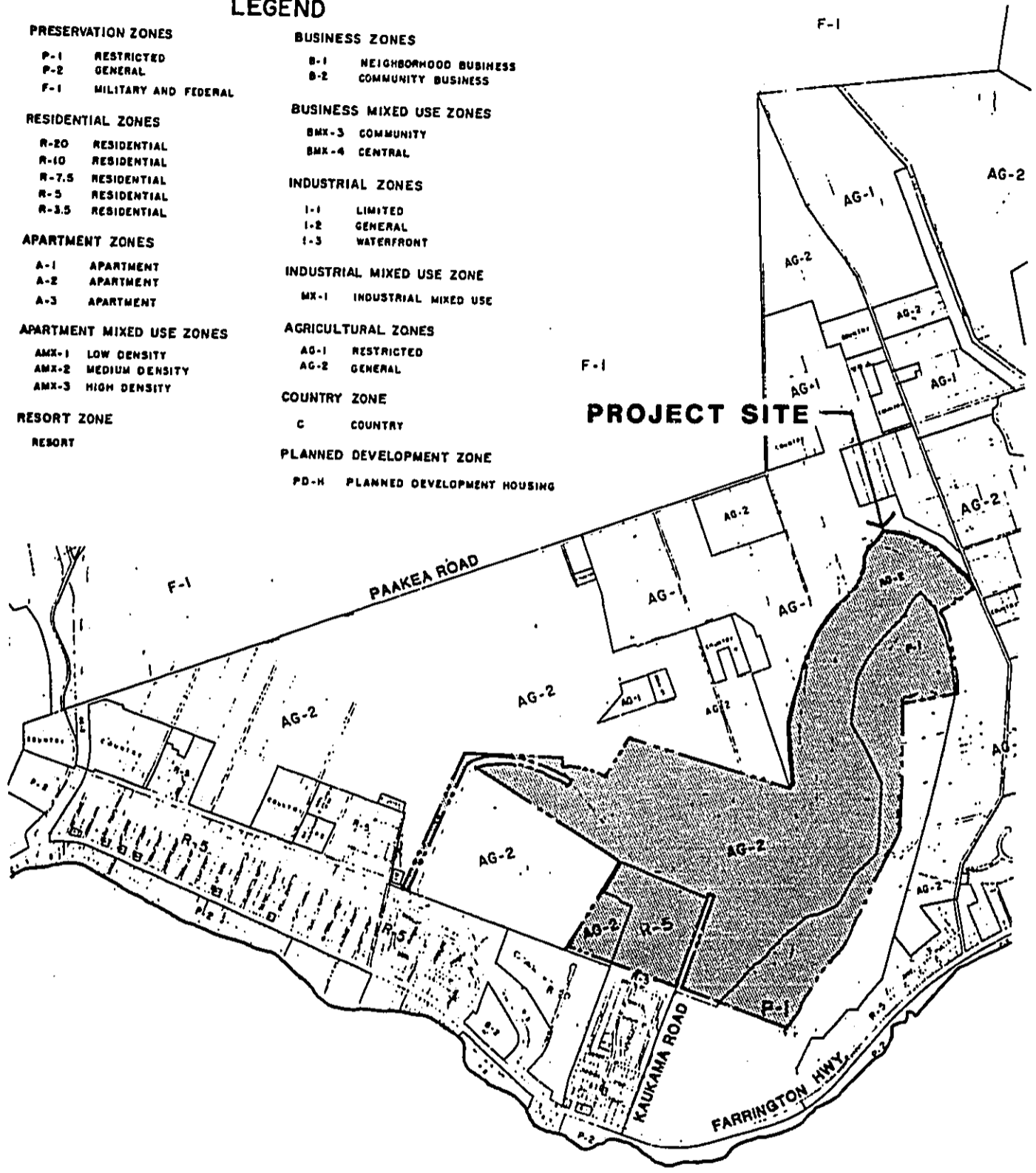
SOURCE: DEPARTMENT OF GENERAL PLANNING CITY & COUNTY OF HONOLULU

**FIGURE 5 MAILI KAI PROPERTY**



**LEGEND**

- |                                  |                                  |
|----------------------------------|----------------------------------|
| <b>PRESERVATION ZONES</b>        | <b>BUSINESS ZONES</b>            |
| P-1 RESTRICTED                   | B-1 NEIGHBORHOOD BUSINESS        |
| P-2 GENERAL                      | B-2 COMMUNITY BUSINESS           |
| F-1 MILITARY AND FEDERAL         |                                  |
| <b>RESIDENTIAL ZONES</b>         | <b>BUSINESS MIXED USE ZONES</b>  |
| R-20 RESIDENTIAL                 | BMX-3 COMMUNITY                  |
| R-10 RESIDENTIAL                 | BMX-4 CENTRAL                    |
| R-7.5 RESIDENTIAL                |                                  |
| R-5 RESIDENTIAL                  | <b>INDUSTRIAL ZONES</b>          |
| R-3.5 RESIDENTIAL                | I-1 LIMITED                      |
|                                  | I-2 GENERAL                      |
|                                  | I-3 WATERFRONT                   |
| <b>APARTMENT ZONES</b>           | <b>INDUSTRIAL MIXED USE ZONE</b> |
| A-1 APARTMENT                    | MX-1 INDUSTRIAL MIXED USE        |
| A-2 APARTMENT                    |                                  |
| A-3 APARTMENT                    |                                  |
| <b>APARTMENT MIXED USE ZONES</b> | <b>AGRICULTURAL ZONES</b>        |
| AMX-1 LOW DENSITY                | AG-1 RESTRICTED                  |
| AMX-2 MEDIUM DENSITY             | AG-2 GENERAL                     |
| AMX-3 HIGH DENSITY               |                                  |
| <b>RESORT ZONE</b>               | <b>COUNTRY ZONE</b>              |
| RESORT                           | C COUNTRY                        |
|                                  | <b>PLANNED DEVELOPMENT ZONE</b>  |
|                                  | PD-H PLANNED DEVELOPMENT HOUSING |



**FIGURE 6  
MAILI KAI PROPERTY**

**COUNTY ZONING**

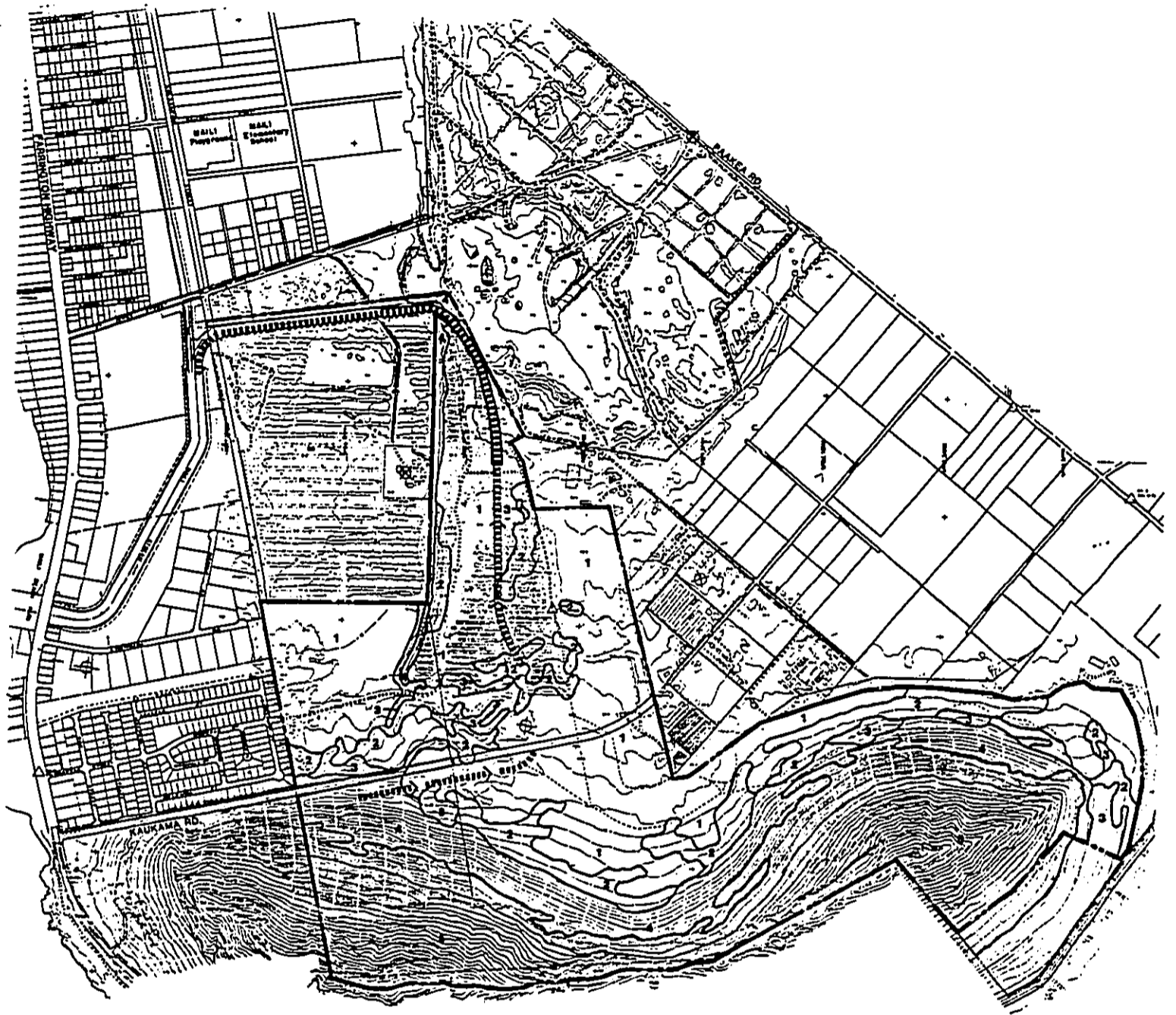
SOURCE: DEPARTMENT OF LAND UTILIZATION  
CITY & COUNTY OF HONOLULU

H-10

**NORTH** **LINEAL SCALE (FEET)** **MAILI, OAHU**

2000 1000 0 2000

The figure includes a north arrow pointing towards the top-left and a lineal scale bar with markings at 0, 1000, and 2000 feet. To the right of the scale is a logo for the State of Hawaii.



- LEGEND**
- SLOPES**
- 1 SLOPES LESS THAN 6%
  - 2 6-10%
  - 3 11-15%
  - 4 16-20%
  - 5 20% AND GREATER
- DRAINAGE**
- 6 SURFACE DRAINAGE

**SLOPES / SURFACE DRAINAGE**

**FIGURE 7**  
**MAILI KAI PROPERTY**  
**MAILI, OAHU**



### C. Project Area Climatological Characteristics

In general, the Waianae District is characterized as semiarid. Mean annual rainfall along the coast averages 20 inches per year, 30 inches per year in the lower valleys and about 80 to 100 inches per year at the higher elevations of the Waianae range. Much of the rainfall occurs during a few severe storms, such as "Kona" storms that approach Oahu from the south or west, usually between the months of December and March.

The only available wind data applicable to the proposed project site is that from Barbers Point NAS, which is located about five miles south of the district boundary and 10 miles from the project site. The wind rose for Barbers Point NAS indicates that northeast trade winds occur 44.2 percent of the time with east-northeast and north-northeast wind occurring 19.1 and 12.2 percent of the time respectively. Winds from other directions occur the remainder of the time. The greatest percentage (approximately 20 percent) of the northeast trade winds average between 8 to 12 knots with wind speeds between 3 to 7 knots and 13 to 20 knots occurring about 10 to 12 percent of the time respectively.

Temperatures in the project area average between 72 and 80 degrees F along the low land areas, decreasing at higher elevations.

### D. Project Area Water Resources

The potable and/or agricultural water resources of the project area are presently minimal. The potable water system serving the proposed project site includes a 12-inch water main that was installed under the Kauhama Road Improvement District. The 12-inch main connects to a 1.5 million gallon reservoir located on the Puu O Hulu Kai ridge. A 20-inch water main in Hakimo Road,

12

south of the property, could be connected to if required to meet fire protection flow requirements.

At present, the Waianae District uses about 10 million gallons of water per day, which is derived from the Pearl Harbor aquifer. The Board of Water Supply (BWS) is presently developing two new water wells each in upper Makaha and Waianae Valleys to provide for the forecast growth of the Waianae area and to reduce dependence on the Pearl Harbor aquifer. It is estimated that the new wells will provide about 4.0 MGD of additional water. Monies for completion of the development of the wells and transmission system have been included in the 1988-1989 City and County Capital Improvement Program Budget and actual construction of these improvements is phased such that four wells are expected to be on-line in 1990 or 1991. Long-range BWS plans also include the development of an additional 2.0 MGD of groundwater resources in Waianae Valley.

Agricultural water rates, as established by the Board of Water Supply, are presently \$1.11 for the first 13,000 or 26,000 gallons used and \$0.75 for over 13,000 or 26,000 gallons. These rates will be in effect until July 1, 1988 at which time they are scheduled to increase to \$1.22 and \$0.88 for the first 13,000 or 26,000 gallons and use over those amounts respectively. Further increases are scheduled for July 1, 1989, 1990 and 1991 with the 1991 rates scheduled to be \$1.38 and \$1.13 for the first 13,000 or 26,000 gallons and over respectively.

### E. Project Area Land Costs

Raw land costs in the project area vary with land use type and present use. New residential use lands average between about \$45,000 to \$150,000 per lot (in 1987 dollars). Note: lot sizes and quality vary resulting in varying square foot or acre costs for land. However, few new residential units have been

13

constructed in the Mailli area in the past few years. Raw land prices are estimated to range between \$50,000 to \$75,000 per acre. The Mailli Kai property is estimated to have a value of between about \$60,000 and \$65,000 per acre.

### III. AGRICULTURAL SIGNIFICANCE OF PROPERTY

As noted previously, the significance of the subject lands as part of the agricultural resources of the State of Hawaii have been evaluated by examining the potential uses of the land. These uses have been determined by evaluating three sets of factors: (1) the physical, agronomic and environmental characteristics of the land; (2) economic variables such as the existence and locations of markets for goods that can feasibly be produced on the land, the cost of inputs required to produce the goods and the supply of similar products from other sources; and (3) the current and future demand of agricultural producers for land having the same physical, agronomic and environmental characteristics as the subject lands.

#### A. Physical Characteristics

##### 1. Soils

The soils of the project site have been examined primarily for their overall agricultural productivity and designated importance to the State of Hawaii. The Detailed Land Classification of Oahu, by the Land Study Bureau, University of Hawaii, 1969, classifies land according to its overall productivity. Lands are rated from A, being the most productive, to E, being the least productive. The project property is classified as being 100 percent E (62, 64, 71, 72, 102, 114 and 115) (Figure 8). The numbers following the letter classification indicate general soil families and soil characteristics. The higher the number, the

greater the constraints are for agricultural suitability. Productivity for the project property soils appears to be limited. The E rated soils are derived from talus and comprise rocky material with little or no soil mantle. E rated soils are considered virtually impossible to work because of excessive rocks and steep slopes.

In addition to the Land Study Bureau soils classification, the soils of the proposed project area have been described as shown on Figure 9 and as follows:

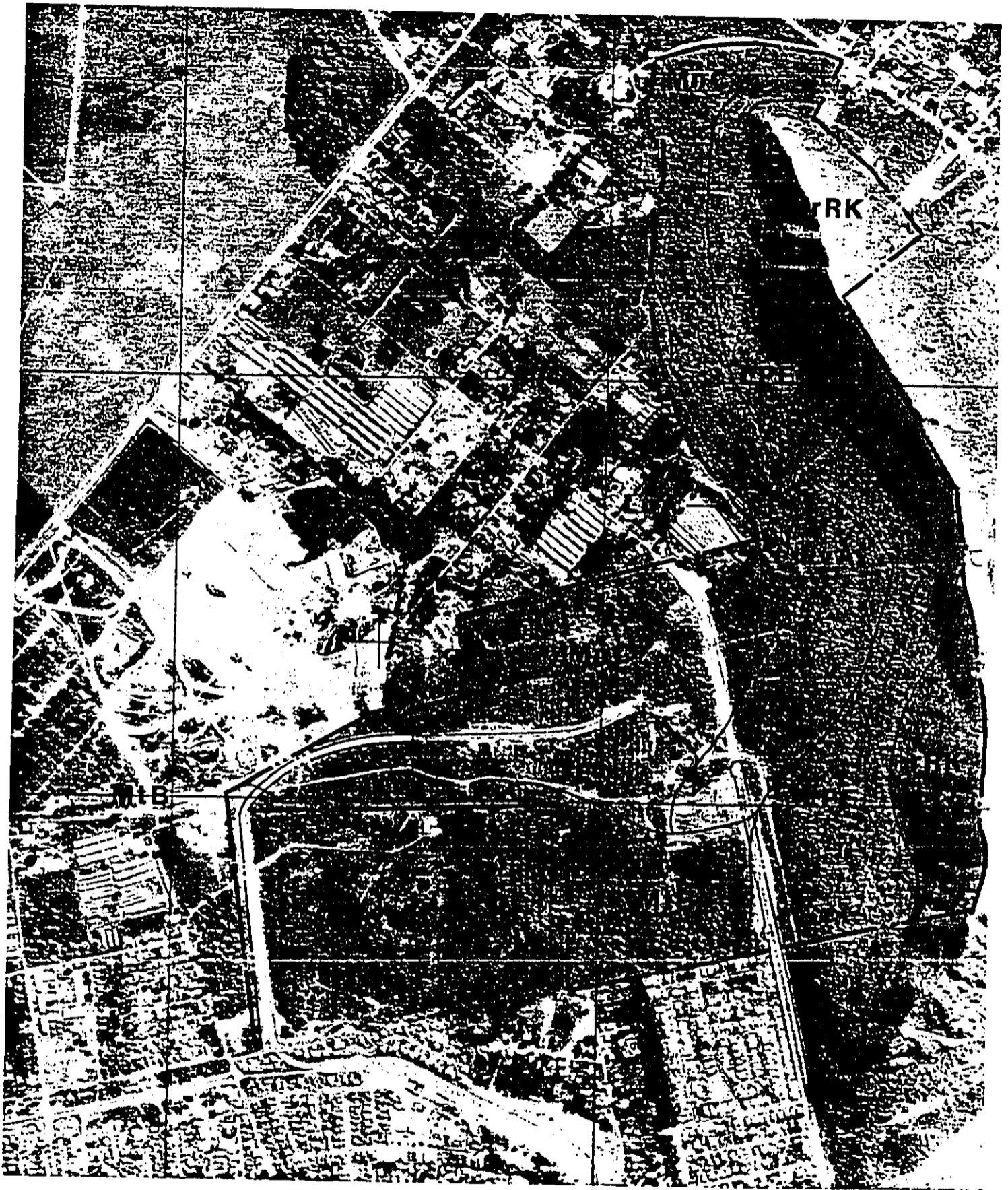
##### Upper Slopes:

RRK - Rock land, 40 to 70 percent slopes, exposed basalt and andesite outcrops extending length of Puu O Huhu Ridge. Rolling stone danger is great. Approximately 15 percent of site classified as rock land. Capability classification VIIe, non-irrigated.

##### Lower Slopes:

LPE - Lualualei extremely stony clay, 3 to 35 percent slopes, Unified Soil Classification - CH. Medium to rapid runoff, moderate to severe erosion hazard. It is impractical to cultivate this soil unless the stones are removed. Capability classification VIIe, non-irrigated.

LMA - Lualualei clay, 0 to 2 percent slopes, Unified Soil Classification - CH. Permeability slow, runoff slow and erosion potential slight. Capability classification IIIe if irrigated, VIe if non-irrigated.



### SOIL CLASSIFICATIONS

SOURCE: U.S.G.S. AERIAL PHOTOGRAPH, 1977.  
 SOIL SURVEY OF ISLANDS OF KAUAI, OAHU, MAUI,  
 MOLOKAI AND LANAI STATE OF HAWAII, 1972.

**FIGURE 8**  
**MAILI KAI PROPERTY**

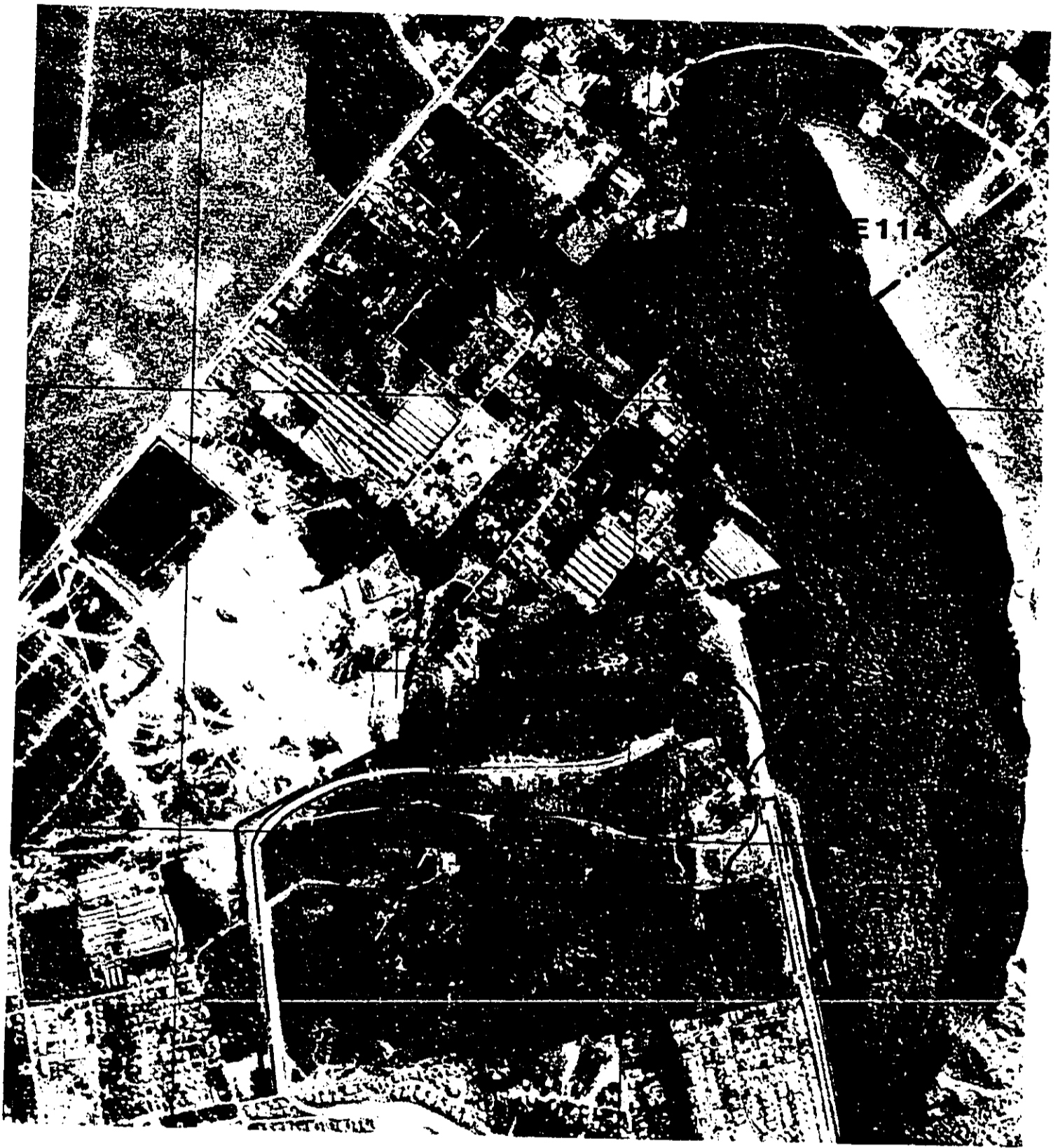
NORTH LINEAL SCALE (FEET) MAILI, OAHU

1000 500 0 1000









**LEGEND**

E	VERY POOR SUITABILITY
---	-----------------------

**DETAILED LAND CLASSIFICATIONS**

SOURCE: DETAILED LAND CLASSIFICATION, 1971-73

**FIGURE 9  
MAILI KAI PROPERTY**



LuB - Lualualei clay, 2 to 6 percent slopes, Unified Soil Classification - CH. Runoff is slow and erosion hazard slight. Capability classification IIIe if irrigated and VIe if non-irrigated.

LvA - Lualualei stony clay, 0 to 2 percent slopes, Unified Soil Classification - CH. Similar to Lualualei clay, 0 to 2 percent slopes, except that there are enough stones to hinder machine cultivation. Capability classification IIIe if irrigated, VIe if non-irrigated.

Note: LPE, LuA, LuB and LvA soils collectively comprise approximately 50 percent of the project site.

MnC - Mamala stony silty clay loam, 0 to 12 percent slopes, Unified Soil Classification - CL-Mu. Very slow to medium runoff, slight to moderate erosion hazard, low shrink-swell potential, coral at depths of less than 20 inches inhibit permeability. Stones hinder but do not prevent cultivation. Capability classification IIIe if irrigated, VIe if non-irrigated. Approximately 30 percent of the site is classified as Mamala stony silty clay loam.

MtB - Mokulele clay, Unified Soil Classification - CL. Nearly level land, very slow runoff, slight erosion hazard, low shrink-swell potential, permeability slow in surface layer, rapid below 20 inches. Workability is difficult because of the sticky, plastic clay. Capability classification IIIe if irrigated, VIe if non-irrigated. Approximately 5 percent of the project site is this soil classification.

## 2. Agronomic Characteristics

Agriculturally, the State Department of Agriculture, in Agricultural Lands of Importance to the State of Hawaii, Waianae Map (1977) (ALISH), designates the property in two categories: (1) Prime Agricultural Land and (2) Other Important Agricultural Land (Figure 10). Prime Agricultural Land, encompassing approximately 10 percent of the site (Table 3), is defined as "Land best suited for the production of food, feed, forage and fiber crops. The land has the soil quality, growing season and moisture supply needed to produce sustained high yields of crops economically when treated and managed, including water management, according to modern farming methods." Other Important Agricultural Land, encompassing about 25 percent of the site, is defined as "Land other than Prime or Unique Agricultural Land that is of state-wide or local importance for the production of food, feed, fiber and forage crops. The lands in this classification are important to agriculture in Hawaii yet they exhibit properties, such as seasonal wetness, erodibility, limited rooting zone, slope, flooding or droughtiness, that exclude them from Prime or Unique Agricultural Land classifications."

TABLE 3  
INVENTORY OF AGRICULTURAL LANDS  
BY ALISH CLASSIFICATION<sup>1</sup>

ALISH Classification	Maui	Kai	Oahu	State
Prime	42		55,500	304,300
Unique	0		9,000	31,300
Other	103		29,000	642,500

1. Based on 1986 data. Acres of some classifications may have changed in recent years.

The subject lands constitute a small percentage of the island-wide (Oahu) inventory of Prime or Other Important Agricultural Land. There are approximately 120,000 acres in total farm acreage on Oahu, of which about 26,000 are in sugar cane and 12,000 in pineapple production. The subject lands with a Prime rating account for approximately 0.07 percent of the island-wide total and those with a rating as Other Important Agricultural Lands represent approximately 0.34 percent of the island-wide total. As implied by these percentages, agricultural lands of similar or better quality are not scarce on the island.

As indicated in the discussion above regarding the soil types, in general most of the project site soils have a capability classification of IIIe, VIe or VIIe. The capability grouping shows, in a general way, the suitability of soils for most kinds of crops. The capability classes are designated by Roman numerals as the broadest classification. The numerals indicate progressively greater limitations and narrower choices for practical use. Class III soils have severe limitations that reduce the choice of plants, require special conservation practices or both. Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland or wildlife habitat. Class VII soils have very severe limitations that make them unsuited for cultivation and that restrict their use to pasture or range, woodland or wildlife habitat. Class VIII soils have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife habitat, water supply or to aesthetic purposes.

In addition to the general capability classification, soil capabilities are further defined by subclasses. Capability subclasses are soil groups within one class. They are designated by adding a small letter (e, w, s, or c) to the class numeral. The letter "e" shows that the main limitation is risk of erosion

unless close-growing plant cover is maintained. The letter "e" shows that the soil is limited mainly because it is shallow, droughty or stony.

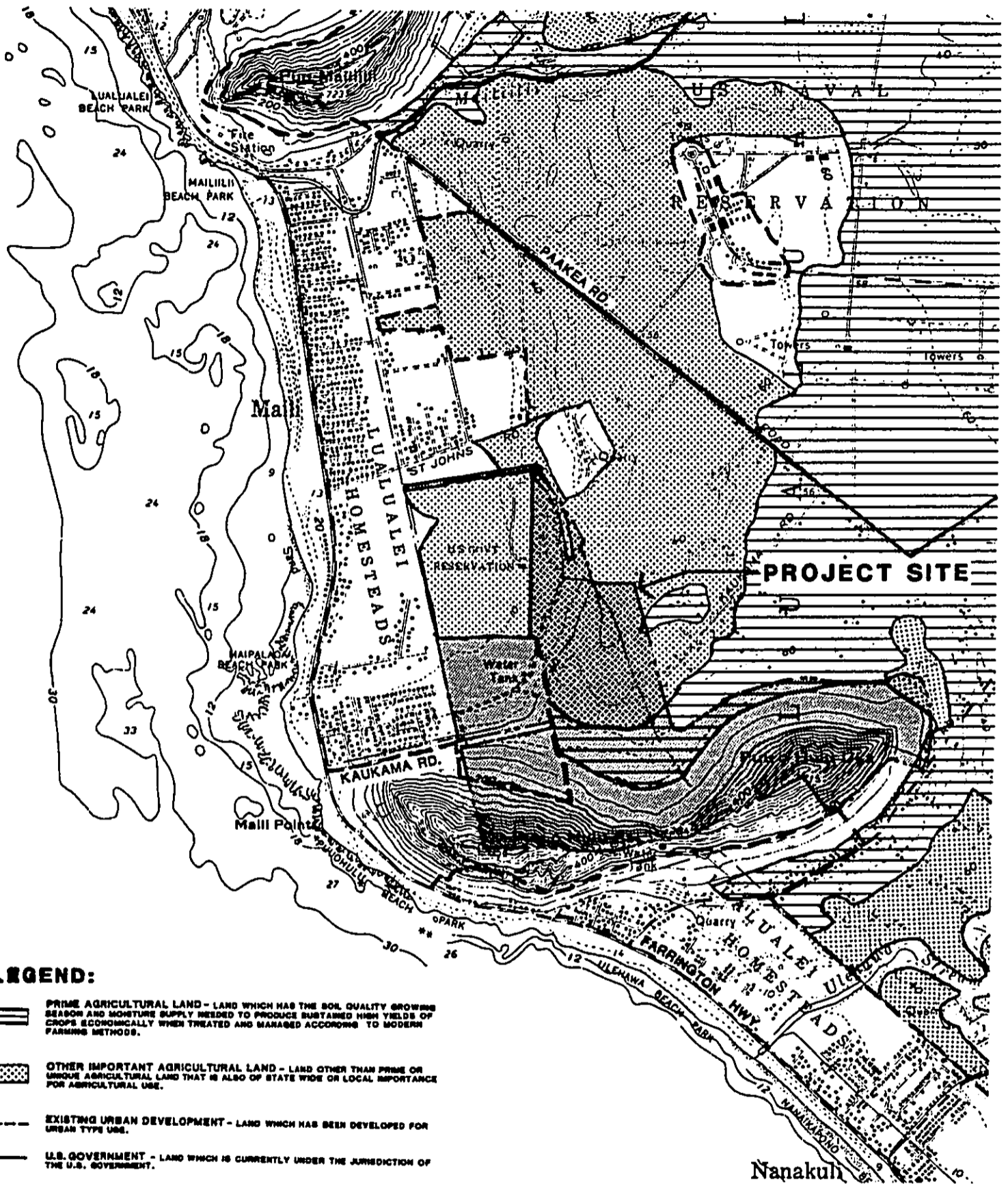
#### IV. POTENTIAL AGRICULTURAL USES OF PROPERTY

##### A. Possible Crops





Given the soils characteristics of the subject lands and the general capability classifications for those soils, the project site is not considered suitable for crop type agricultural activities. The project site could be made suitable for crops such as sugar or truck crops by extending and enlarging the potable water system and the development of an irrigation system for property and the importation of top soils and the removal of stones and rocks that presently hinder machine cultivation. However, the economic feasibility and the time required to implement such actions do not appear to be favorable, given the extent of work that would be required and the costs of that work.

##### B. Forage Crop Production

Large amounts of grains are imported into the state as livestock feeds. The production of feed grains has not proven to be economically viable in Hawaii. However, the production of forage crops for green chop has some potential. For example, corn for green chop has been produced on the North Shore of Oahu. The principal market for the green chop and other forage crops on Oahu is the dairy industry, a large percentage of which is located in the Waianae area. Additionally, if forage crops could be produced at the project site, the feedlot at Campbell Industrial Park would also be a potential customer.



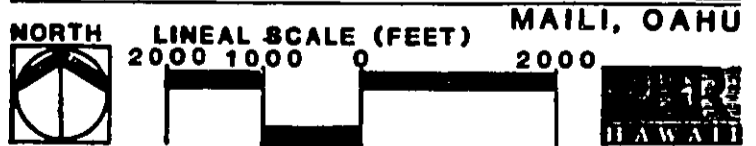
**LEGEND:**

-  PRIME AGRICULTURAL LAND - LAND WHICH HAS THE SOIL QUALITY GROWING SEASON AND MOISTURE SUPPLY NEEDED TO PRODUCE SUSTAINED HIGH YIELDS OF CROPS ECONOMICALLY WHEN TREATED AND MANAGED ACCORDING TO MODERN FARMING METHODS.
-  OTHER IMPORTANT AGRICULTURAL LAND - LAND OTHER THAN PRIME OR URBAN AGRICULTURAL LAND THAT IS ALSO OF STATE WIDE OR LOCAL IMPORTANCE FOR AGRICULTURAL USE.
-  EXISTING URBAN DEVELOPMENT - LAND WHICH HAS BEEN DEVELOPED FOR URBAN TYPE USE.
-  U.S. GOVERNMENT - LAND WHICH IS CURRENTLY UNDER THE JURISDICTION OF THE U.S. GOVERNMENT.

**AGRICULTURAL LANDS OF IMPORTANCE TO THE STATE OF HAWAII**

SOURCE: DEPARTMENT OF AGRICULTURE, STATE OF HAWAII

**FIGURE 10  
MAILI KAI PROPERTY**



The subject property does not appear to be particularly well suited to the production of forage crops for the same reasons it is not suitable for other types of crops. That is, the soils of the site do not lend themselves to machine cultivation nor is there an established irrigation system, both of which would be a necessity to produce forage crops economically.

#### C. Seed Production

The project property does not appear particularly well suited for the production of seed for crops such as corn for the same reasons that it is not suitable for crops or forage crops. That is, the soils of the subject property do not lend themselves to machine cultivation and the lack of water, which would be required for seed production to be economically feasible.

#### D. Floral and Nursery Products

The floral and nursery industry in the state has been expanding rapidly over the past several years. For example, in 1975 there were 465 "farms" raising flowers and nursery products. The value of those products was \$9,767,000. In 1986 there were 590 "farms" producing about \$49,000,000 worth of flowers and nursery products. The industry, however, produces these large volumes of highly valued products from a very small land area (approximately 1,700 acres state-wide) and does not require large acreages. The average size of all floral and nursery operations in the state is under three acres. For these crops, climate is typically more important in choosing a site than land quality or quantity. Current expansion of the industry is limited only by market availability and management capability, not by the availability of land. As such, the proposed golf course, which would require approximately ± 160 acres of the ± 415 acre parcel, would not severely limit the possibility of a floral or nursery products operation being established also. However, water availability

and land availability at economically viable costs may restrict the establishment of a new floral or nursery operation.

#### E. Livestock

##### 1. Cattle

At present (based on 1986 data), there are 84 farms encompassing some 27,873 acres of pastureland and rangeland on Oahu. There are also 75 cattle operations producing approximately \$1,730,000 worth of cattle sales including out-of-state sales of slaughter cattle and feeder calves. Given the type of vegetation existing on the subject property (Kiawe, Koa haole, various grasses and weeds) and the need for extensive land for pasture and grazing land, it does not appear that the subject property of ± 415 acres would serve as suitable land for grazing purposes. Additionally, grazing operation returns are low on a per acre basis. The site, however, could possibly serve as the site of another dairy operation if one were required. At present (1986) there are some 20 dairy operations on Oahu, 14 of which have 10 or more cows. These operations sold 116.5 million pounds of milk valued at \$23,360,000 in 1986. The number of dairy operations on Oahu has been fairly constant over the past five years, thereby indicating that a new operation probably is not required or that a new operation probably would not be economically competitive. A new dairy operation would probably require the importation of feed and would require the construction of barns and installation of milking equipment and support facilities. The costs of the required investments in plant and equipment and the generally higher cost of locally produced milk over imported milk indicate that the establishment of another dairy operation on Oahu is unlikely and probably would not be economically competitive. As such, it does not appear economically feasible to consider the subject lands as a viable site for added dairy operations on Oahu.

## 2. Hogs

Hog farming is presently occurring in the vicinity of the Maili Kai property and, as such, is a possible farm operation that could compete with established farms. There are approximately 310 hog operations on Oahu producing approximately \$5,300,000 in hog sales from about 5,100,000 pounds of dressed weight pork. The number of hog farms on Oahu has decreased from 360 in 1982 to the present 310 operations. Hog farms require less land than dairy or grazing operations but it does not appear that the industry would be limited if the subject lands were not available for use as hog farms. It is also doubtful that a hog farm could provide the owners of the land with the rate of return that other types of uses could provide and it is unlikely that a potential hog farmer could afford to buy the land and/or that the owner would be willing to sell off just a portion of the land for a hog farm, thereby possibly restricting other possible uses of the remainder of the property.

## 3. Poultry

Poultry farming is another possible operation that could be established on the subject lands. However, for the same reasons as cited above for hog farming, it would appear that the establishment of another poultry farm on the subject lands would be subjected to the same constraints. That is, it does not appear that the poultry business suffers from a lack of land but that the costs of establishing a new operation would not be economically feasible. Available statistics indicate a relatively stable poultry industry on Oahu with the number of operations remaining fairly constant over the past five years. Production has increased from 174.1 million eggs in 1982 to 189.7 million eggs in 1986, but the value of sales have decreased from over \$12 million in 1982 to approximately \$11 million in 1986.

Similar reductions in the volume and value of sales of broiler chickens have occurred over the past five years.

Based on the preceding, it does not appear that additional poultry operations on Oahu are either needed or would be economically feasible.

## V. CONCLUSIONS

Based on the analyses performed for this report, the following factors seem apparent:

1. The subject lands are not suitable for in-the-ground crops due to the types of soils that exist on-site. The costs to either replace the existing soils and/or remove the rocks found in the existing soils appear to be prohibitive.
2. Because the site presently lacks sufficiently sized water transmission lines to the site for agricultural purposes, those lines as well as an irrigation system would have to be installed. Although detailed costs for these improvements are not known, it is estimated that they could cost over \$1 million, which would be required prior to any farming operations taking place.
3. It is not the lack of available land that is limiting to the establishment of cattle, hog or poultry operations on-site, but the costs of the land and the investment costs in new plant and equipment for new operations that are limiting.
4. The availability of other, better suited lands on Oahu and the growth of agricultural operations on other islands, indicate that increased agricultural activities on the

subject lands, given the constraints noted above, do not appear favorable.

The subject lands do have some agronomic potential to be productive agricultural lands. However, their marginal value as productive agricultural lands and the availability of sufficient superior quality lands to meet current and projected future agricultural needs indicates that more productive, non-agricultural uses of the lands would be better land use.

#### REFERENCES

- Hawaii. Department of Agriculture. 1977. Agricultural Lands of Importance to the State of Hawaii (revised).
- Hawaii. Department of Agriculture. 1988. Annual Report Fiscal Year 1987.
- Hawaii Agricultural Statistical Service. 1986. Statistics of Hawaiian Agriculture. 1986. Hawaii Department of Agriculture Marketing Division and U.S. Department of Agriculture national Statistical Service.
- Hawaii. Department of Business and Economic Development. 1987. State of Hawaii Data Book; A Statistical Abstract.
- PBR HAWAII. 1988. Draft Environmental Impact Statement, Mailli Kai Property. Prep. for Kaiser Cement Corporation.
- U.S. Department of Agriculture Soil Conservation Service and University of Hawaii Agricultural Experiment Station. 1972. Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii.
- Walter Lum Associates, Inc. 1974. Mailli Kai Soil Reconnaissance Report, Mailli, Waianae, Oahu, Hawaii. Report prep. for Community Planning, Inc.