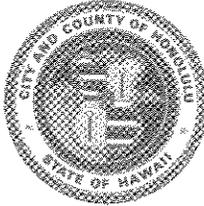


DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK F. FASI
MAYOR

DONALD A. CLEGG
CHIEF PLANNING OFFICER

GENE CONNELL
DEPUTY CHIEF PLANNING OFFICER

RH/DGP 87/NS-1

May 19, 1987

Honorable John C. Lewin, Director
Department of Health
c/o Office of Environmental Quality Control
State of Hawaii
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Lewin:

Final Environmental Impact Statement
Mokuleia Development Proposal by Mokuleia Land
Company From Preservation and Agriculture to Resort,
Residential, Park-Golf Course, and Commercial Use
TMK 6-8-02: 1, 6, 10 & 14; 6-8-03: 5, 6, 11, 15-17,
19, 20, 30, 31, 33-35, & 38-40; 6-8-08: 22

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 by the General Plan, subsequent zoning, subdivision, and other permit processes. These concerns 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,

A handwritten signature in cursive script, appearing to read "Donald A. Clegg", is written over a circular stamp. The stamp contains the text "CITY AND COUNTY OF HONOLULU" and "STATE OF HAWAII".
DONALD A. CLEGG
Chief Planning Officer

Attach.

DEPARTMENT OF GENERAL PLANNING (DGP)
REFERENCE NO.: 87/NS-1
MAY 19, 1987

ACCEPTANCE REPORT: CHAPTER 343, HRS
FINAL ENVIRONMENTAL IMPACT STATEMENT
MOKULEIA DEVELOPMENT PROPOSAL BY
MOKULEIA LAND COMPANY
MOKULEIA, NORTH SHORE, OAHU, HAWAII
TAX MAP KEY: 6-8-02: 1, 6, 10 & 14;
6-8-03: 5, 6, 11, 15-17,
19, 20, 30, 31, 33-35,
38-40;
6-8-08: 22

A. BACKGROUND

In a letter dated March 5, 1987, the Chief Planning Officer was informed that the new landowner and applicant for the above project was Mokuleia Land Company and no longer Northwestern Mutual Life Insurance Company. Details of the project have not changed.

Mokuleia Land Company is proposing to develop a project consisting of 2,100 hotel rooms, 1,200 condominium units, 700 residential units, 100,000 sq. ft. of commercial space, and two 18-hole golf courses on approximately 1,019 acres of ranch land in Mokuleia. This Final EIS has been prepared in conjunction with an application for an amendment to change the designation on the North Shore Development Plan Land Use Map from Agriculture and Preservation to Resort (313 acres), Residential (331 acres), Park-Golf course (342 acres), and Commercial use (33 acres).

The project's demand for potable water is estimated at 2.0 million gallons per day (mgd). In addition, the project will require approximately 1.5 to 2.0 mgd of irrigation water. The developer's water system will include the improvement of 3 existing wells, the installation of one new well, two new reservoirs, water pumping stations, and transmission lines to be dedicated to the Board of Water Supply. In addition, the developer will develop a new private water system to irrigate the two golf courses. Water will be supplied by sources from the Mokuleia Sub-area, which has a sustainable yield of 20 mgd, of the Waialua Ground Water Control area. Less than 40% of that yield is currently being used.

Two alternatives are being considered by the developer to dispose of wastewater generated by this project. One alternative is a developer-provided system to serve only the development. The other is to construct joint treatment and disposal facilities with the City and County. The costs of the second alternative would be shared by the City and developers based on a formula which will be developed later.

Vehicular access to the project site will be via Farrington Highway. The existing highway has sufficient capacity to serve the predicted peak hour volumes. Signalization at Thompson Corner will be provided when traffic volumes and operating conditions warrant. The developer will construct all internal roadways and improvements to the highway within the project limits.

Preliminary drainage plans call for the enlargement of or improvement of Makaleha Stream. Runoff will be directed to a retention basin to be provided mauka of Farrington Highway. From the retention basin, runoff will flow under Farrington Highway to the ocean.

B. PROCEDURES

1. On June 2, 1986, the applicant submitted an Environmental Assessment for the proposed development in order to comply with Section 343-5(a)(b) of the Hawaii Revised Statutes. The applicant was notified by letter dated June 2, 1986 that an EIS would be required.
2. Pursuant to this determination, an Environmental Impact Statement Preparation Notice (EISPN) was published in the "OEQC Bulletin" on June 8, 1986. The EISPN was mailed to 54 interested agencies and organizations and 27 responses were received in the ensuing 30-day comment period.
3. A Draft EIS (DEIS) was filed on February 20, 1987 and notice published in the "OEQC Bulletin." Fifty-six agencies or organizations received copies of the DEIS and 35 responses were received.
4. A request for an extension of the Acceptance period was received on April 6, 1987 and granted in a letter to the environmental consultant dated April 8, 1987.
5. Comments and concerns which were raised were addressed in the DEIS and in the Final EIS (FEIS) which was submitted on May 7, 1987.

C. CONTENT

The Final EIS for the Mokuleia Development Proposal by Mokuleia Land Company adequately addresses the content requirements specified in Sections 11-200-17 and 11-200-18 of the EIS Rules.

D. RESPONSE

The applicant made adequate responses to all comments, which were included in the Final EIS.

E. UNRESOLVED ISSUES

Several issues, while discussed by the applicant, remain unresolved at the present time.

The following issue shall be resolved prior to approval of the applicant's DP amendment request:

1. The applicant's request requires a General Plan amendment, which is currently being processed to designate Mokuleia as a secondary resort area.

The following unresolved issues need to be addressed in the rezoning process:

2. A State Land Use District Boundary Amendment to redesignate the project site from the existing Agricultural and Conservation district to an Urban district.
3. The project will require new water source system approval from the State Department of Health, as well as increased water allocations within the Waialua Ground Water Control Area from the Board of Land and Natural Resources and approval of a water master plan by the Board of Water Supply.
4. A sewer master plan for on- and off-site sewer system improvements approved by the Department of Public Works.
5. Highway Improvement Plans and Programs, as required by the State Department of Transportation, and construction of internal streets to City and County standards as required by the Department of Transportation Services.
6. A noise mitigation plan to be reviewed and approved by the Department of Land Utilization in consultation with the State Department of Transportation, to handle noise from the nearby Dillingham Airfield.

7. An archaeological survey, in consultation with the State Historic Preservation Office and to be approved by the Department of Land Utilization, to identify, assess, and protect the archaeological resources related to this project.
8. A wetlands management program to be developed with the U.S. Fish and Wildlife Service.
9. A Wildfire Contingency Plan and Forest Reserve Access Plan to be worked out with the Department of Land and Natural Resources.

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 does not imply a favorable recommendation on the applicant's request for any approvals or permits required by the Department of General Planning.

Approved: 

for
DONALD A. CLEGG
Chief Planning Officer
Department of General Planning

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FINAL
ENVIRONMENTAL IMPACT STATEMENT
MOKULEIA DEVELOPMENT PROPOSAL
MOKULEIA, OAHU

Tax Map Key: 1st Division
6-8-02: Parcels 1, 6, 10 and 14
6-8-03: Parcels 5, 6, 11, 15, 16, 17,
19, 20, 30, 31, 33, 34, 35,
38, 39 and 40
6-8-08: Parcel 22

MAY 8, 1987

William E. Wanket, Inc.
John Zapotocky, Consultant

OA
374

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**FINAL
ENVIRONMENTAL IMPACT STATEMENT
MOKULEIA DEVELOPMENT PROPOSAL
MOKULEIA, OAHU**

MAY 8, 1987

**submitted pursuant to chapter 343,
hawaii revised statutes
environmental impact statement
regulations**



**WILLIAM E. WANKET
Pacific Tower 1010
1001 Bishop Street
Honolulu, Hawaii 96813**

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- B. Economic and Fiscal Impact Study (John Child & Company)
- C. Socio-Economic Impact Study (Community Resources)
- D. Development Plan Public Facilities Amendment (Engineers, Surveyors Hawaii, Inc.)
- E. Ocean Hazard Study (Charles L. Bretschneider & Associates)
- F. Ocean Engineering Study (Oceanit Laboratories, Inc.)
- G. Agricultural Impact Study (Decision Analysts Hawaii, Inc.)
- H. Archaeological Study (Joseph Kennedy)
- I. Flora and Fauna (Char & Associates)
- J. Air Quality Study (Barry D. Root)
- K. Noise Study (Darby and Associates)
- L. Traffic Study (Parsons, Brinckerhoff, Quade & Douglas, Inc.)
- M. Visual Impact Analysis (Michael S. Chu, Land Architect)

LIST OF EXHIBITS

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PART I

SUMMARY

Action: Applicant

Project Name: Mokuleia Development Proposal

Project Description: A General Plan Amendment and a Land Use and Public Facilities amendment to the North Shore Development Plan. Approximately 1,000 acres are proposed for development. The project includes 2,100 hotel rooms, 1,200 condominium units, 700 residential units, 100,000 sq. ft. of commercial space, two golf courses and other recreational amenities. The applicant is requesting a resort designation on the General Plan and resort, residential, and commercial designation on the development plan.

Project Location: The site is located on Oahu's North Shore on lands north and south of Farrington Highway in Mokuleia. The site is currently vacant with the exception of fencing improvements, and ten houses and the former Dillingham Family Vacation Home.

Tax Map Key: 6-8-02: Parcels 1, 6, 10, and 14
6-8-03: Parcels 5, 6, 11, 15, 16, 17, 19, 20, 30, 31, 33, 34, 35, 38, 39, and 40
6-8-08: Parcel 22

Development Plan Designation: Agriculture/Preservation

State Land Use: Agriculture/Conservation

Zoning: Agriculture/Preservation

Applicant/Owner: Mokuleia Land Company

Environmental Consultant: William E. Wanket, Inc.

Accepting Authority: Department of General Planning

Summary:

The project site is currently vacant with the exception of fencing improvements and eleven dwelling units. The land is used for grazing of cattle. Portions of the property are used for polo and for other equestrian activities. The property also contains a lake of approximately 20 acres which is the remnant of a sand mining operation which ceased in 1979.

The applicant is proposing to develop a recreational/resort/residential complex on approximately 1,000 acres of land. The land to be developed includes all of the coastal properties owned by the applicant as well as the flatlands and a portion of the foothills. The applicant's remaining holdings in the area (1,900 acres) are not proposed for development; however, increased recreation use of these lands may occur.

At full development in 2005, the visitors to the project are expected to spend an estimated \$106,000,000 (in 1986\$). Indirect and induced expenditures are expected to add an additional \$99,000,000 for a total annual expenditure of over \$200,000,000. Residents of the development are expected to generate approximately \$13,000,000 in direct expenditures at full development. Total employment in 2005 generated in the State is expected to be approximately 5,000 jobs. These economic impacts compare with negligible operating revenues and less than 10 jobs under current conditions. The development is expected to contribute to the economic health of Oahu and Hawaii's major export industry, tourism. The project will also contribute directly to State and local finances by maintaining a 2:1 to 3:1 revenue to expense ratio both short and long term.

Additional beneficial impacts include providing housing and recreational opportunities to Oahu residents.

When completed in 2005 the proposed development is expected to have a population of 4,680 persons including an estimated 3,480 visitors and 1,200 residents. (Additional residential population estimated at approximately 800 to 900 persons will be generated between the years 2005 and 2015 as single family lots are developed by their individual owners.)

Adverse or unavoidable environmental effects include population generated impacts and other impacts. The adverse impacts and mitigating measures are summarized below.

<u>Impacts</u>	<u>Mitigating Measures</u>
Agricultural Potential of land lost	None necessary as the Ag Impact Study shows there are an abundance of other lands now and to become available in the future to supply potential agricultural needs.

Aircraft noise	Short-term impacts from military operations may be unavoidable. Impacts from civilian aviation can be mitigated by proper designs.
Construction impacts including noise, dust and traffic	Compliance with State Department of Health rules and regulations governing noise and compliance with City and County of Honolulu Ordinances governing grading and other construction activities.
Increased traffic	The traffic study for the development by Parsons, Brinckerhoff, Quade & Douglas indicates that increased traffic can be accommodated. The applicant will work with the Department of Transportation and City Dept. of Transportation Services to implement the consultant's recommendations.
Increased water consumption	Water consumption will increase; however, the Mokuleia aquifer has sufficient water to supply the project and provide for additional future development. Based on DLNR estimates, the sustainable yield of the Mokuleia Aquifer is 20 million gallons per day, of which less than 8 million gallons per day are being used.
Increased demand for utility services	The utility companies will be kept apprised of the progress of the development so that services will be available without delay.
Increased need for public services, police, fire, schools, parks, etc.	The government fiscal impact analysis for the development indicates that the project will generate \$2 to \$3 in taxes for every \$1 spent to provide services. In addition, the applicant will work with the various governmental agencies to meet the need for increased services.
Lifestyle changes	The impact of the development on lifestyle is subjective and would vary depending on the person's current lifestyle. For example, for an unemployed worker or one facing an uncertain future in the sugar industry, the jobs created at the development may improve the lifestyle. On the other hand, for a retired person desiring a rural lifestyle the new development may not be as welcome. The developer has commissioned a social impact study and has been meeting with community groups and individuals so that the flow of

communications will continue between the community. The applicant intends to continue community communications during the operational phase of the development.

Generation of sewage and solid waste

The applicant will provide a sewerage system either by development of sewerage facilities or by participation in the City's proposed Waialua system. The cost of operating sewage and solid waste disposal sites is generally offset by user fees and/or public subsidy.

Wetlands Human Impact

Applicant to develop a program for management to mitigate impacts as well as design elements such as setbacks, landscapes and fencing to protect wetland habitats.

The applicant has considered a number of alternatives to the proposed action including (1) No Action, (2) Agricultural Development, (3) Recreational Development, (4) Residential Development, and (5) More or Less Development than is being proposed or a different combination of development mix.

Unresolved Issues:

The development as proposed is compatible with the State Plan, Tourism Functional Plan, Housing Functional Plan, the City General Plan (with amendment), the North Shore Development Plan (with amendment), and the Hawaii Coastal Zone Management Program. The development is not compatible with the State Agricultural Functional Plan but meets the conditions for conflict resolution prescribed in the Agricultural Functional Plan.

PART VII of the EIS describes the major processes and its scope of review that will be required for development at Mokuleia. It also identifies certain issues that will require continuing assessment during these processes in order to arrive at the most appropriate method for mitigation, including areas dealing with wetlands, low/moderate income housing, parks and accessways, Dillingham Airfield, and sewage disposal.

The applicant intends to comply with all applicable laws, rules and regulations by obtaining all required approvals including the following:

<u>Approval</u>	<u>Approving Authority</u>	<u>Status</u>
General Plan Amendment	City Council	Application filed
North Shore Development Plan Land Use Amendment/Public Facilities Amendment	City Council	Application filed
Rezoning	City Council	Application to be filed
Special Management Area Permit	City Council	Application to be filed

<u>Approval</u>	<u>Approving Authority</u>	<u>Status</u>
Shoreline Certification	State Surveyor	Application to be filed
Subdivision Approval	Department of Land Utilization	Application to be filed
State Land Use Boundary Amendment	State Land Use Commission	Application to be filed
Department of Army Permit	U.S. Army Corps of Engineers	Application to be filed
Section 7 Consultation (Endangered Species)	U.S. Fish and Wildlife Service	Request for consultation to be filed
Federal Consistency (with Coastal Zone Management Act)	State Department of Planning and Economic Development (DPED)	Application to be filed
Conservation District Use Permit	State Department of Land and Natural Resources	Application to be filed
Stream Permit	State Department of Land and Natural Resources	Application to be filed
Approval of Drainage System	State Department of Transportation/ County Department of Public Works (DPW)	Application to be filed
Approval of Wastewater Disposal System	State Department of Health/County Department of Public Works/County Department of Land Utilization	Application to be filed
Approval of Potable Water System	State Department of Land and Natural Resources/State Department of Health/ County Board of Water Supply	Application to be filed
Historic Sites Review	State Department of Land and Natural Resources	Application to be filed
Permit for Construction within State Highway Rights-of-Way	Department of Transportation/County Department of Transportation Services	Application to be filed
Permit for installation of utility lines within State Highway Rights-of-Way	Department of Transportation	Application to be filed
Electric Connection Approval	Hawaiian Electric (HEI)	Application to be filed
Telephone Connection Approval	Hawaiian Telephone Company	Application to be filed
Grading Permits	Department of Public Works	Application to be filed
Building Permits	Building Department	Application to be filed

PART II
INTRODUCTION

A. GENERAL DESCRIPTION OF THE SITE

The proposed resort development is located on property owned by Mokuleia Land Company in Mokuleia, Waialua, Oahu, Hawaii. The entire property consists of approximately 2,887 acres, of which only 1,019 acres are proposed for the resort project (Exhibits 1 and 1A).

The entire property can be grouped for convenience into five (5) parcels, A through E, as follows:

PARCEL A

LAND SITUATED ON THE SOUTHERLY SIDE OF FARRINGTON HIGHWAY AT MOKULEIA, WAIALUA, OAHU, HAWAII, BEING PORTIONS OF LAND COURT APPLICATIONS 824, 1107 AND 1810. BEING ALSO IDENTIFIED AS PARCEL 6 OF TAX MAP KEY 6-8-02 AND PARCELS 5, 6, 11, 15, 19, 20, 30, 31, 33, 34, 35 AND 40, CONTAINING AN AREA OF 2,763.242 ACRES MORE OR LESS.

PARCEL B

LAND SITUATED ON THE NORTHERLY SIDE OF FARRINGTON HIGHWAY AT MOKULEIA, WAIALUA, OAHU, HAWAII, BEING LOT 1-D OF LAND COURT APPLICATION 824, LOT 8 OF LAND COURT APPLICATION 1107, AND LOTS 4-A, 4-B, 5 AND 59-A OF LAND COURT APPLICATION 1810, BEING ALSO IDENTIFIED AS PARCELS 16, 17, 38 AND 39 OF TAX MAP KEY 6-8-03, CONTAINING AN AREA OF 83.316 ACRES MORE OR LESS.

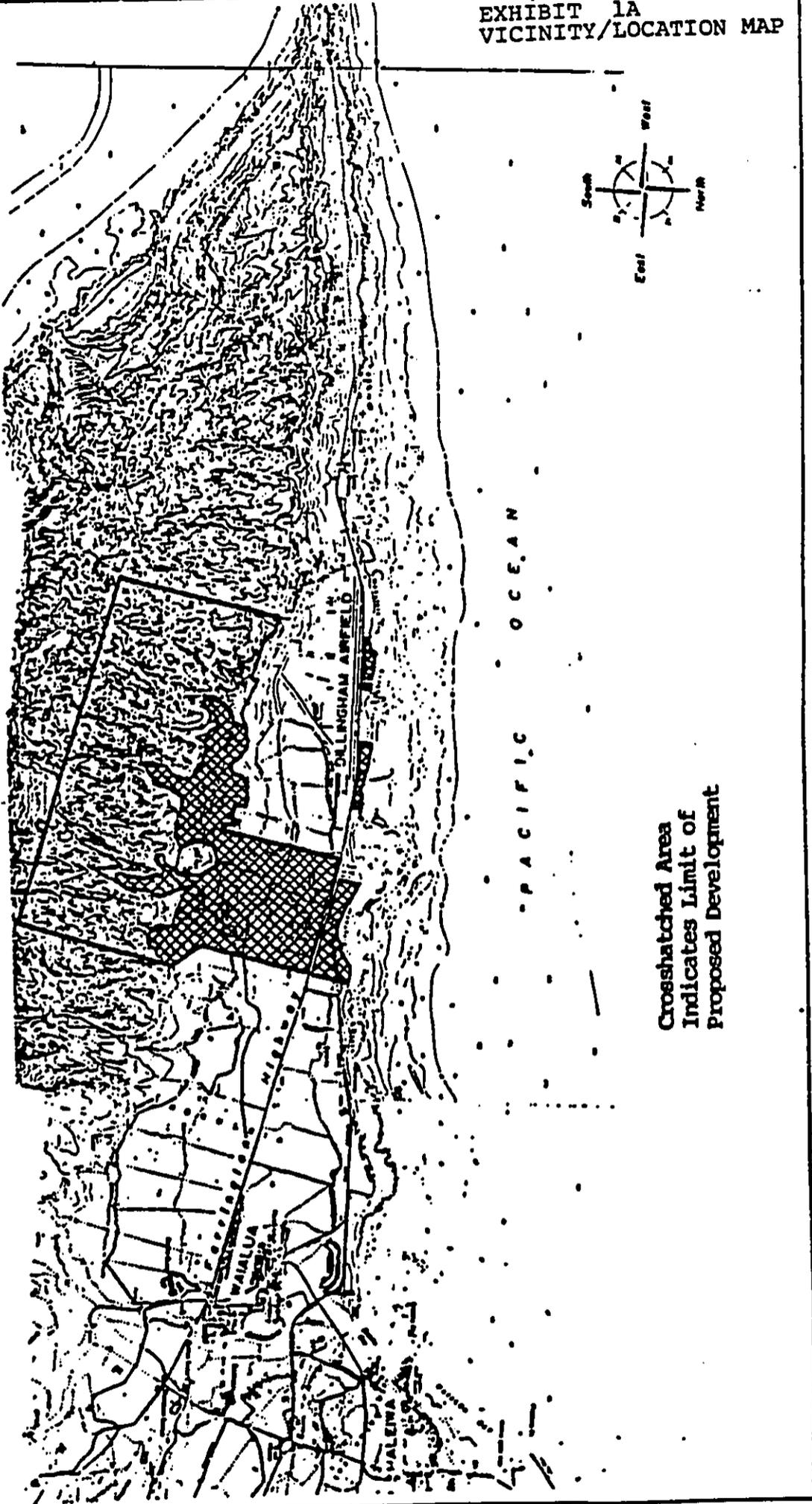
PARCEL C

LAND SITUATED ON THE NORTHERLY SIDE OF FARRINGTON HIGHWAY AT MOKULEIA, WAIALUA, OAHU, HAWAII, BEING LOT 38 OF LAND COURT APPLICATION 1810, BEING ALSO IDENTIFIED AS PARCEL 1 OF TAX MAP KEY 6-8-02, CONTAINING AN AREA OF 26.717 ACRES MORE OR LESS.

PARCEL D

LAND SITUATED ON THE NORTHERLY SIDE OF FARRINGTON HIGHWAY AT MOKULEIA, WAIALUA, OAHU, HAWAII, BEING LOT 39 OF LAND COURT APPLICATION 1810 AND PORTION OF GRANT 338 TO HIKIAU AND KANA, BEING ALSO IDENTIFIED AS PARCELS 10 AND 14 OF TAX MAP KEY 6-8-02, CONTAINING AN AREA OF 13.089 ACRES MORE OR LESS.

EXHIBIT 1A
VICINITY/LOCATION MAP



Crosshatched Area
Indicates Limit of
Proposed Development

PARCEL E

LAND SITUATED ON THE NORTHERLY SIDE OF FARRINGTON HIGHWAY AT MOKULEIA, WAIALUA, OAHU, HAWAII, BEING A PORTION OF GRANT 333 TO MANANA AND HULU, BEING ALSO IDENTIFIED AS PARCEL 22 OF TAX MAP KEY 6-8-08, CONTAINING AN AREA OF 0.856 ACRES MORE OR LESS.

The property has diverse physical characteristics. The property fronts Farrington Highway. The makai (oceanside) portion of the property consists of four non-contiguous parcels totaling about 120 acres. These parcels have about 1.5 miles of ocean frontage along white sand beaches.

The mauka (mountainside) portion of the property includes about 2,767 acres. The site slopes gently from sea level to about 300 feet over a distance of about a mile to the base of the Waianae mountain range. From this point to the top of the mountain range, the topography is steep and rugged and the vegetation shifts from typical ranch scrub to more lush foliage (Exhibit 2). The steep portion of the property, approximately 1,868 acres, will remain in an undeveloped condition, or will be used for recreational purposes.

The hillsides form tributaries to intermittent water courses which flow usually during the stormy periods. The water courses are well defined and flow to the ocean.

Climate in the area is excellent year round with an average temperature of 73.5°. Rainfall averages 30 inches per year. Rainfall is higher in the upper elevations of the Waianae Range, providing a consistent source of ground water recharge. Prevailing breezes are the northeast trade-winds.

Makai of Farrington Highway, Parcel B is primarily used for grazing, with the westernmost 18 acres leased to the Hawaii Polo Club for polo games during part of the year. The remaining three beachfront parcels are all primarily in open space, with the easternmost six acres of Parcel C currently being leased to the Episcopal Church's recreational "Camp Mokuleia" complex.

B. HISTORY OF THE USE OF THE LAND

Mokuleia Land Company purchased the land from Northwestern Mutual in 1987. Prior to Northwestern Mutual's purchase of the land in 1979, these lands were owned by the Dillingham family, who used them for a vacation retreat and ranching purposes. The old Dillingham estate home is still on the site. Throughout the years various parts of the land were in agricultural pursuits, including sugar production, macadamia nut planting, and truck crops. However, since the early 1970's, the land was primarily used for cattle grazing.

EXHIBIT 2
TOPOGRAPHIC MAP



C. CURRENT LAND USE CLASSIFICATIONS AND ZONING

State Land Use Classification is shown on Exhibit 3.

Development Plan Land Use designations are shown on Exhibit 4.

Development Plan Public Facilities designation are shown on Exhibit 5.

Zoning Districts for the property are shown on Exhibit 6.

Special Management Area boundaries affecting the property are shown on Exhibit 7.

Flood Hazard Classifications on the property are shown on Exhibit 7.

ALISH Categories (Agricultural Lands of Importance) on the property are illustrated on Exhibit 8.

Soil Classifications on the property are shown on Exhibit 9.

Land Study Bureau Classifications (A & B) on the property are shown on Exhibit 10.

LESA Proposed LE Classifications on the property are shown on Exhibit 11.

D. OBJECTIVES

1. Market Assessment

Mokuleia could be developed as a community serving both residents of and visitors to Oahu. To be consistent with the current image and attractiveness of the North Shore region, development should be low density, with an emphasis on recreational activities and facilities. The major land uses could include hotels, multifamily condominium and residential units, golf courses, commercial areas and other complementary facilities and amenities.

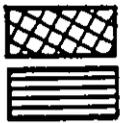
Assessment of the market for the various types of facilities under consideration indicates that Mokuleia could support development of the proposed 2,100 hotel units with a range of guest services, 1,200 condominium units, 700 residential units, a commercial complex, 36 holes of golf course, and possibly polo fields, hiking trails, camping areas and sports center (Exhibit 12).

This development would result in a community with a variety of facilities with appeal to the island resident and repeat visitor. Through careful planning, it could offer a unique residential or vacation experience in a relaxed, rural atmosphere which has previously been found only on the neighbor islands. However, its location on Oahu could give it a competitive edge over neighbor island locations.

EXHIBIT 4

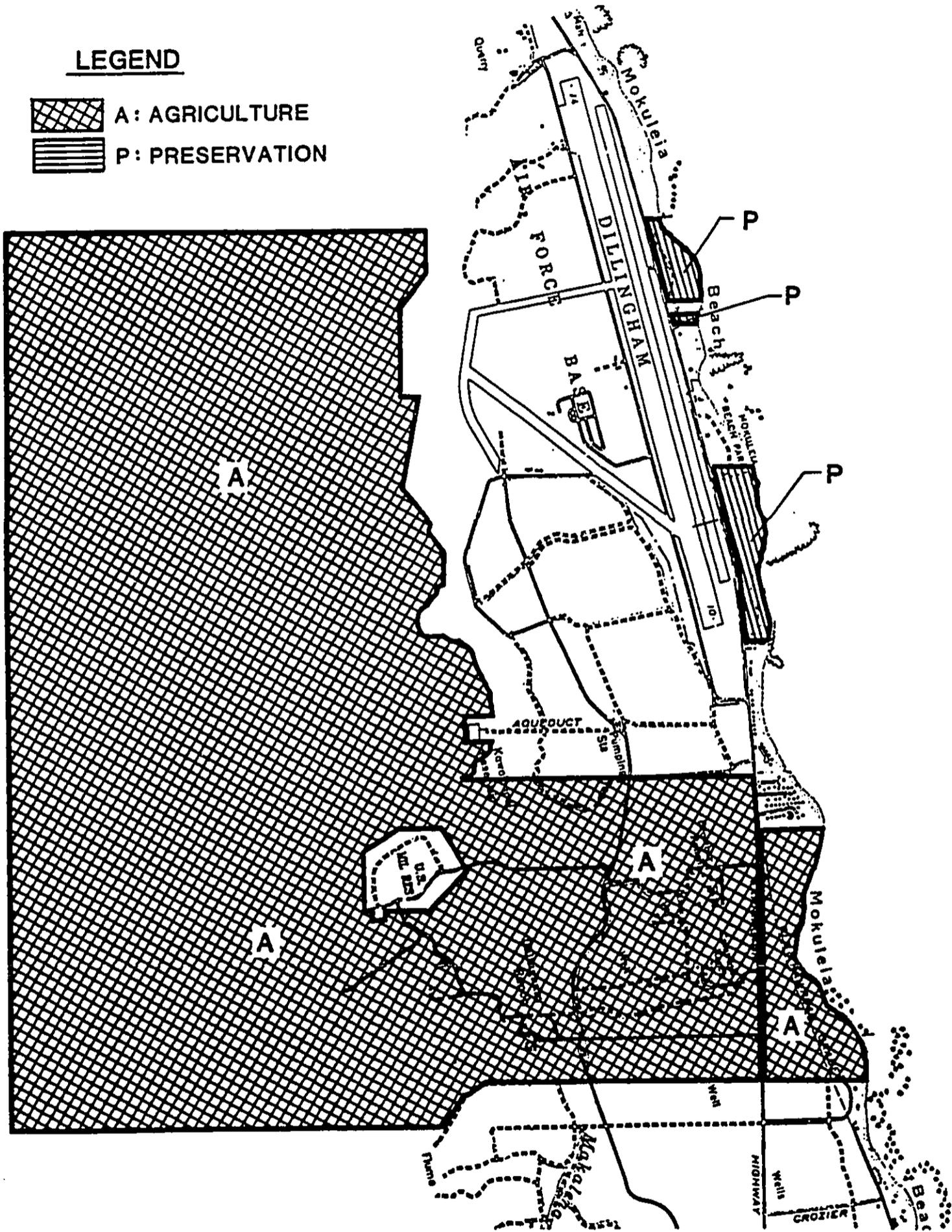
NORTH SHORE DEVELOPMENT PLAN
LAND USE MAP

LEGEND



A: AGRICULTURE

P: PRESERVATION



LEGEND:

FOR
EXHIBIT 5,
NORTH SHORE DEVELOPMENT PLAN
PUBLIC FACILITIES MAP

LEGEND

PROPOSED FUNDING
PARK (2-6 YEARS)

PLANNED FOR FUTURE PARK
(7 YEARS-BEYOND)

PUBLIC FACILITY

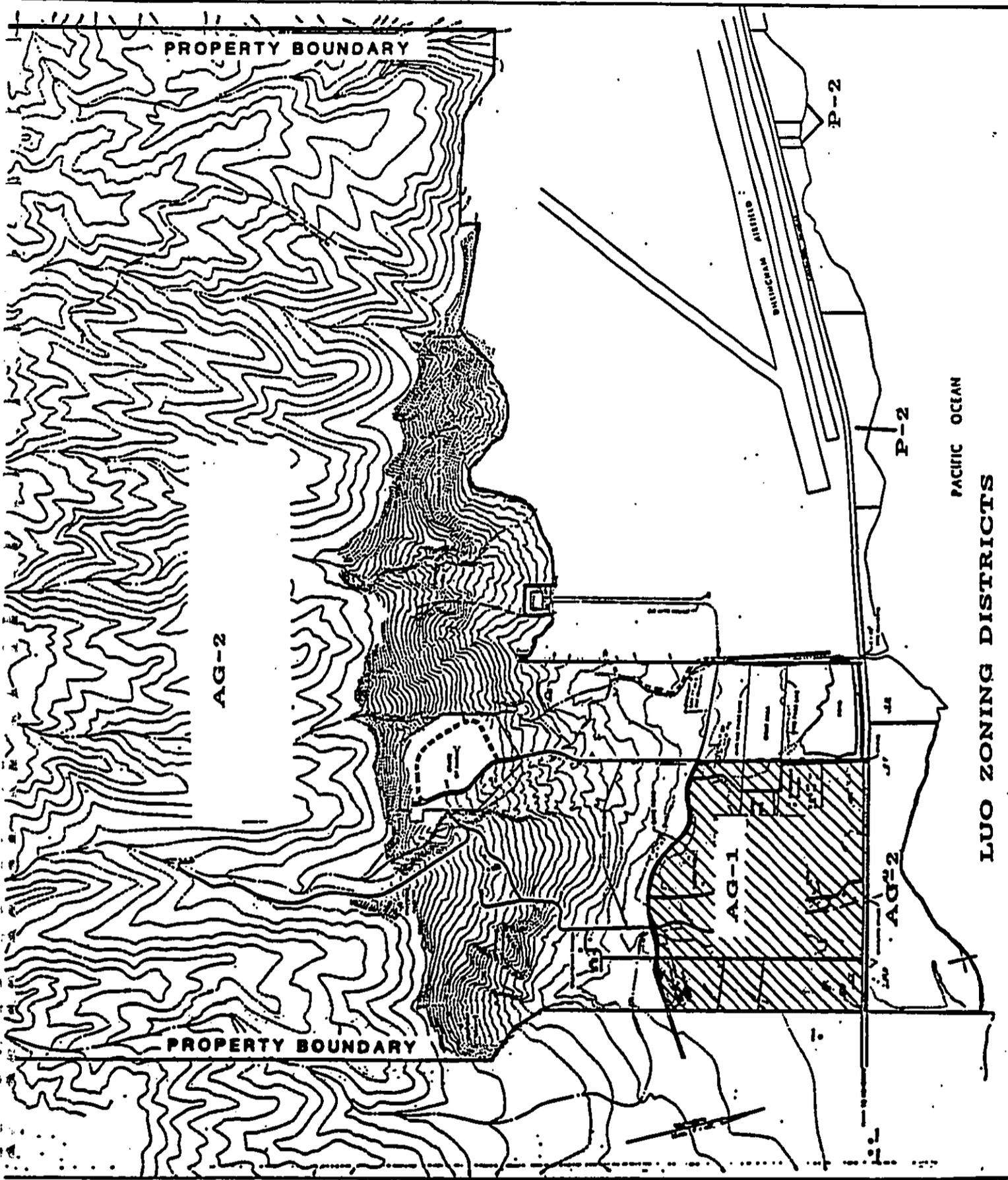
SITE DETERMINED
(BY PROPERTY LINE)



SITE UNDETERMINED
(IN GENERAL AREA)



EXHIBIT 6
LUO ZONING DISTRICTS



LEGEND:

FOR
EXHIBIT 7, SMA/FLOOD DESIGNATIONS

LEGEND

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.



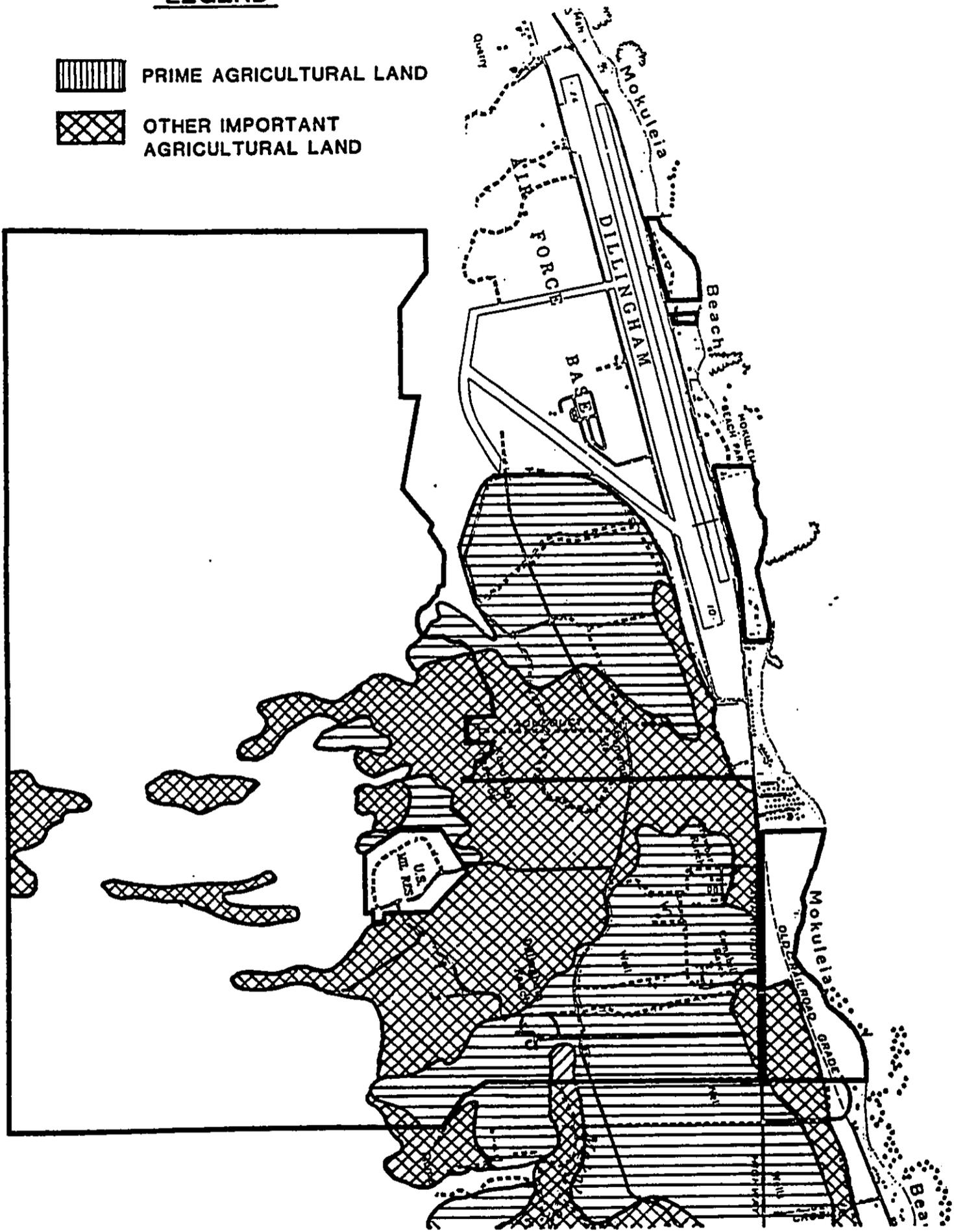
NOTE: The Department of the Army Corp of Engineers provided more detailed information broken down by Tax Map Key parcels. A complete copy of their March 9, 1987 letter and exhibits are found in PART XIII.

EXHIBIT 8

ALISH CLASSIFICATIONS

LEGEND

-  PRIME AGRICULTURAL LAND
-  OTHER IMPORTANT AGRICULTURAL LAND



L E G E N D:
FOR
EXHIBIT 9, SOIL CLASSIFICATIONS:

BS Beaches

EaC Ewa Silty Clay Loam, 6 to 12 percent slopes

EwC Ewa Stony Silty Clay, 6 to 12 percent slopes

EJE Halawa Silt Loam, 20 to 35 percent slopes

HLMG Helemano Silty Clay, 30 to 90 percent slopes

JaC Jaucas Sand, 0 to 15 percent slopes

KaB Kaena Clay, 2 to 6 percent slopes

KaeB Kaena Stony Clay, 2 to 6 percent slopes

KaeC Kaena Stony Clay, 6 to 12 percent slopes

KanE Kaena Very Stony Clay, 10 to 35 percent slopes

KLA Kawaihapai Clay Loam, 0 to 2 percent slopes

KlaA Kawaihapai Stony Clay Loam, 0 to 2 percent slopes

KlaB Kawaihapai Stony Clay Loam, 2 to 6 percent slopes

KpD Kemoo Silty Clay, 12 to 20 percent slopes

KpF Kemoo Silty Clay, 35 to 70 percent slopes

MBL Mahana-Badland Complex

Mt Mokuleia Clay Loam

Ph Pearl Harbor Clay

PsA Pulehu Clay Loam, 0 to 3 percent slopes

TP Tropaquepts

rRk Rock Land

rSY Stony Steep Land

rTP Tropohumults-Dystrandeps Association

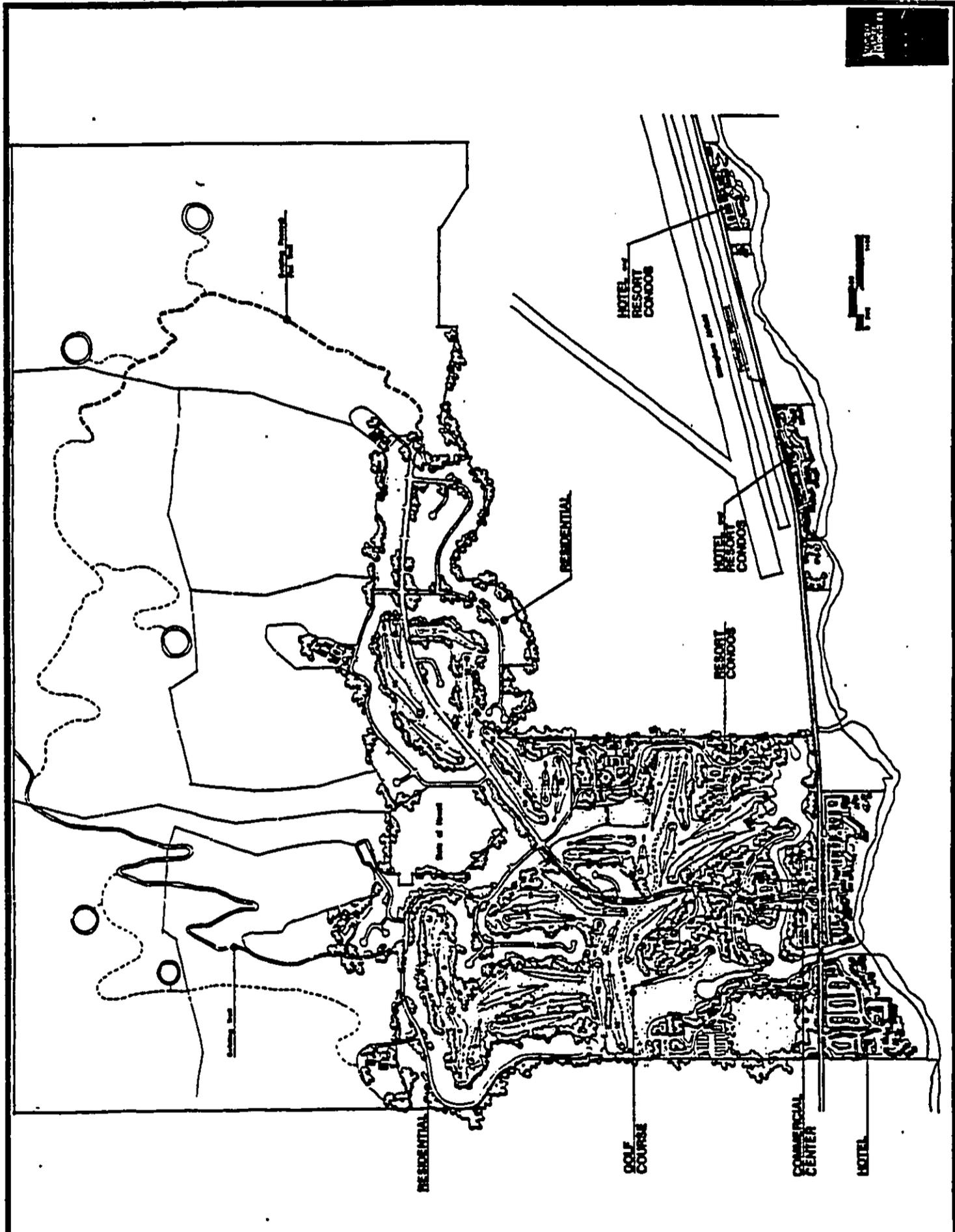
L E G E N D:

FOR

EXHIBIT 11, LESA PROPOSED L. E. CLASSIFICATIONS:

<u>MAP SYMBOL</u>	<u>L. E. RATING</u>
BS	No Rating
EaC	83
EwC	77
HJE	45
HLMG	No Rating
JaC	41
KaB	79
KaeB	71
KaeC	62
KaeE	41
K1A	94
K1aA	83
K1aB	83
KpD	69
KpF	23
MBL	24
Mt	76
Ph	43
PsA	86
TP	No Rating
rRk	No Rating
rSY	No Rating
rTP	No Rating

EXHIBIT 12
MOKULEIA CONCEPTUAL PLAN



Discussion throughout this market assessment makes use of historical market data both from Oahu and the neighbor islands. The Mokuleia proposal calls for the creation of a recreational community. There are no examples of the proposed development on Oahu or on the neighbor islands. There are a number of proposed developments on Oahu such as Kuilima, West Beach and Makaha which exhibit certain of the characteristics of the proposed Mokuleia development. None of the Oahu projects have achieved a mature stage. There are a number of neighbor island developments such as Wailea, Kaanapali, Princeville, etc., which also exhibit some of the characteristics of the proposed Mokuleia Recreational Community, and have achieved varying degrees of maturity. The Mokuleia Recreational Community has been targeted to attract the resident population as well as the Oahu visitor. Alternate accommodations and second home product are needed on Oahu to prevent a continuation of the erosion of Oahu's market share of Hawaii's visitor market. The Mokuleia project is expected to compete for business on Oahu and as part of the Hawaii visitor market. Therefore, it is appropriate to view market data available on Oahu transactions as well as information available about competing products on the neighbor islands.

The applicant believes that absorption rates discussed in the market assessment have a significant upside potential. Inflation rates and mortgage interest rates without precedent in the United States caused disruption in real estate markets during the 1980's. This upheaval caused trouble at financial institutions which responded by reassessing their loan approval criteria. Buyers faced with high interest rates and financial institutions with changing policies tended to defer discretionary purchasers of recreational real estate. For these reasons the applicant feels that a return to more traditional inflation and interest rate levels, as well as increased stability in the financial markets, will increase absorption rates for the product being proposed at Mokuleia.

The market assessment, prepared by John Child & Company, Inc. is included as Appendix A. Specific market assessments for the various land uses are summarized under the following subheadings:

a. Hotel Market Assessment

Based on the preliminary development plan, the proposed hotels at Mokuleia are expected to attract both local residents and off-island visitors. Factors which would attract hotel guests to Mokuleia include:

- o Unique location on Oahu:
 - Accessible to and from Waikiki, the Honolulu central business district and all areas of Oahu
 - Oceanfront, rural environment

- Range of recreational opportunities:
 - Onsite golf course, possibly polo field, hiking trails, riding trails, camping grounds, tennis ranch and sports center
 - Beach activities including swimming, surfing, windsailing, and boating
- Range of entertainment and commercial services:
 - Entertainment at hotel facilities
 - Variety of food and beverage services at hotel and commercial facilities.

Market Share

The supportable hotel rooms were estimated based on Mokuleia's projected market position in relationship to overall Oahu room demand.

Initially, Waikiki hotels and condominium units are estimated to capture about 93% of the Oahu hotel room demand. Waikiki is expected to continue to dominate the Oahu visitor accommodations industry. However, as master planned resort developments in areas outside Waikiki emerge, Waikiki's share could be expected to decline from its current level of about 93% to about 75% by 2005. This decline in market share would result from:

- Limited amount and availability of suitable development sites in Waikiki.
- Development and maturation of resort destination areas outside Waikiki.
- Increasing preference of repeat visitors to stay outside of Waikiki.
- Increasing number and length of stay of local resident hotel guests.

The North Shore/Koolauloa area currently captures about 2% of the room demand on Oahu. Based on the plans for expansion at the Turtle Bay Resort and the proposed development plan for Mokuleia, the North Shore is projected to capture a 12.5% market share of room demand on Oahu by 2005, as shown in the following table.

Potential Market Share Distribution
of Oahu Visitor Units

	<u>1984</u>	<u>1995</u>	<u>2005</u>
Waikiki/Kahala	93.0%	87.5%	75.0%
West Beach/Leeward	3.0	4.5	10.0
North Shore/Koolauloa	2.0	6.0	12.5
Other (airport, downtown, etc.)	<u>2.0</u>	<u>2.0</u>	<u>2.5</u>
Total	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>

Supportable Hotel
Rooms on Oahu

Based on the anticipated supply and demand relationships for visitor units on Oahu, the visitor industry could be expected to require about 18,900 to 22,700 additional rooms by 2005. This represents a requirement of 9,500 to 13,300 rooms in addition to the inventory which is currently being planned for Oahu.

Hotel rooms are expected to continue to account for about 70% of total demand for visitor rooms on Oahu. As a result, the number of supportable hotel rooms on Oahu is projected to range between 40,300 to 42,900 rooms by 2005.

Supportable Hotel
Rooms at Mokuleia

Based on the proposed development concept, Mokuleia could achieve a market capture rate of about 1.5% in 1990, increasing to 5% by 2005. At these estimated market capture rates, the number of supportable hotel rooms at Mokuleia is projected to increase from about 500 units in 1990 to between about 2,000 and 2,200 in 2005, shown as follows.

Projected Supportable
Hotel Rooms at Mokuleia
1990-2005

	<u>Estimated market share</u>	<u>Supportable hotel rooms</u>
1990	1.5%	480- 510
1995	3.0	1,080-1,160
2000	4.0	1,560-1,660
2005	5.0	2,020-2,150

b. Condominium Apartment
Market Assessment

The preliminary condominium development concept for Mokuleia takes into account recent trends in the condominium market, characteristics and history of comparable projects on all islands and the projected market support at Mokuleia.

Market Review

The developments envisioned for Mokuleia could be expected to appeal to residents and visitors seeking an active recreational environment. For purposes of comparison, 30 similar condominium projects were studied. Selection was based on the following criteria:

- Projects in rural locations on Oahu.
- Projects in or near master-planned resort areas on the neighbor islands.

These projects were found to share the following characteristics:

- Location - Condominium developments are typically located to offer attractive views and surroundings. In order of desirability, condominium orientations are usually:
 1. Oceanfront
 2. Ocean view
 3. Golf-front, and
 4. Interior.

View orientations of the sampled units were as follows:

Oceanfront	24%
Ocean view	22
Golf-front	27
Interior	<u>27</u>

100%

- Project Density - This is a general indicator of the relative open space and privacy available to individual units. The average project density for similar projects is 12 units per acre. Project densities ranged from 8 units per acre at Wailea and Princeville to 23 units per acre at Makaha, Mokuleia, Punaluu and Kaaawa condominiums.

- Project Amenities - The projects generally offer a recreation center and at least one swimming pool. Many also front along a beach suitable for swimming. Other amenities provided include whirlpools, saunas, tennis courts, barbecue areas and landscaping.

Sales Absorption

Rural Oahu includes nearly 3,500 units in 31 condominium projects, including 9 projects considered comparable to concepts for Mokuleia. Since 1979, these 31 projects have averaged 300 sales per year. The 9 selected projects accounted for 29% of sales in all 31 projects and averaged 86 sales or resales per year during this period. Kuilima Estates East and West accounted for nearly 40% of these sales.

The shortest marketing periods and the greatest numbers of units sold occurred in 1975 and 1979, when the selected projects achieved annual sales of 100 to 200 units. Since 1980, sales rates have declined, and currently average between 20 and 35 units per year. There is a direct correlation between the rates of sales and the level of interest rates.

Initial sales rates of new units in rural Oahu and the selected neighbor island resort areas range from 30 to 93 units per year, and average 50 units per year.

Buyer Characteristics

Condominium buyers are generally motivated by a desire to acquire a retirement or vacation home or by perceived investment opportunities. Nearly 50% of those purchasing condominiums in rural Oahu are from Hawaii.

Market Assessment

Initially, the condominium buyers at Mokuleia could be expected to be Oahu residents and visitors who return frequently. Buyers are expected to be:

- Primarily from Hawaii as well as the western United States.
- Predominantly married couples, aged 35 to 60 years.
- Physically active and seeking access to golf courses, tennis courts, beaches and restaurants.

The market support for condominium units at Mokuleia is dependent on its reputation and image as a major recreational development, which is expected to attract a large base of local residents from which condominium buyers may emerge. Based on the sales history of similar projects, average sales absorption for oceanfront condominiums could increase from about 70 to 80 units per year over the first decade of development. Similarly, the average sales absorption rates for condominiums on the mauka portion of Mokuleia could be projected to increase from about 45 to 55 units per year. Total projected sales absorption support about 1,725 units; however, the current development concepts include only about 1,200 units.

c. Residential Market Assessment

The location, preliminary development concepts and recreation orientation in Mokuleia are unique. Because the project is unlike any existing area in Hawaii, comparisons with existing residential projects include residential lots of less than one acre available in planned resort communities (community lots) and lots of one acre or more available in rural Oahu (acreage lots).

Market Review

The characteristics and market performance of community and acreage lots are discussed as follows.

Community Lots

To date, planned resort community on Oahu have not included single-family lots (community lots). On the neighbor islands, about 2,149 community lots were developed in five resort communities. The majority of these are at Waikoloa Village and Princeville resorts. However, over the next two decades, about 6,900 community lots are planned for development on the neighbor islands.

The existing and planned community lots are described as follows:

Location - The majority are either hillside with ocean and/or valley views or interior lots. Lot developments that abut golf course fairways are the next most common type, while oceanfront lots represent only about 3% of the total.

Size - A variety of lot sizes are expected, ranging from 9,500 square feet and up. Golf course lots are generally larger and have higher prices.

Amenities - Most community lot subdivisions do not include extensive amenities, because buyers are reluctant to pay for the maintenance of such facilities. Instead, most projects offer short-term, complimentary or voluntary memberships at the resort golf or tennis facilities.

Absorption - Community lot subdivisions averaged about 63 sales per year since 1971. Sales rates have fluctuated with general real estate cycles, with fewer sales between 1982 and 1983. Until recently, lots that have sold since 1982 have typically been lower-priced or offered at discounted prices. Again, the cycle is directly related to the level of interest rates.

Buyer Characteristics - Buyers of community lots tend to be 40 to 55 years of age, and either from the U.S. west coast or the island where the project is located. While view lots are preferred, buyers who:

- visit the area frequently,
- are Hawaii residents, or
- intend to retire in the area

are often willing to forego a view for lower-priced lots. Historically, the majority of purchasers have bought community lots for future improvement as a retirement home or for investment or speculative building.

Acreage Lots

Development of acreage lots has occurred primarily in rural areas in the State. On Oahu, such developments are typically in Kahaluu, Pupukea, Mokuleia and Makaha. Most acreage lot subdivisions include less than 25 lots. Six acreage lot developments on Oahu, Maui and Molokai were selected for study and are described as follows.

Location - Lots are generally considered to be view lots if they have ocean views of varying quality and/or views of mountain ranges. Lot locations in the selected subdivisions are described as follows:

View lots	54%
Interior lots	42
Oceanfront lots	<u>4</u>
	<u>100%</u>

Size - Typical lot sizes range between 1/2 to 7 acres. Lot sizes generally do not vary substantially within subdivisions.

Amenities - None of the projects studied provide any common community facilities or security.

Absorption - The subdivisions have averaged about eight lot sales per year since 1978. Sales are generally the highest in the initial years when the developer markets the lots.

Buyer Profile - The acreage lot buyer is similar to the buyer for community lots, except that the former prefers a higher degree of privacy. In addition, between 75% and 100% of the buyers are from within the State.

Market Assessment

The primary buyers for residential lots could be expected to be those seeking:

- Primary residence in a recreation-oriented community, or
- Vacation or retirement home.

A secondary market could include the speculative builder and investor markets.

The rate of residential lot sales at Mokuleia may be expected to be related to visitor facility development and the maturity of the resort as a visitor destination. Sales are projected to increase with the opening of hotels and condominiums. In addition, these lots would provide a unique opportunity for residential units in a quality recreation-oriented community on Oahu.

Annual community lot sales are projected to increase from 30 to 50 lots per year over a 15-year period; annual acreage lot sales could increase from 10 to 20 lots per year. Total absorption at Mokuleia could amount to 825 lots by 2005; however, the current development concepts include only 700 lots.

d. Commercial and Recreational Facilities Assessment

Commercial and recreational facilities would complement the development envisioned at Mokuleia. The market support for a retail shopping center, golf course and other recreational facilities and amenities were assessed.

Retail Facilities

Market support for retail space at Mokuleia would result from shopping needs of onsite visitors and residents, off-resort visitors and neighboring North Shore residents. The average daily population of these four groups is projected to be over 20,000 by 2005.

The total annual retail sales in Mokuleia by these four markets are estimated to amount to about \$4.9 million in 1990 and to increase to about \$27.6 million by 2005. Visitor dollars are expected to account for the majority of total expenditures (93%); Mokuleia resident expenditures are estimated to account for about 3%. Offsite visitors and North Shore resident expenditures are expected to represent 4% of total expenditures.

The sales level appropriate for retail facilities at Mokuleia has been estimated at \$275 per square foot, based on sales levels at comparable centers. The net demand for freestanding retail space could be expected to support about 10,500² by 1990 and 68,900² by 2005. "Net demand" is defined as total retail space demanded in Mokuleia less that which could be expected to be built in its hotels.

The retail center could include widely recognized restaurant and other food service establishments. The facility could be designed to take advantage of adjoining inland waterways by including wide, landscaped promenades and park areas. To accommodate such malls, walkways and public areas, a development site of 6 to 7 acres would be appropriate.

Alternate Commercial Facilities

Given the unique recreational orientation of Mokuleia, alternate commercial facilities could be supported on 22 to 23 acres. Potential uses being considered include:

Multi-Media Complex - This complex could provide facilities for theatrical, cinematic and musical performances. It could also be used for public meetings and forums. The complex could provide a diverse range of entertainment opportunities to benefit the North Shore community.

Interactive Sports Museum - This facility could showcase the diversity of recreational activities in Hawaii, as well as offer visitors opportunities to participate in these activities. Sports which could be featured include surfing, paniolo rodeo, hang gliding, polo, canoe racing and ancient Hawaiian games.

Recreational Facilities

The image of the Mokuleia area is widely associated with recreational activities. A wide range of recreational amenities would enhance the attractiveness of the development to both residents and visitors.

Golf Courses

As well as being a desirable recreational facility, a golf course enhances the image of the development. It offers the intangible benefits of open space, tranquility and aesthetic value. The presence of a course also lowers the overall density of units in the area and gives a feeling of spaciousness to the resort. Golf courses also enhance the land values of areas surrounding the resort.

A well designed course is able to draw visitors to an area based on its reputation. Thus, resort golf courses are generally "championship" courses, featuring extensive landscaping and challenging, but forgiving, play.

The demand for golf has been projected based on estimated on- and off-resort population and golf utilization rates. The number of rounds of golf are projected to increase from about 166 rounds per day by 1995 to about 320 rounds per day by 2005.

Resort golf courses are often developed prior to the completion of other visitor and community facilities to enable the course to mature and to attract potential visitors to the area. Thus, while the golf course may not be fully supported in terms of desired rounds of play, the first golf course should be developed for completion concurrently with the first major hotel facility. A second golf course could be developed later as the resort matures, to prevent overcrowding and deterioration of the first course.

Other Recreational Facilities

Mokuleia's diverse physical features and other recreational facilities are not typically found on Oahu. As a result, Mokuleia has the opportunity to establish itself as a recreation-oriented destination on Oahu. Other recreational facilities could include:

Polo Club and Stables - Mokuleia is already well known for its polo matches. The development could include a club and stables surrounded by condominiums and golf fairways. This would enhance the rural, ranchlike atmosphere of the community. During off season, the facilities could be used for rodeos and other equestrian events.

Hiking Trails - Several trails now lead from the lowlands to a plateau of the Waianae Mountains known as Peacock Flats. These and other similar trails could be developed to offer visitors and residents the opportunity to experience and enjoy the rugged, natural beauty of the region.

Camping Areas - Camp grounds, developed in conjunction with the hiking trails, could augment the recreational facilities and appeal of the community.

Sports Center - A sports center could include a pavilion and outdoor track and field. The pavilion could include basketball and volleyball courts which could be adapted for boxing, wrestling, gymnastics and other indoor sports, as well as locker rooms and showers. Outdoor activities could include track and field events, soccer, rugby and football.

Tennis Ranch - A tennis ranch could include courts suitable for tournament play and provide ancillary facilities such as locker rooms, showers, pro shop and a restaurant. With the proper design and approach, a tennis ranch could accommodate several tennis tournaments each year.

2. Statement of Objectives

The Mokuleia site is on the North Shore of Oahu, about six miles west of Haleiwa. The North Shore region is rural; the primary land uses and economic activities derive from agriculture and the visitor industries.

The North Shore is known for its scenic coastlines, beaches, and world-class surfing areas. It has long been an area for family beach houses, which are frequented primarily on the weekends and in summers.

In addition, local residents associate Mokuleia with hiking trails, camp grounds, polo fields, and air activities including gliding and aerobatics.

The 2,900-acre site has diverse physical characteristics. The property fronts Farrington Highway. The makai (oceanside) portion of the site consists of four noncontiguous parcels totaling about 120 acres. These sites have about 1.5 miles of ocean frontage along white sand beaches.

The mauka (mountainside) portion of the site includes about 2,780 acres. The site slopes gently from sea level to about 300 feet over a distance of about a mile to the base of the Waianae mountain range. From this point to the top of the mountain range,

the topography is steep and rugged; the vegetation shifts from typical ranch scrub to more lush foliage. Development is to be confined to about 1,000 acres of the total site.

Preliminary development concepts are being studied. The applicant is evaluating these concepts in terms of community needs, market support, physical and financial feasibility. Important goals of the development concept are to create jobs and business opportunities in the community.

The preliminary development concept envisioned for Mokuleia focuses on land uses and recreational facilities which would be enjoyed by Hawaii families as well as visitors. Land uses are planned to complement the existing image and character of the area. As a result, the development is proposed as a low density, recreation-oriented master planned community.

A tentative land use plan has been proposed. This plan is meant to consider the existing image and character of Mokuleia and the North Shore community, address any specific development needs for Oahu and Hawaii residents and the realities of financial limitations for the developer.

Based on the preliminary land use plan, Mokuleia is envisioned to be a recreational community in a relatively rural, low density environment. The applicant proposes to orient land uses and facilities to serve residents in the adjoining communities as well as others on Oahu.

PART III
PROJECT DESCRIPTION

A. GENERAL DESCRIPTION OF THE ACTION'S TECHNICAL, ECONOMIC, SOCIAL AND ENVIRONMENTAL CHARACTERISTICS

1. Technical Characteristics

The preliminary development concept envisioned for Mokuleia focuses on land uses and recreational facilities which would be enjoyed by Hawaii families, as well as visitors. Land uses are planned to complement the existing image and character of the area, and the physical characteristics of the site. As a result, the development is proposed to be a low density project, with structures not exceeding 6 to 7 stories in height, centered around a recreational theme that would offer residents and visitors a wide range of leisure time activities, including water-oriented uses, hiking, camping, golf, tennis, horseback riding, as well as spectator type activities.

The land use elements of the plan are illustrated on Exhibit 13, and can be briefly described as follows:

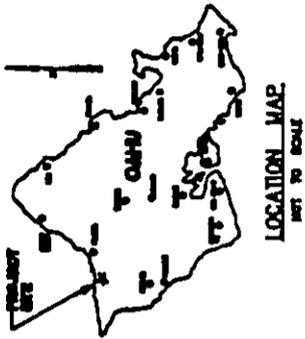
- Resort. The proposed resort project consists of 3,300 units; approximately 2,100 are hotel units and 1,200 are condominium units. The units are to be distributed both makai and mauka of Farrington Highway. The hotel development would include oceanfront resort type hotels and possibly a village hotel and conference center hotel on the mauka side of Farrington Highway.

The oceanfront resort type hotels would be designed to maximize the scenic ocean views and minimize any adverse influences on the two neighboring developments. The hotels would be activity oriented and offer a broad range of on-site recreational and entertainment opportunities.

A hotel mauka of Farrington Highway with a thoughtful design concept could result in a low-density village atmosphere. Extensive interior landscaping and waterways would compensate for the lack of ocean frontage and limited ocean views. The hotel would provide a relaxed environment for guests who seek a slower-paced vacation experience than experienced in Waikiki.

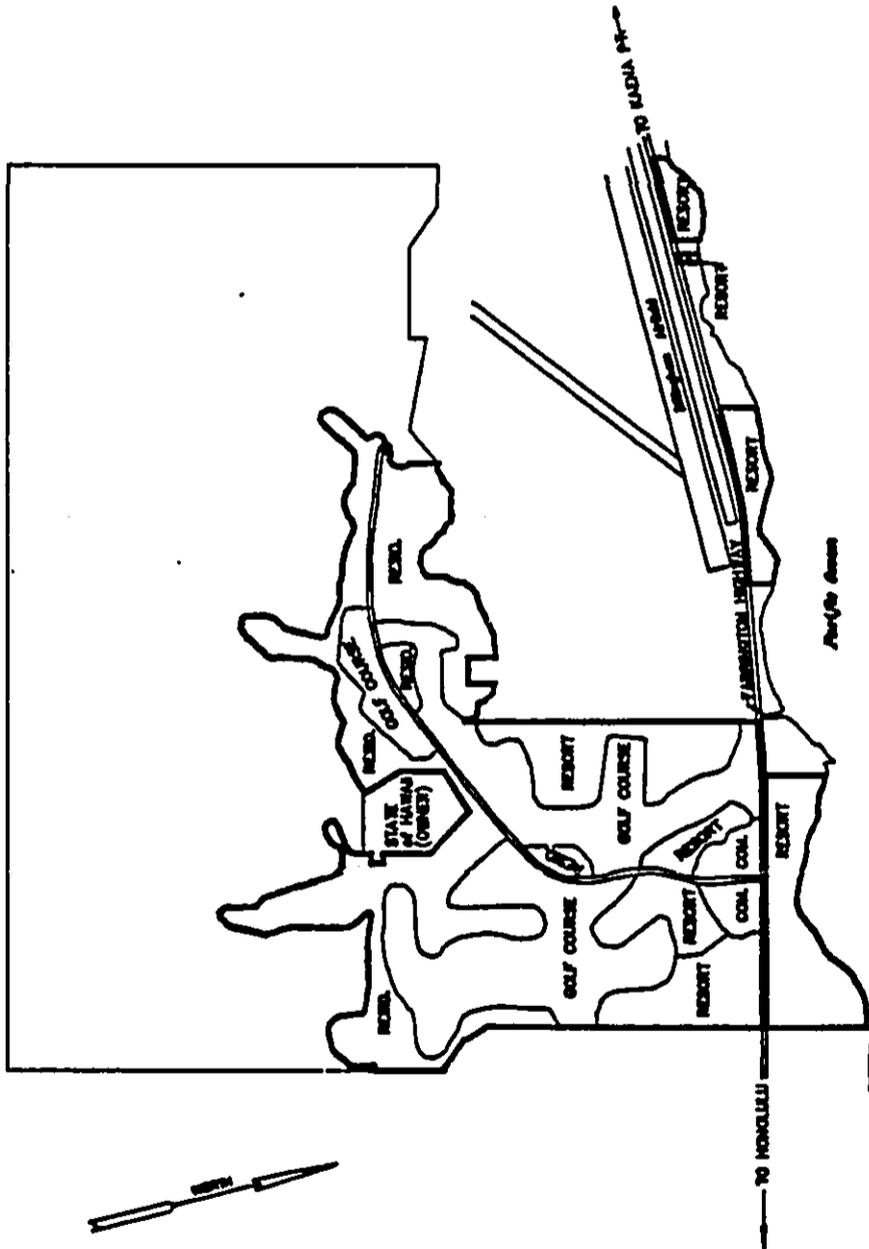
The conference center hotel could cater to small to medium sized conventions and meetings and corporate incentive groups. The hotel could include meeting and conference rooms, audio/visual and telecommunications facilities, pavilions, and

**EXHIBIT 13
NORTH SHORE DEVELOPMENT PLAN
AMENDMENT**



LAND USE LEGEND

RESIDENTIAL (RESID.)	331 acres
RESORT	313 acres
COMMERCIAL (COM.)	33 acres
GOLF COURSE	342 acres
TOTAL	1,019 acres



1000 0 1000 2000
GRAPHIC SCALE IN FEET

banquet halls. On-site recreational facilities including swimming pools and whirlpools, racquet sports, and a health center would provide active recreational complements to the more businesslike meeting rooms.

The 1,200 resort condominium units could be on oceanfront sites and on sites fronting the golf course. These units are expected to appeal to residents and visitors seeking an active recreational environment. Project amenities could include a recreation center, swimming pools, saunas, tennis and other game court activities, barbecue areas, and extensive landscaping.

- Residential. Seven hundred (700) residential units are proposed to be developed, including lots with golf course frontages and lots arranged around open space and recreational amenities. The average density proposed per acre is 2.5.

The residential development would offer a range of choices in terms of living style and investment in Mokuleia. Residential units will provide families privacy as well as flexibility in design and orientation. For growing families, the units may be desirable as primary residences; for other families, a secondary or weekend home could be built. In addition, residential development may represent an opportunity to invest in a property which could be enjoyed in retirement.

- Recreational Development. A wide range of recreational facilities and amenities are possible to enhance the attractiveness of the development to both residents and visitors.

36 Holes of Golf Course are planned to meet the demand for such activity, as well as to provide open space amenities for onsite developments.

Polo Club and Stables - Mokuleia is already well known for its polo matches. The development could include a club and stables surrounded by condominiums and golf fairways. This would enhance the rural, ranchlike atmosphere of the community. During off season, the facilities could be used for rodeos and other equestrian events.

Hiking Trails - Several trails now lead from the lowlands to a plateau of the Waianae Mountains known as Peacock Flats. These and other similar trails could be developed to offer visitors and residents the opportunity to experience and enjoy the rugged, natural beauty of the region.

Camping Areas - Camp grounds, developed in conjunction with the hiking trails, could augment the recreational facilities and appeal of the community.

Sports Center - A sports center could include a pavilion and outdoor track and field. The pavilion could include basketball and volleyball courts which could be adapted for boxing, wrestling, gymnastics and other indoor sports, as well as locker rooms and showers. Outdoor activities could include track and field events, soccer, rugby and football.

Tennis Ranch - A tennis ranch could include courts suitable for tournament play and provide ancillary facilities such as locker rooms, showers, pro shop and restaurant. With the proper design and approach, a tennis ranch could accommodate several tennis tournaments each year.

- Commercial - Approximately 69,200 square feet of commercial space (excluding an estimated 31,500 square feet of space in hotels) are projected to be needed when the development of the project is completed.

The commercial development could provide convenient facilities for goods and services for guests and residents of Mokuleia and for the North Shore community. The commercial development would include retail shopping, dining and entertainment facilities in addition to those that may be provided in the hotel and condominium facilities.

Other potential commercial uses could include a Multi-Media Complex for theatrical, cinematic and musical performances. Such a complex could provide a diverse range of entertainment opportunities to benefit the North Shore community. Another potential use is an Interactive Sports Museum that could showcase the diversity of recreational activities in Hawaii, as well as offer visitors opportunities to participate in these activities. Sports which could be featured include surfing, paniolo rodeo, hang gliding, polo, canoe racing and ancient Hawaiian games.

Following is a brief description of infrastructure improvements related to the proposed resort community. A fuller discussion of the proposed infrastructure improvements can be found in Part IV, Section P, Infrastructure and Public Services.

- Farrington Highway (abutting project) - Provide miscellaneous pavement widening and shoulder improvements and left turn sac. Reconstruct and lengthen one bridge, raise the roadway grade to provide adequate flood clearance and install highway lighting.

- Primary Access Road - Construct 56 feet to 76 feet wide primary access roadway from Farrington Highway through the development to service adjacent sections of land within the project.
- Trunk Sewer Lines - Construct new 12" to 15" sewer lines in Farrington Highway and new privately constructed roadways.
- Sewage Lift Stations - Construct sewage lift stations which are needed to move the wastewater to the treatment plant.
- Sewage Treatment Plant - Construct a new sewage treatment plant (STP), injection wells, and appurtenances to treat and dispose of the wastewater. Alternatively, the applicant will participate with the City and County of Honolulu in its development of a new STP for the Waialua area.
- Water Wells - Complete the installation of pumps and appurtenances on three wells that have been drilled but not yet completed. Drill a fourth well and install the required pumps and appurtenances.
- Water Reservoir - Construct two (2) reservoirs, one for the lower service areas, and the other for the higher service lands, together with the required water lift stations and appurtenances.
- Water Transmission Mains - Construct water transmission mains of various sizes to be built in the private and public roadways.
- Drainage - Two streams flow through the site, Makalena and Kapala'au Streams, with the latter providing discharge into Kai'ahulu Bay. Proposed plans call for rerouting the discharge outlet to Makalena Stream.
- Electricity and Telephone - Additional overhead transmission lines will be necessary to supply needed power for the development. Electrical and telephone service onsite will be provided by an underground duct system.

2. Economic Characteristics

The completed resort development is estimated to generate nearly 4,900 direct, indirect and induced jobs on Oahu, of which about 3,250 jobs are estimated to be located within the region. Much of the supply for this onsite labor demand could be met from within the region from various sources, including the unemployed and underemployed, military dependents, females, high school graduates, employed persons now commuting outside the area, and

3. Social Characteristics

Three types of characteristics merit discussion: (1) continuation and possible expansion of some existing social characteristics; (2) provision of new amenities; and (3) the present community involvement program, which is intended to result in agreements about future benefits to the community.

Existing social characteristics which may be continued and even expanded include equestrian-oriented recreation (particularly polo) and hiking or hunting in the mauka portions of the property. At present, the Hawaii Polo Club leases approximately 18 acres of beachfront Mokuleia property. This site is now the center of polo activities in Hawaii. According to the club president, there are about 30 players and 100 associate members, and matches draw between 500 and 2,000 spectators. Many players keep their horses at the Crowbar Ranch (a division of Mokuleia Ranch), which provides horse stable facilities, daily grooming and feeding service, and limited additional equestrian activities for both polo club members and other paying members of the general public.

Current project plans call for resort development on the existing polo field site. However, there have been preliminary discussions between the landowner and the polo club on relocating the polo fields to a more mauka location. No commitments have been made on either side as of this time. However, if the plans do come to fruition, it is likely that expanded stable operations and related equestrian activities (possibly dressage or rodeo) would also constitute a characteristic of the project.

Mauka portions of the project site include several trails suitable for hiking and a jeep access trail (recently washed out in one place) to Peacock Flats, which is an excellent potential nature/recreational site. Due to liability concerns, the landowner recently has been hesitant to grant permission to outside parties to use the trails. However, there are reports of trespassing by some persons, including hunters. If the project is approved, the access road to Peacock Flat would be improved and the developer would try to provide access to the general public, depending on other requirements for developer expenditures. The current intent is to contract with an outside operator, which could finance needed improvements and operating costs through small user fees. The mauka hiking, picnic, and/or camping facilities could then be open to the general public. It is possible that a portion of the mauka lands could also be set aside for hunting on a fee basis.

Several other commercial aspects of the project will also provide new amenities for North Shore residents--the golf course, restaurants, and contemplated theatre facilities. The additional visitor and resort residential population will provide a base for expanding public services on the North Shore, such as fire protection, emergency medical services, and additional police personnel. A new water system designed to meet the project's needs will upgrade the water service in the area, and to meet wastewater requirements a sewerage system including a sewage treatment plant will be built (possibly in connection with the City's proposed Waialua STP).

To explore the possibility of additional social benefits for the nearby community, the developer has been meeting with community leaders, groups and organizations, and individuals. These efforts will continue throughout the planning process to ensure community issues and concerns (employment, job training, beach and mountain access, shoreline protection, housing, etc.) are appropriately addressed.

4. Environmental Characteristics

The major physical onsite features include the Waianae Mountain Range, Makalena and Kapala'au Streams, pond areas (former sand mining borrow pits), and Kai'ahulu Bay.

The Waianae Mountain Range forms a spectacular, scenic background for the proposed resort community. Approximately 1,800 acres of the applicant's mauka land is not proposed for development, but will remain in open space or be used for recreational purposes, such as hiking and/or camping activities.

The pond areas on the mauka side of Farrington Highway were formed as a result of previous sand mining activity on the site. These pond areas are now used as habitats for waterbirds. Any development, improvement and/or modification to these areas will be done in coordination with the U.S. Fish and Wildlife.

Makalena and Kapala'au Streams flow through the property. Both streams have discharge outlets that empty into Kai'ahulu. However, under the current drainage configuration, only Kapala'au Stream is able to discharge runoff from the adjacent watershed area. Makalena Stream, however, is considered a superior discharge outlet, and improvements to this stream are proposed that will reroute the discharge from Kapala'au Stream. This rerouting is not expected to adversely affect the water quality within Kai'ahulu Bay. More detailed description of the nearshore marine environment is provided in Part IV, Section E of this EIS.

B. PROPOSAL AND PURPOSE OF THIS EIS

Proposal: Amend the North Shore Development Plan to designate approximately 1,019 acres for resort, residential, commercial and recreational uses.

Need: Market studies commissioned by the applicant indicate that there will be a need for 9,500 to 13,300 hotel rooms in addition to the inventory which is being planned for Oahu.

Implementation of Planning Policies: Implementation of State and County planning policies as described in Section IX of this EIS.

Purpose for EIS Preparation: To satisfy the requirements of Chapter 343, Hawaii Revised Statutes ("H.R.S.").

C. USE OF PUBLIC FUNDS OR LANDS FOR THE ACTION

No public funds or lands are being considered for the action if granted.

D. PHASING AND TIMING OF THE ACTION

The following table shows the phasing and timing of the proposed development as estimated by the applicant's market assessment.

MOKULEIA
Proposed Development Phasing Guidelines
1990 to 2005

	<u>1990</u>	1991 to <u>1995</u>	1996 to <u>2000</u>	2001 to <u>2005</u>
Hotel units	500	1,100	1,600	2,100
Condominium units	0	575	1,150	1,200
Single-family lots:	<u>0</u>	<u>200</u>	<u>475</u>	<u>700</u>
Total units	<u>500</u>	<u>1,875</u>	<u>3,225</u>	<u>4,000</u>

The phasing schedule indicates a 20-year development time frame including the time required to obtain government approvals. Timing is affected by several factors beyond the control of the applicant such as government approvals, market conditions for resort and residential development, financing of projects, etc. Accordingly, the schedule should be viewed as an anticipated development framework rather than an exact timetable.

PART IV

DESCRIPTION OF THE ENVIRONMENTAL SETTING AND
THE PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENTA. TOPOGRAPHYExisting Conditions

The area proposed for development consists of four parcels of land between the Farrington Highway and the Pacific Ocean and one parcel of land between Farrington Highway and the Waianae Mountain Range. The shoreline properties are all relatively flat with minor variations caused by drainageways through the parcels and areas of buildup due to windblown sand. The parcel mauka of Farrington Highway is relatively flat for about 1/2 mile mauka of the highway and then slopes up increasingly until it reaches the base of the Waianae mountains.

Impact

The proposed development will have some impact on the overall topography of the site. Localized changes in topography will be necessary to accomplish development. These changes may include the following: (1) building up coastal areas where development is proposed in order to mitigate storm wave and tsunami hazards, (2) grading and construction of drainageways to mitigate flood hazards, (3) cutting and filling in order that roads to be developed are in compliance with good engineering practice and County standards, (4) for areas proposed for recreational use, e.g., golf courses, altering grades in order to improve their value as recreational amenities, (5) within the areas proposed for development of residential lots, grading in order to enhance views or comply with provisions of the subdivision ordinance. The impact of manmade structures or alterations of the landscaping is covered in the visual section of this EIS (Part IV, Section N).

Mitigating Measures

The lack of prominent natural features on the sites being proposed for development and the avoidance of major topographic changes limit the topographical impact of the development. Other mitigating measures will include compliance with City & County of Honolulu grading and subdivision ordinances which contain provisions for erosion control during construction.

B. SOILS

The site is located on the northern coastline of Oahu at the foot of the Waianae range. The Waianae mountain range is believed to have developed in Tertiary time from three rift zones. The lavas that built the mountain generally consist of aa and pahoehoe basalts.

After the volcano became dormant, soil developed from the weathering of the rock surface. Streams carved valleys into the mountain range, and changes in sea level resulted in alluviation of the valley floors and development of fringing coral reefs.

The project is generally overlain by alluvium and colluvium derived from soil materials of the uplands being transported to the lower slopes by water and gravity. Along the shoreline, beach sand can be found. The sand is derived from wind and water deposited material from coral and seashells.

The USDA Soil Conservation Service, "Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii", classifies the near surface soils on the Island of Oahu. Soils within the project site are shown on Exhibit 9 and described as follows:

Ewa Series

Ewa silty clay loam, 6 to 12 percent slopes (EaC)
Ewa stony silty clay, 6 to 12 percent slopes (EwC)

The Ewa soils are classified as low-plasticity silt and clay (ML or CL using the Unified Soil Classification System) and has moderate shrink-swell potential. The soils are generally suitable for use as fill and can support low-rise structures.

Haleiwa Series

Haleiwa silty clay, 0 to 2 percent slopes (HeA)

The Haleiwa soils are classified as high-plasticity silt and clay (MH and CH), have moderate shrink-swell potential, are suitable for use as fill, and can support low-rise structures.

Jaucas Series

Jaucas sand, 0 to 15 percent slopes (JaC)

The Jaucas sands are classified as poorly-graded sand (SP). The sand has low shrink-swell potential, is erodable, and can support low-rise structures.

Kaena Series

Kaena clay, 2 to 6 percent slopes (KaB)
 Kaena stony clay, 2 to 6 percent slopes (KaeB)
 Kaena stony clay, 6 to 12 percent slopes (KaeC)
 Kaena very stony clay, 10 to 35 percent slopes (KanE)

The Kaena soils are classified as high-plasticity clays with high shrink-swell potential. The soil is very sticky and plastic when wet and is generally unsuitable for use as fill. Structures placed on this type of soil will require special design consideration to minimize distress due to shrinking and swelling of the soils. This usually includes removal of 18 to 36 inches of unsuitable soil and replacement with non-expansive, compacted granular fill.

Kawaihapai Series

Kawaihapai clay loam, 0 to 2 percent slopes (K1A)
 Kawaihapai stony clay loam, 0 to 2 percent slopes (K1aA)
 Kawaihapai stony clay loam, 2 to 6 percent slopes (K1aB)

The Kawaihapai soils are classified as low-plasticity clays underlain by silty sand and gravel. The clay soil has moderate shrink-swell potential, is suitable for use as fill (except that there are stones in the soil profile), and is suitable to support low-rise structures.

Mokuleia Series

Mokuleia clay loam (Mt)

The Mokuleia soil is classified as a low-plasticity clay and silty sand that is underlain by clean sand. The soil has moderate to low shrink-swell potential, is suitable for use as fill and capable of supporting low-rise structures.

Pearl Harbor Series

Pearl Harbor clay (Ph)

The Pearl Harbor soils are classified as high-plasticity clays underlain by peat and organic soils. The soil has high shrink-swell potential, is poor for use as fill, and has low supporting capacity for structures. Special design considerations are required for development over these soils due to the soft consistency of the material.

Pulehu Series

Pulehu clay loam, 0 to 3 percent slopes (PaA)
Pulehu stony clay loam, 2 to 6 percent slopes (PuB)

The Pulehu soils are classified as low-plasticity clay and silt, and as silty sand. The soil has low to moderate shrink-swell potential, and is suitable for use as fill, and capable of supporting low-rise structures.

Impacts

Location of improvements on the site must take into consideration soil conditions. Building on unsuitable soils may jeopardize the safety and value of the improvement.

Mitigating Measures

In most areas the use of conventional foundations will be adequate to support the development being proposed. In areas having soils with high shrink-swell potential, removal of unsuitable soil to depths varying from 18 to 36 inches and replacement with non-expansive soil will be required. In soft soil areas, surcharging, "floating" foundation, or removal of soft soil will provide the necessary support for structures.

Siting of proposed improvements will take into consideration soil conditions. Soil testing prior to construction and the adherence to good engineering practices and City & County Building Codes should mitigate any problems associated with soil stability.

C. WATER RESOURCES AND WATER USAGE

Existing Conditions

The proposed development is within the Mokuleia sub-area of the Waialua Water Control Area. The Board of Land and Natural Resources (BLNR) controls water allocations within a water control area under authority of Chapter 177, H.R.S., and Chapter 166 of Title 13, Administrative Rules. According to documentation provided by BLNR, the Mokuleia sub-area has a sustainable yield of 20 million gallons per day. Existing wells on the property have a combined capacity of almost seven (7) million gallons per day (see Exhibit 14).

Impact and Mitigating Measures

The proposed development would require the use of approximately 2.0 million gallons of potable water for domestic consumption and an additional 1.5 to 2.0 million gallons of water per day for irrigation purposes. Little or no impact on water recharge is expected due to the development as proposed. The bulk of the development proposed is in areas described by the Board of Water Supply as "pass" areas indicating no connection between surface and groundwater resources.

As the proposed water usage for the development is lower than the existing developed well capacity on the site, it is doubtful that any mitigating measures need be taken. However, the proposed development is located in the Waialua Water Control Area and requires the installation of a public water system. Such a system would require the approval of the Board of Land and Natural Resources, the Board of Water Supply, and the Department of Health. The approval process of these agencies will assure that adequacy of the water source and the purity of the water meets standards of the City & County of Honolulu and the State of Hawaii.

D. TSUNAMI/FLOOD HAZARDS

Existing Conditions

The standard used in the United States of America for determining the flood hazard potential of various properties is the Department of Housing and Urban Development's "Flood Insurance Rate Map" (FIRM). These maps were developed by the U.S. Army Corps of Engineers. These maps designate and rate the flood hazards from both rain and wave action. A portion of the property being proposed for development is located within flood hazard areas designated under the FIRM program. The affected areas are shown on Exhibit 7. The following is a description of the various zones that are applicable to the proposed project.

EXHIBIT 14

Wells Existing on Property

Wells existing on the subject property are as follows:

State Well Number	Well Capacity in MGD
3410-01	.83
3410-03	1.5
3410-05	-
3310-01	1.5
3310-02	1.5
3310-03	<u>1.5</u>
	<u>6.83</u>

Flood Zone A	Areas of 100-year flood; base flood elevation and flood hazard not determined.
Flood Zone A4	Areas of 100-year flood; base flood elevation and flood hazard determined.
Flood Zone C	Areas of minimal flooding.
Flood Zone V22	Areas within which in addition to base elevations there are structural requirements.

NOTE: The Department of the Army Corps of Engineers provided more detailed information broken down by tax map key parcels. A complete copy of their March 9, 1987 letter and exhibits are included in Part XIII of this EIS.

Impact

Development within flood zone areas may pose a risk to both human safety and the safety of improvements.

Mitigating Measures

The applicant will mitigate the potential for flood impacts by the following:

Additional studies

Prior to developing plans for specific improvements, the applicant will study the areas in Flood Zone A in accordance with "Storm Drain Standards" of the City & County of Honolulu to determine the base flood elevations and hazard potential.

A study identifying the potential hazard from Tsunami and Hurricanes has been done by Dr. Charles Bretschneider and is included as Appendix E. This information is being incorporated into the engineering study which will make specific recommendations for mitigating against flood-tsunami hazards.

Specific Actions

A number of specific mitigating measures may be recommended, including:

- Providing setbacks from coastal areas subject to wave action.

- Raising the grade of the site above base flood elevation.
- Increasing structural capabilities of foundations or building to withstand projected hazard.
- Development of various designs to dissipate potential wave action.

Compliance with Ordinances and Laws

The FIRM program developed by HUD has been incorporated into the City & County of Honolulu's Land Use Ordinance (Article 7.10). The applicant will comply with the requirements of all laws relating to flood mitigation.

E. MARINE ENVIRONMENT

The marine environment of concern can be divided into two regions that can be described as the nearshore marine environment and the near/offshore marine environment. The nearshore marine environment begins at the waterline and extends offshore to depths of approximately 60 feet. The near/offshore marine environment includes depths from 60 feet to 600 feet, occurring 2 to 3 miles offshore. A different environmental impact discussion is offered for each of these regions.

E.1. NEARSHORE MARINE ENVIRONMENT

Existing Conditions

Conditions in the nearshore marine environment adjacent to the proposed Mokuleia development are typical of a class "A" nearshore coastal body of water. Kai'ahulu Bay, which is located adjacent to Parcel B, the largest oceanfront parcel proposed for development, was found to be acceptable for recreation purposes. Observations by the consultant (e.g., nearshore submarine channel, see Appendix F, Oceanit Laboratories, Inc.) led them to conclude that the existing drainage pattern had been altered in the past from Makalena to Kapala'au Stream.

Impacts

The major impact on the nearshore waters would be the rerouting of drainage from Kapala'au to Makalena Stream, approximately 300 meters apart along the coast. Both discharge into the same nearshore embayment area, i.e., Kai'ahulu Bay. An additional impact could result from runoff containing pesticides and herbicides after being applied to the landscaping and golf course. No other significant impacts on nearshore ocean waters are expected from the proposed recreational resort community.

Mitigating Measures

Based on a consulting report from Oceanit Laboratories, Inc. rerouting of the drainage to Makalena Stream would have a beneficial impact. This is due to the fact that there is an existing channel in front of the Makalena Stream outlet which serves as a conduit for discharging runoff into the ocean. Runoff into the ocean is expected to be the same or less than without the development due to drainage improvements as part of the development. Impacts from the use of pesticides and herbicides can be mitigated through the selective use of "safe" materials. Additionally water quality monitoring and marine life observations will help to identify any adverse effects. This selection and monitoring process is regulated by the Department of Health through their Water Quality Certification, Section 401 application. No other mitigating measures appear necessary as there are no other impacts identified.

E.2. NEAR/OFFSHORE MARINE ENVIRONMENT

Existing Conditions

The near/offshore marine environment includes a shelf that skirts around Kaena Point and includes the area offshore of the proposed Mokuleia Development. This shelf is considered to be an area of high productivity (i.e., good area for fishing).

In general, nearshore currents can be characterized as geostrophic currents that flow in the westerly direction; wind-driven currents that tend to flow in the westerly and easterly direction during tradewind and kona wind conditions, respectively; and tidal currents that tend to flow in the westerly and easterly direction during flood and ebb conditions, respectively (Bathen, Circulation Atlas for Oahu, Hawaii, 1978).

Discussions with the National Marine Fisheries Services (NMFS) indicated that at present there is no known significant Green Sea Turtle (*Chelonia mydas*) activity along the 1.5 mile strip of beach and marine waters adjacent to the proposed project. Tiger sharks (*Galeocerdo curvier*), the only known natural predator of juvenile, subadult and adult Green Sea Turtles (Balaz, Synopsis of Biological Data on the Green Turtle in the Hawaiian Islands, NMFS, 1980) have been caught in the offshore waters, generally at night. The diversion of stream discharge from Kapala'au to Makalena Streams is considered to be an environmentally good move because it will help to preserve the existing structure of the reef, i.e., the channel in front of the Makalena Stream.

Discussions with the University of Hawaii Kewalo Basin Marine Mammal Laboratory (KBML) indicated that there are several species of marine mammals that utilize, either directly or indirectly, the waters off of the proposed Mokuleia Development, including: Bottle-Nose dolphin (*Tursiops gilli*), Spinner dolphin (*Stenella longirostris*), Spotted dolphin (*Stenella attenuata*), Rough-toothed dolphin (*Steno bredanensis*), False Killer whale (*Pseudorca crassidens*), Pilot whale (*Globicephala macrorhynchus*), Pigmy Sperm whale (*Kogia breviceps*), and Mellon Headed whale (*Peponocephala electra*). The Humpback whale (*Megaptera novaeangliae*) is known to use the area in the winter time, generally between the end of December to mid May. In general, Humpback whales have been seen in the area from Mokuleia to Kaena Point out to the 600-foot isobar.

Discussions with the US Fish and Wildlife Service (USFWS) and the State Division of Aquatic Resources (AR), part of the Department of Land and Natural Resources (DLNR), did not add to the list of near/offshore marine life previously identified by NMFS and KBML.

A few Hawaiian Monk Seals (*Monachus schauinslandi*) have recently been reported in the area (Ramon-Saunders, Haleiwa). However, although periodic sightings occur around populated islands such as Oahu, Hawaiian Monk Seals are typically found on isolated outer atoll islands of the Hawaiian islands (Svihla, "Notes on the Hawaiian Monk Seal," Journal of Mammalogy, Vol. 40, No. 2, 1959).

Impacts

Impacts on the near/offshore marine environment could result from increased recreational use including increased vessel traffic, jet skiing, wind surfing, etc. The potential increase in marine use and noise, resulting from easier access and increased public awareness, could cause certain types of marine life to avoid the area. Additional impacts could result from night-time lighting particularly for nocturnally feeding marine life.

Significant impacts from the project are not anticipated at this stage in the project development plan, i.e., rerouting the stream discharge in Kaiahulu Bay. Any additional project plan modifications would require further study.

Mitigating Measures

Based on discussions with the NMFS, USFWS, KBMML, and AR certain conditions could be imposed to limit the impact on near/offshore marine life, such as restricted vessel usage during peak use periods of marine life. However, these concerns are generally addressed by the federal government, e.g., restrictions for whale watching. Therefore, no additional restrictions on near/offshore marine environmental use is seen as necessary at this time.

Other forms of mitigation could include the controlled use of nighttime lighting so that shaded lights, rather than flood lights are used to light the coastline in certain areas.

Additionally, impacts could be mitigated through a public awareness and appreciation program that would inform the public about marine life habitats and uses, e.g., watching the Humpback whale. This type of public awareness program could be coordinated with the different regulating agencies and KBMML.

F. COASTAL EROSION AND POTENTIAL SEA LEVEL CHANGES

Coastal Erosion:

Existing Conditions

According to Beach Changes on Oahu as Revealed by Aerial Photographs by Dennis Hwang, July 1981.

The areas proposed for development have shown varying susceptibility to coastal erosion as shown below.

Site B, Transect 12:	Lost 8' with accretion and relictions
Site C, Transect 9-10:	Varied from 5' gain to 11' loss at transection
Site D and E:	Transects 6 and 7 varied from a 6' gain at Transect 6 to a loss of 37' at Transect 7

It should also be noted that the report showed significant accretion at various points along the north shore from time to time.

Impact

Locating new improvements in areas where shoreline instability has been recognized in the recent past may subject the improvements to long-term ocean hazards due to coastal erosion.

As indicated by the above table the parcels proposed for development have had gains and losses in the past 30 years.

Coastal Erosion

Mitigating Measures

There are a number of mitigation measures which can be undertaken to minimize the impact of erosion.

1. Provision of Adequate Setbacks - Providing adequate setbacks is the method of minimizing erosion preferred by both the applicant and the various government agencies charged with administration of coastal approvals. This alternative has the advantage of minimizing impacts to proposed development while at the same time providing maximum protection to the environment by not interfering with natural processes. Setbacks may have the undesirable effect of limiting development or encouraging concentration of development (higher structures).
2. Replenishment of Eroded Material - This alternative has been used successfully in other beachfront locations. In the case of the Mokuleia property large quantities of sand have been mined from the property in the past and there is reason to believe that large deposits of sand remain unmined in certain areas particularly beneath the existing polo field. During the development process it would be possible to stockpile sand for future use replacing it with other material. Negative impacts of this methodology would be the interference with the natural coastal changes which might have impacts at other coastal locations.
3. Artificial Stabilization with Barriers or Seawalls - While this is a potential option it is undesirable from the viewpoint of public policy cost and developer liability. The applicant has no plans to propose the use of barriers or seawalls in order to prevent coastal erosion. Should such a request be made it would be subject to a number of permit requirements including Corps of Engineers, Shoreline Management, Conservation district Use Permit and other.

POTENTIAL SEA LEVEL CHANGES:

Existing Conditions

In response to Senate Resolution 137, 1984, the Department of Planning and Economic Development prepared a report titled "Effects on Hawaii of a Worldwide Rise in Sea Level Induced by the 'Greenhouse Effect'"

January 1985. This report indicated that increases in sea level would have a significant impact on the state's shoreline as well as the economic activities if that rise were 4.8 feet or greater. However, no conclusion could be reached as to what the actual level 100 years from now would be.

Impact

The location of economic investment in areas impacted by sea level changes is of interest to State and County planners.

Due to tsunami considerations, the Mokuleia Development will most likely be raised to levels (elevations) which would probably keep it above any potential rise in sea level over the next 100 years.

Of greater concern to the development is the usability of public facilities such as the Honolulu Airport and Honolulu Harbor in the event of sea level changes. The economic viability of the development is dependent on the existence of a tourist industry on Oahu.

Mitigating Measures

At the present time actual changes in sea level cannot be known. Therefore only general caution can be exercised.

In selecting designs and building locations consideration should be given to potential increases in sea level.

G. DILLINGHAM AIRFIELD

Existing Conditions

Dillingham Field is located approximately one mile West of the bulk of the development proposed mauka of Farrington Highway and immediately south of the non-contiguous oceanfront parcels proposed for development. Dillingham is a military field under long term lease to the Department of Transportation DOT (State of Hawaii) for civilian operations. At the present time the bulk of the aircraft using the field are small general aviation aircraft. Other uses include gliders, skydiving and occasional military use. In recent years the primary military use has been for helicopter training. Information provided in a 6 April 87 communication from Directorate of Facilities Engineering U. S. Army Support Command, Hawaii, indicates that no military safety zones have been developed for the field and that no ICUZ Installation Compatible Use Noise Zone has formally been adopted for the field.

According to State DOT information, Dillingham Field reported approximately 100,000 operations in 1986 from all sources during normal hours of operations. Note: Military training operations conducted outside normal operating hours (daylight) would not have been counted. DOT provided the following statistics on total operations: 1979 145,000; 1980 131,000; 1981 120,000; 1982 92,000; 1983 85,600; 1984 89,200; 1985 95,000; 1986 99,966.

Impact

Noise impacts of the field on the proposed development are extensively discussed under the Noise section of this EIS.

Safety impacts of the airfield on the proposed development: Discussions with Department of Transportation and FAA personnel indicated no special hazards relating to the land uses proposed. Written communication from both the FAA and the DOT made no mention of safety hazards associated with the airport. Communication dated 6 April 87 from the military indicated that there are criteria for establishing accident potential zones. Depending on how that criteria were applied at Dillingham Field the potential for incompatibility of land uses existed. However, the same letter states that civilian authorities should be the ones contacted for safety information.

Mitigation Measures

See noise section of EIS for mitigation measures relating to noise.

Mitigation measures appropriate to mitigate safety considerations include restricting development to areas outside of designated hazard zones, if any. Compliance with recommended land use restrictions within designated hazard areas will be followed.

H. TERRESTRIAL VERTEBRATES AND VEGETATION

Existing Conditions - Terrestrial Vertebrates

A terrestrial vertebrate survey of the site was conducted by Char and Associates (June 1986). The results of this study can be found in Appendix I. The study results are summarized below.

Faunal habitats: Six general faunal habitats—pasture lands, koa-haole scrub, kiawe forest, pond areas, beach area, and mixed maritime scrub/grassland—are recognized on the project area. A more detailed classification system of vegetation types is presented in the botanical report.

The predominant faunal habitat on the project area is pasture land, which consists of open to semi-open grassy areas. In the semi-open areas, scattered trees and shrubs of kiawe (Prosopis pallida), Java plum (Syzygium cumuni), koa-haole (Leucaena leucocephala), and klu (Acacia farnesiana) are frequently observed. The dominant grasses are two species of Panicum and California grass (Brachiarala mutica). The pasture area provides grazing for both beef and dairy cattle (Bos taurus) as well as horses (Equus caballus). Cattle egret (Bubulcus ibis) was often seen associated with horses and cattle in the lower pastures. Bird densities and variety are high in this habitat, with a number of granivorous (seed-eating) species present. Bird and several smaller mammal species, such as the mongoose (Herpestes auropunctatus) and the house mouse (Mus musculus), are frequently encountered around the livestock watering troughs scattered throughout the paddocks.

The koa-haole scrub and kiawe forest are the second and third faunal habitats. These habitats occupy the inland portions of the project area. Species density and diversity are not as great as in the pasture areas. The red-crested cardinal (Paroaria coronata) is common in this habitat. Mongoose, the metallic skink (Leiolopisma metallicum), and the mourning gecko (Lepidodactylus lugubris) prefer these wooded areas.

The pond areas around the Crowbar Ranch were surveyed intensively, as endangered waterbirds are known to frequent the area. Seventeen (17) Hawaiian coot or 'alae ke'oke'o were observed on the largest of the ponds, which has been modified for waterbirds; two (2) coot were observed in the reservoir pond behind the corrals; and one (1) coot was observed on the pond located on the Wai-a-lua side (easternmost) of the ranch facilities. This pond area consists of one irregularly-shaped pond which has been incompletely separated by an earth and corral rubble berm. Four (4) Hawaiian duck or kolea (Anas wyvilliana) were found on this pond. The birds are probably captive-bred birds released in this or a nearby area. We were not able to get close enough to see if the birds were banded.

The endangered Hawaiian Stilt (Himantopus mexicanus knudseni) and the Hawaiian Gallinule (Gallinula chloropus sandvicensis) have been reported from the wetlands on the study area by the State Division of Forestry and Wildlife and the U. S. Fish and Wildlife Service. Another source reported that a colony of Laysan Albatross (Diomedea immutabilis) a protected Hawaiian bird had frequented the project area at least during the past two winters.

The beach or coastline area is the fifth habitat and is used by a number of migratory species which winter over in the islands. The survey was conducted after most of these species had already left for their summer breeding grounds in North America or the Arctic. Migratory species which would probably be seen here during the late fall, winter, and early spring months include the Pacific golden-plover or kolea (Pluvialis fulva), wandering tattler or 'ulili (Heteroscelus incanus), ruddy turnstone or 'akekeke (Arenaria interpres), and sand-derling or huna-kai (Calidris alba). These species would also utilize the pond areas and some of the pasture areas, especially those low-lying spots periodically flooded during heavy rains.

The maritime mixed scrub/grassland habitat located behind the beach has a faunal community similar to those of the koa-haole scrub and pasture areas. The house sparrow (Passer domesticus), however, is more numerous in these areas. The red-vented bulbul (Pycnonotus cafer) was common in this habitat and was often observed searching among the grassy areas for ripe wild tomato fruit (Lycopersicon pimpinellifolium). The tomato plants are abundant here, and the birds are attracted to the area by the fruit; the birds would probably be less common in this area when the tomato plants are not fruiting.

The consultant has recommended that buffer zones be established around the pond area. Existing trees and shrubs should remain intact; additional planting should be made in those areas without shrub cover.

Anticipated Impacts and Mitigative Measures - Terrestrial Vertebrates

The vertebrate fauna present on the site is composed largely of introduced species. Development of the pastureland areas, kiawe forest, koa-haole scrub, and maritime scrub/grassland will probably reduce the habitat size of a number of introduced bird species, especially finch and game bird species. Opportunities for range expansion of species commensal with man, such as the house sparrow and the common mynah, will increase. The vertebrate fauna affected by the development in these areas is of minor environmental concern. None is considered endangered by federal or state governments. Some, such as the mongoose and cat, prey on the native waterbirds found in the pond areas.

The pond areas and the coastline, to a lesser extent, support a number of native bird species. The pond areas provide habitat for and are utilized by two endangered waterbird species, the kolea and the Hawaiian coot. The consultant's recommendation that alterations or modifications of the pond areas should be done in close consultation with the U.S. Fish and Wildlife Service will be followed.

Existing Conditions - Vegetation

Based on a terrestrial botanical survey of the site (Char and Associates, 1986), eight (8) vegetation types or plant communities can be found: strand assemblage, Maritime wooded assemblage, wetland areas, pasture areas, leucaena scrub, prosopis woodland, stream bottoms, and rocky hillsides.

- Strand assemblage. In the unconsolidated sand of the beach, the dominant plant is naupaka-kahakai, which forms extensive, low, wind-swept strands, especially on the top of the dune. Three native plants share the top of the dune with naupaka-kahakai. They are the 'akoko, pohilihili, and pohinahina. In addition, New Zealand spinach is common throughout.

Where there are not trees immediately behind the beach, the dune-type vegetation extends for some length. In these areas, the back dune vegetation is much richer in both native and exotic species. Most of these are annuals or small, non-woody perennials. The ground is covered for the most part by Bermuda grass, New Zealand spinach, 'ilima, Australian saltbush, alena, and pau-o-Hi'iaka.

- Maritime wooded assemblage. Farther back from the beach, or where trees come down to the beach, strand vegetation gives way to plants more common in the dry lowlands. Within the study area, the only tree that tolerates exposure to the elements, especially salt spray, and thrives at the beach is ironwood. It is widely planted and also comes up spontaneously from seed.

Away from the trees other plants increase. The vegetation may take three forms—thicket, scrub, or grassland. Only koa-haole forms extensive scrub and thickets. Where koa-haole is more open, it produces a scrub which grades into grassland with a further decrease in woody cover. In places where the woody species do not predominate, Guinea grass and sour grass forms grassland. In drainage areas with running water, California grass grows in a narrow band adjacent to the water's edge.

- Wetland areas. These are areas adjacent to standing fresh or slightly brackish water—ponds and drainage ways. Ordinarily they would be expected to have unique flora of their own, but this is not the case in the study area, as these wet areas have been greatly modified by man. The pond areas are former borrow pits

from sand mining operations. For the most part, the vegetation in these wetland areas consists of those plants already growing in the adjacent communities, though usually much more lushly than nearby.

- Pasture areas. The vegetation of these areas has been modified by the introduction of range grasses and some legumes for forage and by the grazing of horses and cattle. In addition, a number of weedy plants have also found their way into these areas. In the upper areas the primary forage grass is Guinea grass. In the lower areas it is California grass. Other grass species were found to be more restricted.

Besides the grasses, which are the most salient feature of the pasture areas, a number of other plants are significant members of the community. Among the woody plants are kiawe and Java plum. Klu and koa-haole form a very open scrub throughout. In the upper sections of the study guava, Chinaberry and silk oak are occasional. In the area just to the west of the Dillingham house is the remnant of an old macadamia nut orchard. A large number of herbaceous plants are to be found in the pastures. Several degrade the quality of the pasture and, as they are avoided by the animals, they tend to take over when the more desirable plants are overgrazed.

- Leucaena scrub. These are areas in which the koa-haole are taller, up to five or six meters tall, and whose crowns meet to form a more or less closed canopy. An infestation of a recently introduced psyllid species has severely damaged koa-haole plants in the islands. While large areas of koa-haole scrub on the study site are damaged, it was observed that koa-haole was thriving in several places. Closer examination found high numbers of ladybird beetles, which were apparently reducing the psyllid infestations.
- Prosopis woodland. Kiawe is scattered throughout the study area, but in only two areas does it become a major component. One area is a mixed scrub/forest near the western extreme of the upland portion, the other is an almost pure strand just to the west of the Nike road. In the lower reaches it is clearly an artificial strand with the trees planted in a row. Kiawe wood is harvested in this area. In the upper areas of the project site, the canopy opens up considerably, and the orderly planting of trees is not apparent. At the very top of the study site, the woodland is quite scrubby with koa-haole. In the scrubby areas, it is little different from the preceding Leucaena plant community type.

- Stream bottoms. This vegetation type is of very limited occurrence in the study area. It is also a woodland, extending down the length of every stream with significant seasonal flow, though seldom greater than thirty meters in width. The predominant tree is Java plum, which forms an almost completely closed canopy. What gaps there are in the canopy are filled with kukui. Wiliwili, a native tree, is occasional; seedlings and saplings of wiliwili are found in a number of even the smallest dry streambeds in pasture areas.

Two ferns characteristic of stream bottoms are also found here, though the streams are almost too dry to support them during the summer months. They are *Blechnum occidentale* and downy woodfern.

- Rocky hillsides. For the most part, the hillsides are rockier than the pastures, on steeper slopes, and less heavily grazed. Scrubs are common. Among the species restricted to this community are two dryland ferns which prefer arid banks, *Pteris cretica* and the gold or silver fern. Among the flowering plants, there are two native species characteristic of rocky areas. Nehe is locally fairly common along the foothills all the way to Ka'ena Point. 'Ala'ala-wai-nui is virtually restricted to thin pockets of soil on rocky ledges of the steep hillsides. Wiliwili, while seen occasionally in the pastures and stream bottom below, is quite common on the hillsides, mostly just outside the study area, although they do extend down into the study area for a short distance. The only other native tree unique to this area is alahe'e.

For a complete description of the eight vegetation types and the relative abundance of each species, please refer to Appendix I, Biological Survey Study by Char and Associates (1986).

The U. S. Department of Interior Division of Fish and Wildlife expressed concern about potential secondary impacts to native dry land forest and candidate endangered plants found in the Mokule'ia, Makua Kea'au, and Kuaokala Forest Reserves from increased camping and hiking activities in the upland area. Several candidate endangered plants including *Cyanea superba*, *Schiedea kaalae*, *Neowawraea phyllanthoides*, *Alsinodendron obovatum*, *Neraudia melastomifolia*, *Zanthoxylum skottsbergii*, and *Tetraplasandra turbans* are found within the Mokule'ia Forest Reserve. Of these, *Cyanea superba* is one of the rarest and is presently under review by the Washington office for listing as an endangered species. In 1981, this plant was restricted to two disjunct populations of 22 adults, 21 subadults, and 6 juveniles at Pahole Gulch and 3 adults and 15 juveniles at Kahanahaiki Valley.

Anticipated Impacts and Mitigative Measures - Vegetation

According to the survey by Char and Associates, there are no plant communities or individual species located in the study site in need of protection. There does not seem to be any botanical impediment to the development of the study area. It has a long history of use and alteration, and little of botanical value remains. All vegetation types on the project area, with the exception of the strand, are dominated by introduced (or exotic) plant species. The recommendation that landscaping be done, as far as practical, with native plants adapted to the environment will be followed.

Increased camping and hiking activities in the dry upland areas of the Mokule'ia project may substantially increase the potential for accidental wildfires spreading into the forest reserves and destroying these candidate endangered plants. Fires spreading into these forest reserves may be difficult to control because of the topography, isolation, and abundance of inflammable grasses and other vegetation. In addition to fire threat, camping activity may increase the potential for introduction of exotic plant competitors into the forest reserves and improved access roads and trails may encourage off-road-vehicle activity causing erosion and habitat degradation.

The EIS states that additional trails and campgrounds may be developed in the upland areas which would be available to the general public. The U. S. Fish and Wildlife Service is concerned about the secondary impacts to the native dryland forest and candidate endangered plant species found on the adjacent Mokule'ia Forest Reserve and the Pahole Natural Area Reserve by the increased human activity.

A number of mitigating measures are available, including:

1. Keep upland areas in present use. These upland areas have been used for grazing cattle. Grazing cattle and, perhaps, horses could be continued. Guided activities such as horseback riding and nature walks could be allowed.
2. Limited use. The upland areas could be opened for day hikes only, no camping. Picnic shelters with appropriate facilities for open fires for cooking would be established.
3. Camping and hiking allowed. Increased activity in the upland areas will require an active management and control system. The following suggestions are offered.

Upland Resource Management Program. This program (manager and staff) would be involved in issuing camping permits, monitoring and policing visitors and campsites, trail maintenance, etc.

This office would be responsible for making sure Mokule'ia hikers and campers do not go onto State forest reserve lands without appropriate permits from DOFAW. The office would also work closely with DOFAW and the Division of Conservation and Resources Enforcement (DOCARE) as well as the U. S. Fish and Wildlife Service.

Fire Control System. Camping allowed only on designated areas with facilities for open fires—fire pits, barbecue grills, etc. Or open fires could be banned; gas stoves, sterno, etc. used for cooking. Water tanks should be located near each campground. A system of firebreak roads and a fire fighting plan should be set up in coordination with DOFAW.

In the options presented above, all vehicular traffic would be restricted to paved or gravel-lined roads (for service vehicles). No off-road vehicle (ORV) activity, dirt-bikes, etc., would be allowed.

A Resource Management Program would be developed in consultation with the Fish and Wildlife Service, the Board of Land and Natural Resources Forestry Division, and other concerned and interested parties. The applicant believes that this would be the most appropriate forum for developing a mountain access program which addresses the many concerns.

I. WETLANDS

Existing Conditions

Exhibit 14A shows the existing wetlands areas as provided by the U.S. Department of Interior Fish and Wildlife Division. There is only limited information on the use of these wetlands by endangered waterbirds and migratory waterfowl. The Crowbar Ranch pond is listed as a primary habitat in the Hawaiian Waterbirds Recovery Plan. As indicated in the previous section, the applicant's consultant on Terrestrial Vertebrates focused attention on the wetlands area identified as having significance for endangered birds.

EXHIBIT 14A
WETLAND DESIGNATIONS

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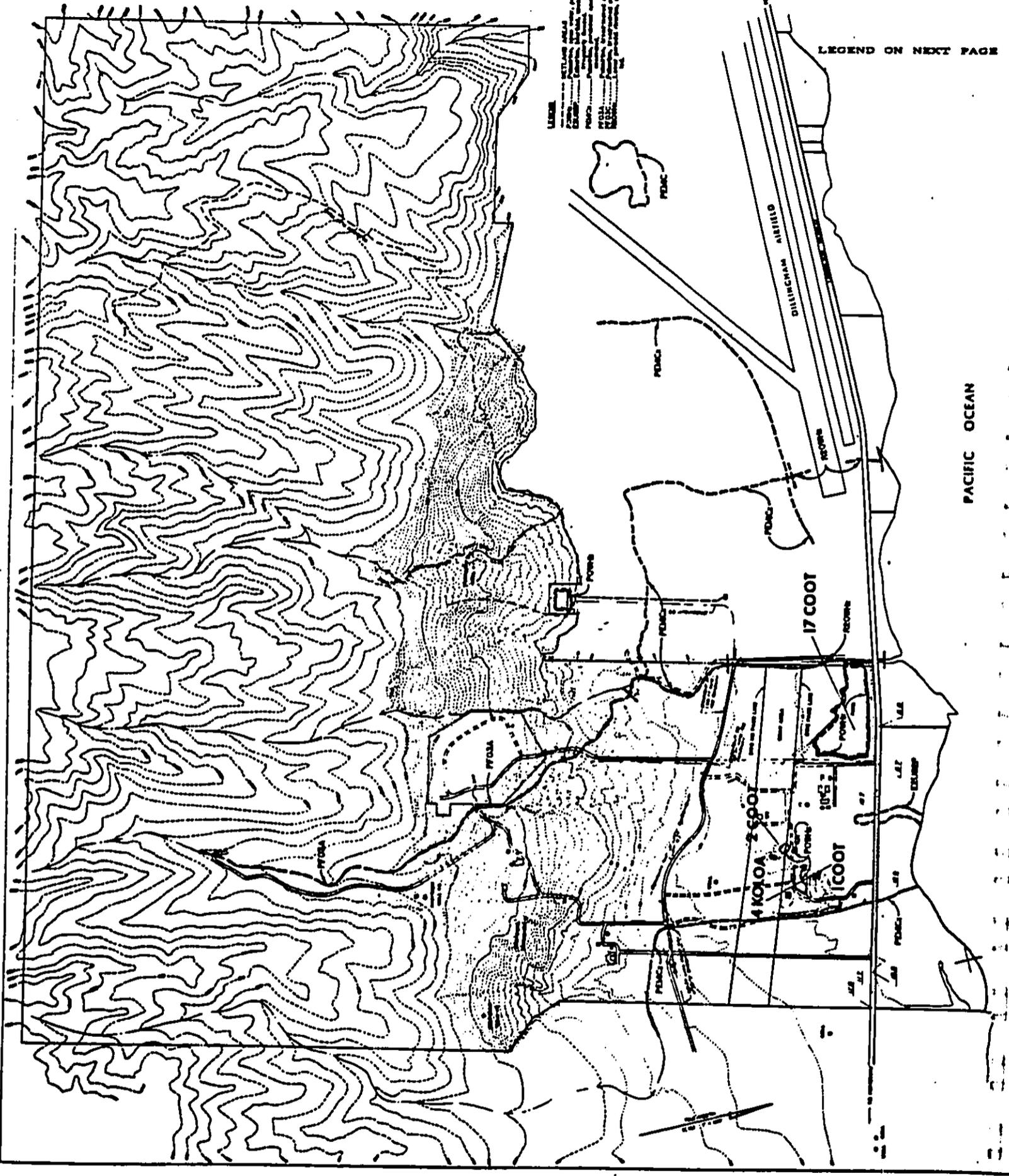


EXHIBIT 14A

LEGEND
WETLAND MAP

- POWHx palustrine, open water, permanent, excavated.
E2US2P estuarine, intertidal, unconsolidated shore (sand),
irregularly flooded.
PEM1Cx palustrine, persistent emergent vegetation, seasonal,
excavated.
PFO3A palustrine, broad-leaved evergreen vegetation, temporary.
PFO3C palustrine, broad-leaved evergreen vegetation, seasonal.
R2OWHx lower perennial riverine, open water, permanent, excavated.

Pond History:

The U.S. Department of Interior, Fish & Wildlife Division, has identified a number of Wetland Areas within the proposed development. A brief history of the creation of the major pond areas is appropriate at this point.

During the 1970's the Warren Corporation, a mining and construction company, was granted mining rights on the subject property in return for royalty payments to the property owner. Warren Corporation obtained a conditional use permit from the City and County of Honolulu in order to exercise its rights under the royalty agreement.

Terms of the conditional use permit required that the Warren Corporation return the land to its original grade following mining operations. In addition, the conditional use permit required that only limited amounts of land were to be opened for mining purposes at any given time.

In 1979, when the property was acquired by a new owner, mining operations had exceeded the scope allowed under the conditional use permit. The new owner went to court to prevent the Warren Corporation from continuing to violate the conditional use permit requirements and was granted a temporary restraining order and later a preliminary injunction. By the time injunctive relief was granted, over 20 acres of land were below grade, more than three times the acreage allowed in the conditional use permit.

Subsequently, the landowner filed for an agricultural subdivision at which time the Department of Land Utilization required that the landowner fill the largest pond as required by the conditional use permit. In order to release the conditional use permit to allow for processing of the agricultural subdivision, the landowner had to post a bond of approximately \$800,000 to assure that the pond was filled.

Subsequently, the landowner was notified by Fish & Wildlife that endangered birds were using the mined areas as a habitat. The landowner wrote to the Corps of Engineers and received written confirmation that the manmade ponds were not "Wetlands" as defined by federal law because they were manmade. Fish & Wildlife was notified of the Corps' findings, yet has persisted in describing the mined areas as Wetlands.

The applicant in its recent resort development proposal has voluntarily proposed to work with the Department of Interior, Fish & Wildlife Division, and Department of Land and Natural Resources in order to preserve the recently developed ecosystem. Thus the existing ponds are the result of haphazardly created mining pits in violation of City permits which were created in the last 10 years.

Proposed Action

The applicant proposes to retain the existing pond areas and incorporate them into the resort development as a design element. The primary purpose for this proposal is to retain the area as a primary habitat for the Hawaiian Waterbirds Recovery Plan.

The applicant believes that the sites can be improved and enhanced and, if need be, recreated in other locations with professional guidance from interested agencies into superior environments for the preservation of endangered species.

Impacts

Increased human occupation in the areas surrounding the ponds is expected to have some impact on the waterbirds which utilize the ponds. Human disturbance and activity near the ponds will increase. This may affect breeding activity and the recovery of the endangered waterbirds. There may be increased predation of waterbirds by pet and feral cats and dogs; rodent populations may increase. In addition, there may be changes in drainage and runoff patterns as well as water quality due to construction in nearby areas.

Mitigating Measures

The U.S. Fish and Wildlife Service has identified the ponds around the Crowbar Ranch as important habitat for the recovery of endangered Hawaiian waterbirds. The U.S. Fish and Wildlife Service has recommended that the design, planning, and modification of the wetlands (ponds and streams) on the project site be done in coordination with their office and the State Division of Forestry and Wildlife.

The consultant has recommended that buffer zones be established around the pond areas. Existing trees and shrubs should remain intact; additional plantings should be made in those areas without shrub cover.

The developer, the U.S. Fish and Wildlife Service, and the State Division of Forestry and Wildlife should develop a long-term maintenance program for the wetlands and a protection plan for the endangered waterbirds. Fencing of the pond areas would reduce disturbance from humans and the larger predators. In addition, an active trapping program for rodents and feral cats should be considered.

J. ARCHAEOLOGICAL

Existing Conditions

The applicant commissioned an archaeological investigation of the property proposed for development. The investigation was conducted by Archaeological Consultants of Hawaii, Inc. in June of 1986 (see Appendix H). The investigation undertaken consisted of two main elements. The first of these was a review of the literature and archaeological records available. This initial review indicated the presence of seven (7) sites of significance. The second element of the investigation was a field investigation of the site. The site investigation was undertaken in the company of ranch employees whose employment in the cattle operation for almost 30 years provided them with an extensive knowledge of the land and its characteristics.

Based on the survey described above, Archaeological Consultants of Hawaii, Inc. concluded that of the seven sites of potential significance, three have been destroyed and their function suggests that sub-surface investigation is unnecessary. The four remaining sites--Kawaiiloa Heiau, Hidden Waters, Heiau Site and Village Site--require additional study to determine exact locations, and in some cases, subsurface investigation.

Impact

The proposed development may jeopardize the sites identified in the archaeological report.

Mitigative Measures

The developer will work with the State Historic Preservation Officer and follow procedures for development which are compatible with State law. The Archaeological Consultants of Hawaii, Inc. report indicates an additional research program to be undertaken once a more detailed development plan is available. These recommendations include a more intensive survey, sub-surface investigation and further review of archival materials. The developer will follow the recommendations outlined in the report.

K. AGRICULTUREExisting Conditions

The lands for the Mokuleia development can be divided into three general categories: beachfront, coastal-plain, and foothill lands. The beachfront lands consist of about 100 acres of Jaucas sand, which has very severe limitations for agriculture because soil is loose and lacks stability for heavy equipment, and is subject to wind erosion [U.S. DOA, Soil Conservation Service].

The coastal-plain lands of the Mokuleia development cover about 820 acres. Of this, about 440 acres are prime agricultural lands having few limitations for agriculture, or only moderate limitations because of some stoniness or vulnerability to erosion. These are level or gently sloping lands consisting of Pulehu clay loam, Kawaihapai clay loam, and Mokuleia clay loam. About 360 acres are other agricultural lands having severe limitations for agriculture. Problems include stoniness, vulnerability to erosion, and poor drainage. Slopes are as high as 12 percent, and the soils include Kaena clay, Kaena stony clay, Ewa silty clay loam, and Ewa stony silty clay. Finally, about 20 acres of the coastal-plain lands have poorly drained Pearl Harbor clay that has very severe limitations for agriculture.

The foothill lands of the development cover about 100 acres of the lower slopes and gulches of the Waianae Range. The soils include Kaena very stony clay, Halawa silt loam, Kemoo silty clay, Helemano silty clay, and rock land. These soils have very severe limitations which make them unsuited or generally unsuited for agriculture. Problems include stoniness, undesirable texture (too sticky and plastic), very steep slopes, and vulnerability to severe erosion.

Most of the coastal-plain lands are also categorized as prime and secondary lands for aquaculture (slopes of less than 5 percent and, for prime lands, clay, loam, or clay loam soils) [Hawaii Aquaculture Planning Program].

Annual rainfall in the area is about 30 to 35 inches per year, and somewhat higher for the mauka lands.

Currently, most of the higher quality agricultural lands are used for grazing.

Proposed Action

The proposed Mokuleia development will require converting about 1,000 acres of land to resort, housing, and recreation uses.

Anticipated Impacts

The Mokuleia project will not adversely affect plantation agriculture since no sugar or pineapple lands are involved. Also, based on a study by Decision Analysts Hawaii, Inc. (Appendix G), it is extremely doubtful that the Mokuleia development will affect adversely the statewide growth of diversified agriculture or aquaculture, either immediately or over the long term. This conclusion is derived from a comparison of the modest amount of prime agricultural land required for diversified agriculture versus the very large supply of prime agricultural land that is available for profitable crops.

To increase Hawaii's self-sufficiency in produce crops to a realistic level, and to accommodate resident-plus-visitor population growth to the year 2000, a surprisingly small amount of land is required—less than 1,200 acres.

A large market exists for feed crops, but most of these crops are not commercially feasible for Hawaii. A possible exception is corn silage to feed cattle in feedlots. However, less than 2,600 acres would be needed statewide to feed all cattle in feedlots, even with an increase in cattle operations. Experiments with corn silage and other feed crops have been performed, but returns per acre have been low.

Regarding export crops, papaya is a possibility being explored for Oahu lands, although the acreage requirement for increased production is relatively small; total statewide plantings amount to a little over 2,000 acres, primarily on the Big Island. Macadamia nuts offer the potential of absorbing a significant amount of agricultural land, but increasing overseas competition indicates that this is a high-risk venture unable to compete in those areas where other economic activities offer higher land rents. Other existing export crops are not agronomically suited for the Mokuleia area and/or require very little land. Finally, efforts in Hawaii for over a century indicate that it is extremely difficult to identify new export crops and develop them into new and profitable industries.

Livestock operations are another possibility, but the returns are low from cattle grazing; the trends are not favorable for increased dairy, egg, and swine and pork operations; and little land is required for poultry operations.

Problems with freshwater prawns include low profitability, a saturated local market, and an export market of doubtful potential. Other potential freshwater aquaculture activities suffer from low prices, stiff competition from the mainland, a small local market, unsuitable climate, and/or other problems.

The potential for brackish and saltwater aquaculture, particularly shrimp, is regarded as more promising. However, brackish and saltwater aquaculture is still in a research-and-development stage, with profitability for large-scale operations yet to be proven. Also, various land use policies and regulations make profitability difficult to achieve, and limit development. Finally, concerns over salt contamination of prime agricultural lands and the groundwater supply argue against brackish and saltwater aquaculture for most Mokuleia lands.

Increased demand for agricultural land in Hawaii as a result of land shortages on the mainland should not be anticipated, since such mainland land shortages are not expected. On the mainland, as in Hawaii, there is a large supply of fallow agricultural lands. Furthermore, this supply is expected to increase given genetic engineering advances which promise higher yields for crops, increased resistance to diseases and pests, and increased tolerance to variations in climate.

In contrast to this demand, the supply of prime agricultural lands available to profitable crops is enormous. Since 1970 over 42,000 acres of land have been freed from sugar production (about 8,600 acres on Oahu and 33,600 on the Neighbor Islands). Some of the land freed from sugar and pineapple production has or will be converted to urban, diversified agriculture, and aquaculture uses. Also, some of the land freed from pineapple use on Oahu was converted to sugar production. Making allowances for the various conversions, the bulk of the 80,000 acres which has been freed from plantation agriculture remains fallow or is in pasture or some other low-profit holding operation awaiting discovery of profitable crops. (Even though considerable agricultural land is available, it should be noted that the supply of parcels for small-scale farmers is limited. This is partially because added expense for improvements makes it uneconomical for large land owners to subdivide their lands into small agricultural lots.)

The supply of fallow prime agricultural land probably will increase given the unfavorable outlook for the sugar industry. Nine of the thirteen sugar plantations in Hawaii are unprofitable and the Federal price support for sugar is scheduled to remain unchanged until at least 1991. In fact, some unprofitable mills remain in operation temporarily only because of lease and/or energy agreements.

Furthermore, some plantations continue as land-holding operations awaiting discovery of profitable replacement crops.

Many of the lands freed or to be freed from sugar and pineapple production have excellent agricultural qualities and climatic conditions, and are well-suited for crop and aquaculture production. Also, water is available for most of these lands, particularly lands freed from sugar production.

Finally, some additional land has been made available to diversified agriculture in government-sponsored agricultural parks throughout the State.

In summary, the amount of prime agriculture land required to accommodate growth of diversified agriculture is very small compared to the huge supply that is available for profitable crops. The Mokuleia project requires too little land to materially affect this land demand/supply balance. Thus the project will not limit growth of diversified agriculture.

Application of Land Evaluation and Site Assessment (LESA) System

The Hawaii State Constitution was revised in 1978 to include the following statements concerning agriculture (Article XI, Section 3):

"The State shall conserve and protect agricultural lands, promote diversified agriculture, increase agricultural self-sufficiency and assure the availability of agriculturally suitable lands. The legislature shall provide standards and criteria to accomplish the foregoing."

"Lands identified by the State as important agricultural lands needed to fulfill the purpose above shall not be reclassified by the State or rezoned by its political subdivisions without meeting the standards and criteria established by the legislature and approved by a two-thirds vote of the body responsible for the reclassification or rezoning action."

The Land Evaluation and Site Assessment (LESA) Commission was assigned the task of identifying and recommending, for adoption by the Legislature, a system to identify important agricultural lands (IAL) and developing procedures and criteria to reclassify land to or from IAL designation. The LESA Commission Report and corresponding legislative recommendations were submitted to the 1986 legislature, but were carried over to the next session since no action was taken. Therefore, at this time LESA remains a proposal that has not yet been adopted into law by the State Legislature. Its provisions are still subject to review and change and its final form or adoption is far from certain.

The LESA Commission report defines IAL as lands capable of producing high agricultural yields, lands which produce commodities for export and local consumption, lands not currently in production but needed to attain desired projected levels of agricultural activities and income, and lands designated by public policies as important agricultural lands resulting from some unique quality, setting or use. Excluded are lands which are inappropriate or infeasible for agriculture, or which would provide greater benefits in a non-agricultural use.

For a given parcel, an IAL designation is to be based on Land Evaluation (LE) and Site Assessment (SA) factors. Briefly, the recommended LE rating reflects soil quality, and is based on an average numerical score of five past soil surveys. Site Assessment (SA) factors express the value of a site in terms of locational, environmental, and operational factors. Included are such considerations as government plans, onsite or proximity to various agricultural facilities and improvements, parcel size, and compatibility with and impact on neighboring land uses.

Based on the proposed LESA methodology, the LESA Commission developed Illustrative Generalized IAL Maps which show the IAL having the highest ratings while providing sufficient area to accommodate the LESA projections for agricultural land requirements. Included in the Illustrative Generalized IAL Maps is a portion of the Mokuleia lands proposed for development. According to the Department of Agriculture, nearly all of the Mokuleia area identified as Parcel A(1) (approximately 890 acres) is within the illustrative IAL boundary. Parcel A(1) has LE ratings of 71, 77, 79, 83 and 94 on a scale of 12 to 96.

It should be noted, however, that the designation of the Mokuleia lands as IAL is questionable in that the LESA agricultural-land projections used in developing the Illustrative Generalized IAL Maps, as well as the Maps themselves, appear to contain a number of questionable assumptions:

- The projected growth of diversified agriculture and aquaculture appears to be excessively optimistic. It is assumed that many unprofitable crops will become profitable, that Hawaii farmers will be able to undersell low-cost summer crops from California, and that each and every activity will experience rapid growth.
- The LESA contingency of 29,500 acres is excessive, especially since LESA projects a requirement for less than 9,000 additional acres of prime agricultural lands. The contingency is large primarily because the LESA methodology implicitly allows for expansion of sugar operations—an unlikely possibility. Furthermore, the contingency amounts to double counting since optimistic projections have a built in contingency.
- The LESA methodology assumes that prime agricultural lands that were freed from sugar and pineapple production and placed in pasture or some other low profit operation will stay in these uses. This is very unrealistic in that these are holding operations for land until profitable crops can be identified.
- The LESA methodology assumes that sugar production is a healthy industry, and that sugar lands would be unavailable for more profitable replacement crops.
- The Illustrative Generalized IAL Maps allocate prime agricultural lands to certain activities which do not need such lands (e.g., aquaculture should be allocated the agriculturally low quality coastal lands at Kahuku).

Verification of the assumptions is hampered as the assumptions and analyses which underlie the LESA projections have not been made available for public inspection.

Once a parcel has been designated as IAL, the LESA Commission recommendations provide for a redesignation to urban or some other use based on a demonstrated change in economic or social conditions, and where the requested designation will provide greater benefits to the general public than its retention as IAL. A two-step process is recommended:

1. The LE and SA methodology is reapplied to determine whether conditions have changed sufficiently to warrant a reclassification from IAL status. (An example would be a change in County plans to urbanize the area).

2. The proposed development is subject to three criteria:
 - a. Does the proposal conform to the State Plan?
 - b. Does the proposal conform to the County Plans?
 - c. Will the project provide a public benefit that overrides the IAL designation?

Applying the first step of the proposed LESA process for redesignating the Mokuleia lands from IAL to urban and other uses, no known changes in conditions would warrant a change in the LESA ratings and a corresponding reclassification from IAL status. However, as discussed above, it should be noted that the original IAL designation for the Mokuleia lands is questionable.

Applying the test of parts (a) and (b) of the second step of the proposed LESA process, the proposed development does contribute to various State and County goals, objectives, and policies regarding job creation, increased income, housing, and recreation. Regarding agriculture, the thrust of the State Plan is to assure the availability of agricultural lands. As discussed previously, the proposed Mokuleia development requires too little land to materially affect the land/supply situation; the amount of prime agriculture land required to accommodate growth of diversified agriculture is very small compared to the huge supply that is available for profitable crops.

Applying the final test of the second step of the proposed LESA process, the proposed development will provide a public benefit that overrides the IAL designation. At the same time, the development will not adversely affect plantation agriculture, nor adversely impact growth of diversified agriculture.

Mitigating Measures

Since the Mokuleia project is not expected to adversely affect agriculture, no mitigating measures are required.

L. NOISE

Existing Conditions

The primary land uses that will potentially be affected by the project are public and private beach parks and residences located between the shore and Farrington Highway. Noise sources affecting these areas now are categorized as:

- * Surf
- * Motor vehicle traffic on Farrington Highway
- * Aircraft
- * Wind in the trees
- * Birds and people activities

Measurements of existing noise levels in the area were made continuously over a two-month period, utilizing a sensor located at two different locations on the Episcopal Church camp property. One location was midway between the highway and the shoreline, while the other was 54 feet seaward of the highway. Though these measurements were made in 1977, they are considered representative of the existing conditions.

The typical diurnal noise level variation in the populated area had an hourly equivalent sound level (L_{eq}) of 47 dBA at night and a maximum of L_{eq} of 65 dBA during the day. At night the noise sources were primarily the surf and wind in the trees. During the day, motor vehicles, aircraft, birds and people activities also contributed to the total noise level.

Occupants of beachfront residences experienced relatively high, continuous noise exposures attributed to the surf. The surf is a high-level, linear noise source that generally attenuates 3 dB each time a person doubles his distance from it. It masks practically all motor vehicle noises in beachfront homes. On the average, surf noise exceeded existing aircraft noise by 10 dB at a beachfront location directly under the departing flight path.

Occupants of typical residences directly on Farrington Highway experience a lower level of surf noise and a greater contribution of motor vehicular noise. The average total day-night sound level (L_{dn}) was 61 dBA over a 21-day period. Motor vehicle noise contributed an average of 51 dBA to the total, while aircraft noise contributed an average of 53 dBA. The surf, wind in the trees, birds and people activities were the dominant noise sources, contributing about 60 dBA, L_{dn} , and controlled the average total noise exposures in housing along the highway at that time.

Proposed Action

Development of the project site will involve land clearing, site preparation, construction of infrastructure and buildings, and the installation of landscaping.

Anticipated Impacts and Mitigative Measures

A noise study by Darby & Associates is included in the Draft EIS as Appendix K. The various construction phases of a development project may generate significant amounts of noise; the actual amounts are dependent upon the methods employed during each stage of the process. Pile drivers; earthmoving equipment such as bulldozers; and diesel powered trucks will probably be the loudest equipment used during construction.

The State Department of Health (DOH) Title 11, Administrative Rules, Chapter 43, Community Noise Control for Oahu, specifies maximum allowable levels of noise for each use zone contained in the City and County of Honolulu's comprehensive Zoning Ordinance. Allowable noise levels from the project site are:

Preservation (P-1) and Residential (R-1 through current A-7)

Daytime (7 a.m. to 10 p.m.): 55 dBA

Nighttime (10 p.m. to 7 a.m.): 45 dBA

Apartment (A-1 through current A-5)

Daytime (7 a.m. to 10 p.m.): 60 dBA

Nighttime (10 p.m. to 7 a.m.): 55 dBA

These standards apply to non-impulsive sounds. The allowable level for "impulse" noise is 10 dB(A) above those listed. The Comprehensive Zoning Code (CZC) also regulates noise levels emanating from private property and is usually confined to stationary noise sources.

Since it is anticipated that noise generated during construction will exceed allowable limits, a permit will be obtained from DOH. DOH may grant permits to operate vehicles, construction equipment, power tools, etc. which emit noise levels in excess of the allowable limits. Required permit conditions for construction activities are:

"No permit shall allow construction activities creating excessive noise ... before 7:00 a.m. and after 6:00 p.m. of the same day."

"No permit shall allow construction activities which emit noise in excess of ninety-five dB(A) ... except between 9:00 a.m. and 5:30 p.m. of the same day."

"No permit shall allow construction activities which exceed the allowable noise levels on Sundays and on ... [certain] holidays. Activities exceeding ninety-five dB(A) shall [also] be prohibited on Saturdays."

In addition, construction equipment and on-site vehicles or devices requiring an exhaust of gas or air must be equipped with mufflers.

Traffic noise from heavy vehicles traveling to and from the construction site will be minimized to daylight hours in residential areas and will comply with the provisions of Title 11, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu enforced by DOH.

Because sound attenuates with distance, the farther away people are from a noise source, the less the sound will affect them. Thus, during construction in the proposed mauka resort and residential areas, the potential noise impact to persons in the housing and parks along Farrington Highway will be minimal. However, construction operations in some of the shore resort parcels will have greater noise impact on persons in the abutting land use.

After the proposed resorts are completed and are in operation, persons in the abutting land uses will potentially be impacted by noise from the stationary equipment servicing the complex, such as air conditioning and pool pumps. Noise levels from such equipment must not exceed the allowable noise limits in the aforementioned DOH and CZC noise regulations.

As the project develops, there will be an increase in traffic on Farrington Highway, causing higher traffic noise levels primarily to housing directly on the highway. Presently the maximum hourly averaged noise level [$L_{eq}(1hr)$] at 50 feet from the center of the road is about 56 dBA during the weekdays and about 60 dBA during the weekends. Because Farrington highway has only two lanes and is directly accessed by driveways, the average vehicle speed will be reduced as the traffic volume increases. Traffic noise increases more rapidly with increasing vehicle speed as compared to increasing traffic volume. Thus, there tends to be a limiting effect on traffic noise levels. For example, the maximum predicted traffic noise level, for the years 2000 and 2005 tends to limit-out at 62 to 63 dBA despite significantly greater traffic volumes. These predicted noise levels are 2 to 3 dBA greater than that presently experienced on weekends, but may be 5 to 6 dBA greater than that presently experienced on weekdays. It is to be noted that the maximum predicted noise levels do not exceed the noise criteria of 67 dBA as recommended by the

Federal Highway Administration (FHWA) for "picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, hotels, schools, churches, libraries, and hospitals." For proposed housing on the mauka side of Farrington Highway, acceptable noise will exist if posted speeds of 35 mph are used and if building setbacks are at least 50 feet.

Occupants in the proposed project will be exposed to noise from aircraft operations from Dillingham Airfield. Dillingham Airfield is operated by the State Department of Transportation and has a single runway 5,000 feet long. Only daylight visual flight rule operations requiring good weather and visibility are conducted by civil aircraft. Aircraft operations at Dillingham Air Field are now dominated by single-engine airplanes towing gliders. Military use of the airfield involves helicopters and light fixed wing aircraft. The number of operations at the field has declined lately: e.g. in 1980 there were 82,406 civilian power operations (ops) and 21,930 military ops while in 1985 there were 60,494 civil ops and 5,060 military ops. For analytical purposes aircraft noise contours based on 120,000 civilian power operations have been used.

The noise contour use the day-night noise level (L_{dn}) which is a time averaged dBA noise level over 24 hours that includes a 10 dBA penalty for any noise events occurring at night (10 p.m. to 7 a.m.). Most federal agencies including the Department of Housing and Urban Development (HUD) and the Department of Defense (DOD) recommend that housing not be located in areas where L_{dn} 65 is exceeded. For future planning, the Federal Environmental Protection Agency (EPA) in reference 4 has established long range goals of:

"Through vigorous regulatory and planning actions, reduce environmental noise exposure levels to L_{dn} 65 dB or lower, and ... in planning future programs concerned with or affecting environmental noise exposure, to the extent possible, air for environmental noise levels that do not exceed an L_{dn} of 55 dB. This will ensure protection of the public health and welfare from all adverse effects of noise based on present knowledge."

Because of the open lifestyle in Hawaii, it is often recommended that L_{dn} 60 not be exceeded for residential and resort areas.

All of the proposed residential and resort parcels mauka of the highway and Resort Parcel 1 should never experience aircraft noise levels exceeding L_{dn} 55. Also the figures indicate that L_{dn} 60

should not be exceeded on Resort Parcels 6, 7 and 8. It is estimated that about 90% of the aircraft operations per year are in a tradewind pattern and that there are no operations about 26 days per year due to excessive crosswinds. Exhibits identifying Resort Parcel numbers are included in Appendix K, Noise Study.

The recent use of Dillingham Airfield by the military is lessening. However, it is possible that in the future there could be sporadic training exercises involving helicopters. More conservative contours were generated to address helicopter noise, that is, they are in excess of actual existing noise exposures and are not necessarily directly comparable with civilian noise contours.

The State Department of Transportation commenting on the DEIS indicated that development of combined military and civilian noise contours would be helpful. This comment was received after the deadline for public comment (3/30/87 - the deadline was 3/25/87). Upon the availability of Military data, it is the applicant intent to restrict resort/residential development within the 60 L_{dn} and greater areas unless special noise mitigation features are incorporated into the structures. In the 55-60 L_{dn} noise impact area, a disclosure will be made to advise developers and tenants that the areas are subject to noise from aircraft activity.

Residents in the proposed resort and residential areas abutting (or near) the sugar cane fields will experience noise exposures from cane operations. Sugar cane fields are harvested very year (alternating fields) and last about two weeks a year. According to the Manager of Waialua Sugar Company, there is flexibility in harvesting, and by mutual coordination and cooperation, these operations can be timed to minimize the impacts on surrounding uses.

Housing and resort facilities located near the cane haul road will experience noise events from passing cane haul trucks when the fields serviced by the cane haul road are being harvested. Noise exposures along the cane haul road caused by cane haul trucks and other vehicles which service the fields near the project were estimated. It is estimated that there will be about two weeks per year when cane haul trucks will use the road. Day-night noise levels (L_{dn}) on those days are predicted to be 55 dBA or less assuming a setback of at least 50 feet from the cane haul road. Though the total noise exposure does not exceed the aforementioned criteria, persons may complain of noise from the large cane haul vehicles which will be much greater than the ambient noise level (typically 84 dBA at 50 feet).

Another noise event that will be experienced by persons in the proposed project will be aircraft flyovers when the sugar cane fields are sprayed with insecticides, herbicides, etc.

Building setbacks and designs will take into account the recommendations of the noise study.

There is a potential for noise generated in commercial and industrial areas to impact residential areas. The applicant believes that any impacts would be minimal because residential areas are buffered from commercial/resort activities by a golf course fairway. In addition, the new commercial resort areas abutting developed areas are on oceanfront lands where wave noise is expected to mask resort/commercial noises.

The applicant will follow all City and State laws and regulations related to noise. In addition the applicant will follow City ordinances relating to the separation of resort/commercial and residential districts. Current ordinances require setbacks, solid walls, and landscaping. In certain instances, uses are restricted within the commercial resort districts where there is an abutting residential district. In addition the applicant intends to develop restrictive covenants for the commercial/resort development which will ensure a harmonious relationship with the residential development in close proximity including restrictions on noise, and other items incompatible with residential development.

The proposed development will contain two golf courses and a number of other recreational activity centers. Recreational activities conducted on these sites may generate noise which may impact the residential areas. The applicant believes that the noise impacts of these facilities on residential areas will be minimal and that numerous mitigating measures are available.

The primary mitigating measure will be in facilities design. For the Golf Course and Clubhouse the siting of the clubhouse facilities, their orientation and the location of the tees and greens on the course will have a major impact on the potential noise impact of the facilities. The siting and design, as well as landscaping, will be major considerations during the design phase of the golf complex. Selection of maintenance equipment which includes noise minimization features can also mitigate against noise impacts. In addition the scheduling of maintenance operations and golf activities can also be done to minimize noise impacts.

The same mitigation measures as apply to the golf courses also apply to other recreational activity centers. In addition, the proposed Mokuleia Community area will have a community association which will be a forum for balancing recreational needs of the community with those of the nearby residents for minimal noise impacts. This organization will assure that the rules and regulations governing the various recreational facilities of the development will continue to meet the needs of the community that they serve.

M. AIR QUALITY

Existing Conditions

Present air quality in the project area is estimated to be very good since there are no major contributing sources of air pollutant emissions other than vehicles traveling on nearby roadways and isolated sugar cane fires.

Impacts

An air quality study was conducted by Barry D. Root and his findings are found in Appendix J. Except for dust emissions during the construction phase of the development, no significant short-term direct air quality impacts are expected. Adequate control measures exist to limit the impact of windblown dust, but special care will have to be exerted to ensure that previously developed residential areas are not subjected to excessive levels of particulate pollution from construction activities.

Indirect air quality impacts are expected to result from new demands for electrical energy. This impact is most likely to occur in the vicinity of existing power plants such as the Kahe Plant on the Waianae coast where increased levels of particulates and sulfur dioxide can be expected. Maximum use of solar energy designs in project development can at least partially mitigate the magnitude of this impact. New methods of generating electrical power such as wind or ocean thermal energy conversion may eventually also play a mitigative role in this regard.

Increased traffic generated by the Mokuleia Development will increase emissions of carbon monoxide along Farrington Highway in the project area. Modeling of current and projected weekend peak hour worst case concentrations of carbon monoxide at the intersection of the main project access road and at Thomson Corner indicates that projected

levels will be well within allowable State and National ambient air quality standards with or without project development. For that reason no specific air pollution mitigation measures other than those proposed in the traffic impact study for the project are deemed to be necessary.

The modeling study does indicate, however, that installation of a traffic light at the intersection of the main project access road and Farrington Highway sometime before project completion should result in lower concentrations of carbon monoxide than would be the case without such a signal.

Mitigative Measures

Short-Term

As previously indicated the only direct short-term adverse air quality impact that the proposed project is likely to create is the emission of fugitive dust during construction. State of Hawaii regulations stipulate the control measures that are to be employed to reduce this type of emissions. Primary control consists of wetting down loose soil areas. An effective watering program can reduce particulate emission levels from construction sites by as much as 50 percent. Other control measures include good housekeeping on the job site and pavement or landscaping of bare soil areas as quickly as possible.

Long-Term

Once completed, the proposed Mokuleia Development is expected to have little direct impact on the air quality of the surrounding region.

Indirect long-term impacts in the form of increased air pollutant emissions from power plants serving new residences in the project area can be mitigated somewhat by planning and implementing solar energy design features to the maximum extent possible.

Other indirect long-term air quality impacts are expected in those areas where traffic congestion can potentially be worsened by the addition of vehicles traveling to and from the proposed project. Project planners can do very little to reduce the emission levels of individual vehicles, but the installation of traffic signals at the main intersection of project traffic with Farrington Highway and at Thomson Corner could decrease traffic queuing times at these intersections, thereby decreasing projected air pollution impacts at these critical locations.

Carbon monoxide modeling conducted as a part of this report indicates that no special traffic control measures will be necessary to ensure compliance with State and National air quality standards even under worst case traffic and meteorological dispersion conditions.

Because the stringent national vehicular emissions reduction program now being pursued is entirely the product of perpetually changing government regulations, it is always possible that economic conditions or other factors could lead to an early abandonment of the program. If that were to occur, then the projected pollutant levels presented in this study could be too optimistic. On the other hand, it is possible that technological innovation may lead to new vehicular power systems that produce few or none of the currently regulated atmospheric pollutants.

In any case, this study indicates that currently proposed mitigative measures for traffic congestion along roadways leading to and from the project area should be sufficient to meet existing air quality requirements and no further air pollution mitigation measures are proposed. It is noted, however, that tall, dense vegetation can provide some screening of residential areas from larger airborne particulates generated along roadways and near construction areas. It is thus recommended that wherever possible such vegetative cover be included in the landscaping plans with plantings occurring as early in the development process as practicable.

N. VISUAL

A Visual Impact Assessment was conducted by Michael S. Chu, Land Architect, and his findings are found in Appendix M, and summarized as follows:

Existing Viewing Areas

Due to its bowed configuration, the entire North Shore is considered to be one viewshed ranging from Kaena Point to Kawela Bay with a maximum viewing distance of 18 miles across. In order to determine the visual quality of the Mokuleia area, the entire North Shore viewshed was studied, beginning at the farthest reaches of this viewshed and moving inward towards the Mokuleia site. Off-site viewing points considered included Sunset Beach, Pupukea Beach Park, Waimea Bay, Haleiwa Beach Park, Haleiwa Alii Beach Park, Kaiaka State Park, Puuiki Park, Camp Erdman, Army Beach, Mokuleia Beach Park, park near the apartment area at Waiialua, and roadway views.

The Mokuleia area was described as unique. The absence of urbanization, dispersion of man-made elements, and abundance of natural vegetation (particularly ironwood trees) over a substantial stretch of the highway attributes to this character.

Based on an inventory and assessment of off-site views and the establishment of several vertical benchmarks, the probable visual impact zone generated by the proposed Mokuleia development lies between the Army Beach to the west and Kaiaka Recreational Park to the east. Views from the east were considered the more critical of the two.

Anticipated Impacts and Mitigating Measures

Based on the Mokuleia conceptual plan, specific visual impacts that may be expected are as follows:

- The visual quality of each individual parcel and the general Mokuleia area will be noticeably altered.
- The proposed six- to seven-story buildings along the coastal parcels will likely be visible and prominent from several off-site public viewing points. Army Beach, Mokuleia Beach Park, park near the apartment area at Waialua, and the Kaiaka Recreational Park are within the determined visual impact zone.
- Existing roadway views from Farrington Highway (between Army Beach and Mahinaai Road) will be altered and will likely include substantial views of the proposed development in both the mauka and makai directions.

The capacity of the Mokuleia area to assimilate urbanization of the nature proposed, while retaining its visual integrity, may rely upon a development concept that de-emphasizes building prominence in favor of visual compatibility, e.g., Makaha Sheraton and the Kikiaola Plantation on Kauai.

Mitigating measures which may help to reduce visual impact include the following:

- Reduction in building heights.
- Increase shoreline setbacks to include angled building envelopes.

- Retention of existing trees and siting of buildings among/behind the trees for maximum screening.
- Provide extensive landscaping using plant material that are consistent with the visual quality of the area and will assist in the screening of structures.
- Use of muted building colors to blend in with the background.

O. SOCIO-ECONOMIC CHARACTERISTICS

The socio-economic impact of the proposed resort development was studied by John Child and Company and Community Resources, Inc. (Appendices B and C).

1. Population

Existing Conditions

On the project site, there are currently nine tenant households (six for ranch employees and three rented on a month-to-month basis to non-employees). Approximately 31 people live in these homes.

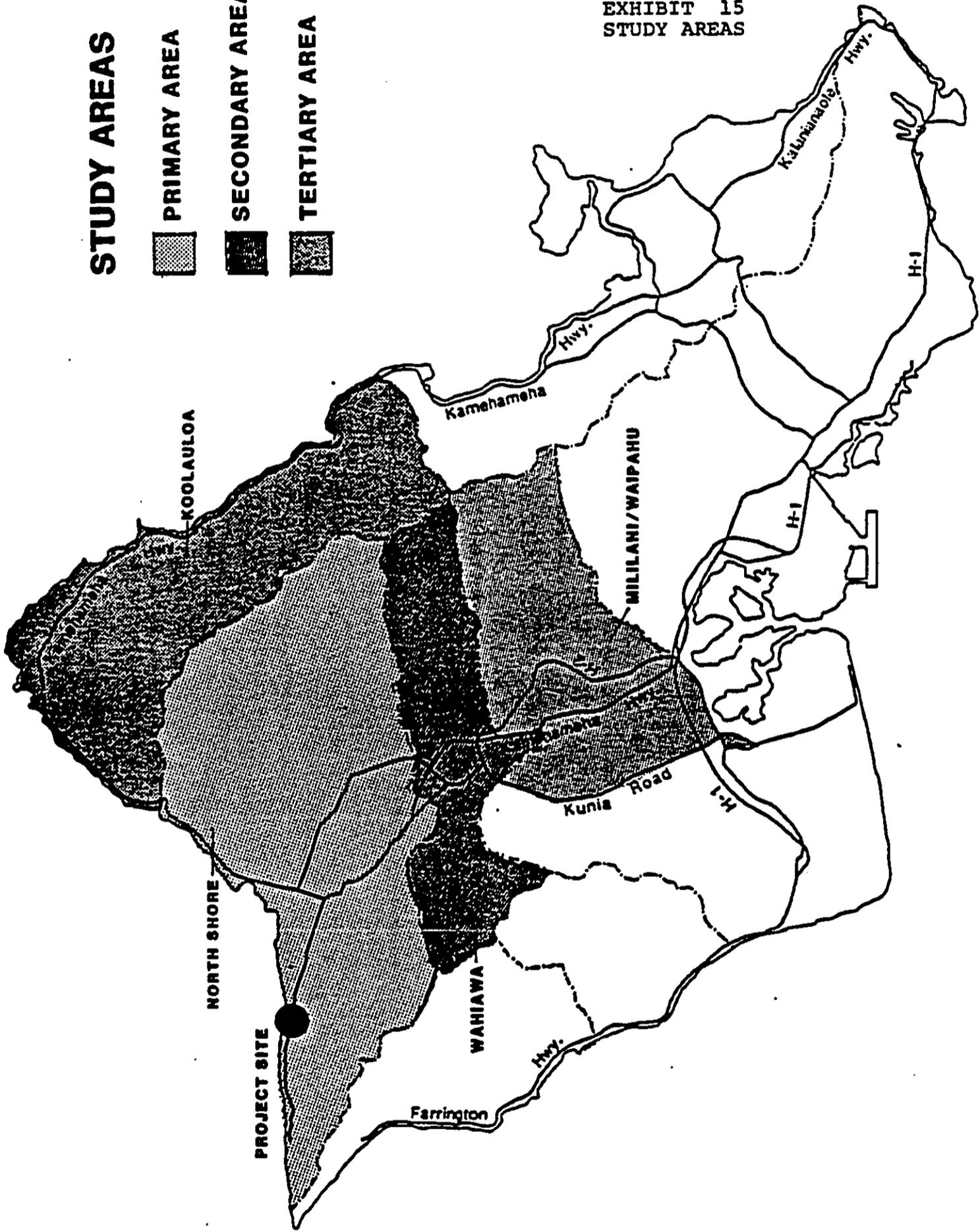
The project site is located in the U.S. Census Bureau's "Waialua Division", consisting of census tracts 99.01, 99.02, and 100. (To avoid confusion with the town of Waialua, this area will be referred to as the "North Shore".) Other possibly affected nearby areas include the Koolauloa division (tracts 101, 102.01, and 102.02) and the Wahiawa division (tracts 90 through 95.05). Below Wahiawa, the communities of Waipahu and Mililani (tracts 87.01 through 89.03) represent possible labor supply sources, although it is not anticipated that these areas would be otherwise impacted by the project. The North Shore is considered the "Primary Study Area"; Koolauloa and Wahiawa, the "Secondary Study Areas"; and Mililani/Waipahu the "Tertiary Study Area".

Exhibit 15 shows the boundaries of these various portions of the overall Study Area. Exhibit 16 shows differences between the census areas and the City's Development Plan areas for the North Shore and Koolauloa. In the Development Plan Areas, the areas known as Sunset Beach, Waimea, and Pupukea (with a total 1980 population of about 3,200) are considered part of the "North Shore," although they are in the Koolauloa Census Division. (However, census figures to be quoted here for the North Shore

STUDY AREAS

-  **PRIMARY AREA**
-  **SECONDARY AREA**
-  **TERTIARY AREA**

**EXHIBIT 15
STUDY AREAS**



would exclude these areas.) Thus, the combined North Shore/Koolauloa Development Plan Areas are equivalent to the combined North Shore/Koolauloa census divisions. Additionally, the combined Wahiawa and Mililani/Waipahu areas are approximately equal to the City's "Central Oahu" Development Plan Area.

As of the 1980 U.S. Census, the North Shore's population was 9,849. Major ethnic groups were Filipino (32%) and Caucasian (31%). The median age of 26.3 years was somewhat lower than the islandwide median, although the proportion of senior citizens on the North Shore exceeded the islandwide proportion. Average educational levels on the North Shore are behind those of the overall Oahu population. Approximately two-thirds of the North Shore population lived in two communities—the sugar plantation town of Waialua (population 4,051, nearly one-half Filipino) or Haleiwa (population 2,412, with a cosmopolitan ethnic composition dominated by Caucasians, Filipinos, and Hawaiians). The project site is located in "Block Group 9" of census tract 99.01, which includes the beachfront areas known as Mokuleia (which has no official boundaries) and Waialua Beach, as well as scattered inland homes; the 1980 population was 650, of which 70% was Caucasian.

Also as of the 1980 census, the Koolauloa Division population was 14,195 (predominantly Caucasian and Hawaiian); the Wahiawa Division population was 41,562 (45% Caucasian, due to the large military presence in the area); and the combined Mililani/Waipahu population was about 50,500.

The North Shore, Koolauloa, and Wahiawa populations are all characterized by significant poverty problems. In 1980, compared to islandwide figures, median family incomes were lower and proportions of the population below official "poverty level" were higher. Proportionately more people were renters rather than owner-occupants, and larger percentages of median family income were required to pay rental costs than elsewhere on the island.

The City's General Plan population guidelines say the year 2005 population for the combined North Shore/Koolauloa Development Plan Areas should be held to a figure between 2.9% and 3.3% of total islandwide population, which is now estimated by the State as 954,500. This means a combined North Shore/Koolauloa population between 27,700 and 31,500 in 2005.

For the Mokuleia community along Farrington Highway in the area of the proposed project, certain population changes are also expected even without the project. Rising prices for beachfront residential land throughout Oahu could ultimately result in small pockets of currently cheap rental housing being phased out, to be replaced by tenants or owner-occupants better able to afford the rising land values and property taxes. Additionally, a few homes toward the Kaena Point side of Farrington Highway are on land designated "Preservation" and cannot be rebuilt if destroyed or badly deteriorated.

Anticipated Impacts and Mitigative Measures

Based on the proposed development plan and the population and residency characteristics, the average daily population at the proposed development is anticipated to increase from 590 persons in 1990 to 4,680 persons by 2005, as shown in Exhibit 17.

Visitors from Oahu and the neighbor islands are projected to increase from about 180 persons in 1990 to 950 persons by 2005, as shown in Exhibit 18. Out-of-state residents visiting the hotel and condominium facilities are projected to increase from 410 persons in 1990 to 2,530 by 2005.

The majority of the part-time residents are projected to be out-of-state residents while all of the full-time residents are projected as residents of the State, as also shown in the exhibit.

The project's residential component would be consistent with the population distribution range established for the North Shore by the General Plan. The North Shore population distribution range is set at between 1.6% and 1.8% of the islandwide population. The 1984-85 North Shore DP estimates a 2005 year population of 15,600, with 100 unit housing deficiency existing. This represents a 1.6% share of the projected population of 954,500 for the island by the year 2005. If the upper range of 1.8% is used, an additional 600 to 800 units (in addition to the current 100 unit deficiency) can be planned for and still be within the population guidelines of the General Plan. The residential component of the project calls for 700 units.

The impacts of the increased population on traffic, public services and recreation are found in Section P, Infrastructure and Public Service.

EXHIBIT 17

EXHIBIT 17

MOKULEIA
Projected Average Daily Population

<u>Population type and residence</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>	<u>2005</u>
Visitors:				
Hotel units	590	1,290	2,020	2,840
Condominium units	0	300	610	640
Single-family units	0	0	0	0
Subtotal - visitors	<u>590</u>	<u>1,590</u>	<u>2,630</u>	<u>3,480</u>
Residents:				
Condominium units-				
Full-time	0	330	660	680
Part-time	0	90	180	190
Subtotal	<u>0</u>	<u>420</u>	<u>840</u>	<u>870</u>
Single-family-				
Full-time	0	10	90	260
Part-time	0	0	20	70
Subtotal	<u>0</u>	<u>10</u>	<u>110</u>	<u>330</u>
Subtotal - residents	<u>0</u>	<u>430</u>	<u>950</u>	<u>1,200</u>
Total population	<u><u>590</u></u>	<u><u>2,020</u></u>	<u><u>3,580</u></u>	<u><u>4,680</u></u>

Source: John Child & Company, Inc.

EXHIBIT 18

EXHIBIT 18
MOKULEIA
Projected Population by Residence
1990 to 2005

<u>Population type and residence</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>	<u>2005</u>
Visitors:				
State residents-				
Hotel	180	390	610	850
Condominium	0	50	90	100
Subtotal	<u>180</u>	<u>440</u>	<u>700</u>	<u>950</u>
Out-of-state residents-				
Hotel	410	900	1,410	1,990
Condominium	0	260	520	540
Subtotal	<u>410</u>	<u>1,160</u>	<u>1,930</u>	<u>2,530</u>
Total	<u><u>590</u></u>	<u><u>1,600</u></u>	<u><u>2,630</u></u>	<u><u>3,480</u></u>
Part-time residents:				
State residents-				
Condominium	0	0	10	10
Single-family	0	0	0	0
Subtotal	<u>0</u>	<u>0</u>	<u>10</u>	<u>10</u>
Out-of-state residents-				
Condominium	0	90	170	180
Single-family	0	0	20	70
Subtotal	<u>0</u>	<u>90</u>	<u>190</u>	<u>250</u>
Total	<u><u>0</u></u>	<u><u>90</u></u>	<u><u>200</u></u>	<u><u>260</u></u>
Full-time residents:				
Condominium	0	330	660	680
Single-family	0	10	90	260
Total	<u><u>0</u></u>	<u><u>340</u></u>	<u><u>750</u></u>	<u><u>940</u></u>

Source: John Child & Company, Inc.

2. Economic Development

Existing Conditions

The Mokuleia Ranch manager and nine employees now graze approximately 500 animal units on all parts of the property except the Crowbar Ranch, steep areas, and dairy cattle pasture. Most of these animal units are beef cattle. Some horses are also grazed on the property as brood stock for ranch work purposes or occasional sale to outsiders.

Various amounts of pasture land are also leased on a month to month basis to dairy operations. The number of dairy cattle has ranged from 200 to 1,000 in recent years.

The Crowbar Ranch is actually a department within the overall ranch operations, rather than an independent entity. It provides horse stable facilities, daily grooming and feeding services, and limited equestrian activities. Private owners now board about 80 horses at the ranch, including about 50 polo horses.

For the overall North Shore area, principal current economic activities include the Waialua Sugar Plantation's sugarcane operations and retail/commercial activities in Haleiwa. As with all sugarcane operations in Hawaii, the Waialua plantation's future is uncertain, and the company has reduced its payroll substantially in recent years. Haleiwa retail activities have become increasingly oriented to drive-through visitor traffic, although the nearest major visitor accommodations are at the Turtle Bay Hilton in Koolauloa. Other Koolauloa economic activities are also primarily tourist-oriented, including the Polynesian Cultural Center and Mormon Temple in Laie as well as several restaurants and arts and crafts shops further south. In Wahiawa, the principal economic activities include pineapple, retail/commercial activities, and other support services for the large nearby military bases (Wheeler Air Force Base and the Army's Schofield Barracks).

On the North Shore, the overall level of economic activity at present is quite limited. This is reflected in certain patterns to be detailed in the following section on "Employment," which will discuss the low number of jobs relative to the labor force, low labor force participation, unemployment, and commuting outside the area for employment.

Anticipated Impacts and Mitigation Measures

Development of the proposed resort project will result in the loss of the animal-raising ranch operations, which have been unprofitable for the landowner. The income from the resort project will more than offset the loss of income associated with ranch operations.

Resort plans also call for development on the current Crowbar Ranch site. However, equestrian facilities of some type are a likely project component. If the polo operations (makai of Crowbar Ranch) are relocated (discussions on this issue are currently being conducted between the landowner and the polo club) mauka of Farrington Highway, stables and other equestrian facilities may actually be expanded.

The economic impact (expenditures and income) of the proposed project was studied by John Child and Company (1986). Their findings are summarized below:

Expenditures

Mokuleia will generate direct, indirect and induced expenditures in Hawaii from the visitors and residents. This group will make direct expenditures for food, accommodations, recreational activities and other goods and services. These direct expenditures will, in turn, generate indirect and induced expenditures throughout the State through multiplier effects.

Visitor Expenditures

Direct expenditures are projected based on the expected average daily visitor population and visitor expenditure patterns observed in the State.

Direct expenditures attributable to the visitors at Mokuleia could be expected to increase from about \$18.3 million in 1990 to \$106.8 million by 2005, in 1986 dollars.

Based on multipliers estimated by the Hawaii State Department of Planning and Economic Development (DPED), the direct visitor expenditures could be expected to generate indirect and induced expenditures amounting to about \$17.0 million in 1990 and \$99.3 million by 2005, in 1986 dollars.

Including direct, indirect and induced effects, expenditures in the State attributable to Mokuleia's visitors are projected to increase from \$35.3 million in 1990 to \$206.1 million by 2005, in 1986 dollars.

Resident Expenditures

This analysis addresses the expenditures attributable to the resident population at Mokuleia. The relationship between direct expenditures and indirect and induced expenditures associated with resident spending in the State has not been quantified.

Based on the average daily population and expenditure estimates, annual expenditures by full-time and part-time residents at Mokuleia could increase from \$0 in 1990 to \$13.4 million by 2005, in 1986 dollars.

Resident Income

Mokuleia could be expected to have a significant impact on personal and household income for residents of the island and the State. Mokuleia would generate resident income through employee wages, salaries and fringe benefits and as income to proprietors.

Personal Income

Personal income is defined as the wages and salaries paid to the direct construction and operational employees of Mokuleia. Personal income is projected on the basis of average industry wages and salaries and the expected future levels of employment demand.

Annual personal income paid to Hawaii residents in the form of wages and salaries earned directly from establishments at Mokuleia or from its visitors may be expected to increase from \$30.3 million in 1990 to \$42.3 million by 2005, in 1986 dollars.

Household income

Estimation of total household income effects based on visitor expenditures permits a perspective on the net benefits to state-wide household income that would result from the development at Mokuleia.

Total household income generated by visitor expenditures at Mokuleia would include the fringe benefits and proprietor's income paid by establishments that sell goods and services directly to visitors as well as the wages and salaries noted previously. In addition, household income includes income generated through the multiplier effects of indirect and induced expenditures.

It is projected that Mokuleia could annually contribute about \$12.8 million to total household income in 1990 and about \$74.8 million by 2005, in 1986 dollars.

The impact of the proposed development on State and County finances was studied by John Child and Company (1986). The findings of the study are summarized below:

Revenues

Development at Mokuleia would bring tax revenues to the County and State governments. County government revenues would be in the form of real property taxes on the new facilities. Revenues to the State government would be principally of unemployment taxes, excise taxes, gross income tax and personal income taxes.

County

Based on current real property tax rates in the County, the proposed development at Mokuleia could be expected to generate about \$0.7 million in additional real property taxes in 1990 and \$4.5 million by 2005, in 1986 dollars.

State

State government revenues are estimated as a residual of total revenues less County government revenues. The tax revenues to the State government attributable to activity at Mokuleia are projected to increase from \$1.5 million in 1990 to \$8.3 million in 2005, in 1986 dollars.

Thus, total tax revenues to the State and County governments are estimated at \$2.2 million in 1990 and \$12.8 million by 2005, in 1986 dollars.

Expenditures

The visitors and residents at Mokuleia would necessitate expenditures of public resources.

County

Annual County public expenditures on behalf of Mokuleia's visitors and residents could be expected to total \$0.2 million in 1990 and \$1.7 million by 2005, in 1986 dollars.

State

Annual State public expenditures on behalf of Mokuleia's visitors and residents could be expected to total \$0.2 million in 1990 and \$3.3 million by 2005, in 1986 dollars.

Revenue/Expenditure Analysis

The net fiscal impacts of Mokuleia's development to the County and State governments are estimated by comparison in the following sections.

County

Comparison of projected public revenues and expenditures indicates the County government may expect to net about \$0.5 million in additional annual revenues in 1990 and \$2.8 million by 2005, in 1986 dollars.

The analysis also indicates that additional County government revenues generated by Mokuleia would be about 2.6 to 3.1 times the additional expenditures incurred by the County government.

State

Comparison of the revenues and expenditures, as projected, indicate the State government could be expected to net about \$1.1 million in 1990 and \$3.9 million by 2005, in 1986 dollars. This indicates a revenue/expenditure ratio averaging about 2.3:1 during the forecast period.

3. Employment

Existing Conditions

Employment at Mokuleia Ranch (including the Crowbar Ranch) is now limited to about ten persons.

The major North Shore employer is the Waiialua Sugar Company with about 460 employees. According to U.S. Census figures from 1980 (when the plantation payroll was somewhat larger), there were 864 jobs in the Waiialua/Mokuleia census tract 99.01; of these about two-thirds were in agricultural field operations or sugar-mill manufacturing jobs. For census tracts 99.02 and 100 (including Haleiwa and the rest of the North Shore), the job count was 1,167, and nearly one-half of these were in either retail trade or professional services. Thus, the nature of employment is very different in Waiialua/Mokuleia from the rest of the North Shore area.

In areas adjacent to the North Shore, the major employers are tourism activities in Koolauloa and military bases or pineapple operations around Wahiawa. Below Wahiawa, the communities of Mililani and Waipahu as of 1980 contained about 9,300 jobs, many of them in plantation agriculture, neighborhood retail/commercial centers, and some military activities. In the other direction, the Polynesian Cultural Center in Laie provides about 1,000 jobs (many of them for students or part-time workers), while the Turtle Bay Hilton at Kuilima now employs some 550 persons.

Additional planned future employment centers include expanded resort activities at Kuilima (projected to provide an additional 3,550 jobs in Koolauloa and the North Shore) and a high-technology park about Mililani (projected to provide more than 14,000 jobs, although it should be noted that the limited track record of high-technology industries in Hawaii makes this estimate somewhat speculative).

The North Shore unemployment rate has approximately matched the islandwide rate in the 1980's, but the labor force participation rate—particularly among women—has been significantly lower, indicating possible hidden unemployment. Additionally, census data indicate many North Shore residents work less than full time. Compared to the islandwide population, North Shore residents have lower educational levels and a younger median age, both of which suggest fewer job-related skills.

As of 1980, the North Shore civilian labor force totalled 3,837 (compared to the 2,031 jobs in the area), and 27% of employed workers had to commute 45 minutes or more to workplaces far outside the area. Compared to islandwide employment patterns, North Shore workers were more concentrated in blue-collar occupations and less in professional or administrative jobs.

In other nearby areas, the 1980 civilian labor force totalled 6,115 in Koolauloa; 9,701 in the Wahiawa census division; and 25,494 in the Mililani/Waipahu area. Unemployment in all these areas has exceeded the islandwide rate. The rate has been particularly high in Wahiawa, which also has a low civilian participation rate. Military dependents in the Wahiawa area encounter substantial difficulties in finding employment, both because of distance from Honolulu job centers and because their stays in Hawaii are generally limited to three years.

ECONOMIC QUALITY OF RESORT EMPLOYMENT

1984 data on average employment and wages for various types of jobs associated with destination resorts (hotels, other services, eating and drinking places, other retail trade, and transportation), as well as sugar and pineapple plantation jobs is shown below.

Some implications of this include:

While the sorts of service jobs commonly associated with resorts comprise more than 50% of Hawaii's jobs statewide (although many such jobs would actually serve residents rather than visitors), average wages for most categories fall below the statewide average wage for all private-sector jobs.

Average hotel wage is relatively close to the statewide average, but wages for food and beverage jobs (which are often just part-time) are below 50% of the statewide average.

Average Hawaii Employment and Annual Wages for Industries
Associated with Resorts and Plantation Agriculture, 1984

	<u>Average Employment</u>		<u>Average Annual Wage</u>	
	<u>no.</u>	<u>% of total</u>	<u>dollars</u>	<u>% of total</u>
TOTAL PRIVATE SECTOR	332,227	100.0%	\$15,502	100.0%

Selected Resort-Related Industries

"Hotels, rooming houses, etc."	28,262	8.5%	13,067	84.3%
"Other services"	58,442	17.6%	14,061	90.7%
"Eating and drinking place"	37,628	11.3%	7,319	47.2%
"Other retail trade"	54,248	16.3%	12,297	79.3%
"Transportation"	22,150	6.7%	19,500	125.8%

Selected Plantation-Related Industries"Agriculture, forestry,
fisheries:"

— Sugar	3,225	1.0%	20,642	133.2%
— Pineapple	1,989	0.6%	14,841	95.7%

"Manufacturing:"

— Sugar Mills	3,117	0.9%	16,715	107.8%
— Pineapple canning	2,241	0.7%	14,654	94.5%

Source: Hawaii State Department of Planning and Economic Development,
1985, p. 334.

Wages for sugar — the North Shore's current major job provider — are higher than the statewide average, but relatively few people in Hawaii still work in the sugar industry.

If sugar does fail on the North Shore, one alternative is to convert at least some of the sugarcane acreage to pineapple. However, as shown above, average wages in the pineapple industry are lower than in the sugar industry, though not quite as low as in most forms of service employment. Given the small numbers of persons still employed in pineapple, it may also be apparent that pineapple is unlikely to absorb all current sugar workers on the North Shore.

In addition to somewhat low average wages, hotel and other resort-related jobs are subject to seasonal fluctuations and inconvenient and/or split working hours.

In part because of seasonality, tourism is perceived by some economists as moving Hawaii toward a "dual labor market" or a "dual economy" in which some workers live a substantially better life than others:

. . . This suggests the growing prevalence in Hawaii of what economists term a dual labor market in which workers become increasingly polarized into separate primary and secondary labor markets. Jobs in the primary market are characterized by high wages, good working conditions, employment stability, chances of advancement, due process in the administration of work rules and, often, labor union representation.

Jobs in the secondary market, in contrast, tend to have lower wages and fringe benefits, poorer working conditions, high labor turnover, little chance of advancement, and often ill-defined work rules. (First Hawaiian Bank, Research Department, 1984.)

Some additional perspectives on these concerns would include:

The choice now facing the North Shore is not between resort jobs and some alternative industry with better-paying year-round jobs. Rather, it is a choice between resort jobs and no additional jobs.

Future employment opportunities should match the educational and skill levels of the population. As noted elsewhere in the EIS the average educational level of North Shore residents (particularly in the Waialua community) is significantly lower than the islandwide average.

Only some resort jobs would be of the "secondary-sector" nature, where job security is punctuated by seasonal lay-offs, split shifts, low wages, etc. In most hotels, workers with seniority have more choice of shifts, protection against seasonal lay-offs, etc.

A recent doctoral dissertation (Bouslog, 1985) utilized ten years of Hawaii Health Surveillance Survey data to explore which hotel workers are most likely to hold "primary-sector" vs. "secondary-sector" jobs. The study found that Hawaii-born citizens were slightly more likely than others to have the more desirable "primary-sector" jobs, while foreign-born workers were more likely to be in the "secondary-sector" tourism jobs.

Bouslog also noted that, while hotel workers' average wages were somewhat less than other private-sector workers in the early 1980', hotel wages have been climbing more rapidly than wages in most other Hawaii industries in the 1980's.

Additionally, she noted that past studies indicate wages represent only about two-thirds of the average hotel worker's total compensation, with tips and fringe benefits supplying the rest. If this is still true, the 1983 average Oahu hotel worker actually earned slightly more than other private sector-workers.

Anticipated Impacts and Mitigative Measures

Employment

The planned developments at Mokuleia will generate employment during the construction of new facilities and long-term employment in the operation and maintenance of those facilities. Similar to expenditures, employment effects may also be classified as being direct, indirect or induced.

Construction Employment

Direct construction employment is that which would be supported directly by the construction of the various facilities at Mokuleia. The direct needs for construction employees are estimated based on the employment experiences of similar facility construction projects in the State. Construction could begin in 1988 and proceed through 2005.

The employment impacts in particular years during the projection period will depend on the construction timing of the various facilities, but could average about 210 full-time equivalent jobs per year between 1988 and 2005.

Including direct, indirect and induced labor requirements, the proposed construction development at Mokuleia would result in a total demand for about 490 full-time equivalent jobs per year during the 18-year projection period.

Operational Employment

Based on the development and employment characteristics, Mokuleia is projected to generate about 600 full-time equivalent direct operational employment positions by 1990 and about 2,700 by 2005. The majority of these jobs would be associated with the hotel operations at Mokuleia.

Through indirect and induced effects, the direct operational positions created would generate additional employment elsewhere in the State. According to recent studies on the economic impacts of tourism by the DPED, development as proposed at Mokuleia could be expected to support about 470 full-time equivalent positions in 1990 and 2,160 by 2005.

Based on these estimates, total operational employment resulting from the Mokuleia development is projected to increase from nearly 1,100 positions in 1990 to nearly 4,900 positions by 2005.

Labor Demand and Supply

In the social impact assessment for this project prepared by Community Resources, Inc. (Appendix C), an analysis of future labor demand and supply—both with and without the project—was prepared utilizing methodologies and assumptions detailed in that company's report.

Community Resources concluded that, without the Mokuleia project, the North Shore will have an increasing excess of workers over available jobs, so that by the year 2000 there will be 44% more workers than jobs. This suggests progressively higher rates of unemployment and/or commuting to other places for jobs. With the project, the situation would be reversed, and the number of North Shore jobs may exceed the number of workers by the year 2005.

The labor supply/demand analysis also considered an expanded area, including Koolauloa, Wahiawa, and Mililani/Waipahu. This analysis included projected labor demand for the Kuilima expansion and the Mililani high-tech park, although it is again noted that it is somewhat speculative whether the high-tech park will actually reach full development in the 20-year time frame for this assessment. For this expanded Study Area, labor supply is projected to continue to exceed available jobs although the excess will dwindle over time. By the year 2005, without Mokuleia and with only one-half full development of the high-tech park, there would be 30% more civilian workers than jobs. With Mokuleia, the excess of workers over jobs would be 23%. If the high-tech park reaches full capacity and there is no Mokuleia project, the excess would be 15%. And, only if both the high-tech and the Mokuleia projects reach full development by the year 2005, the excess would shrink to 9%, bringing the entire expanded Study Area to the edge of full employment or, at worst, a labor shortage.

The availability of a large Central Oahu labor supply makes it somewhat uncertain whether the Mokuleia project would actually experience difficulty in securing workers. It is possible that any labor shortage might be displaced to the Koolauloa area, requiring the Kuilima project to draw more upon commuters from the lower parts of Windward Oahu.

Potential employment resources were identified that included (1) increasing the labor force participation among several groups with current low rates: females, military dependents, and the educationally disadvantaged; (2) unemployed and/or underemployed; (3) the high number of people who must now commute outside the area; (4) the large number of future high school graduates expected to seek immediate employment; and (5) former plantation workers.

Sociological and psychological aspects of resort work were also considered by Community Resources (1986) in its social impact assessment. These may be either transitional and temporary or more permanent and inherent. The major transitional impacts reported in other rural Hawaii communities switching from an agriculture- to a tourism-based economy have involved family impacts (marital strains, child care problems, etc.) associated with wives' initial entry into the labor force and/or their changed self-images resulting from exposure to other people at hotels. Community Resources notes that, on the one hand, many North Shore women have already entered the labor force--but, on the other hand, some of the major reserve labor pools still involve women. Thus, some transitional family impacts may be expected but not to the level of severity perhaps experienced in Neighbor Island resort areas 15 to 20 years ago. More enduring impacts may include family logistical problems due to shift work; ethnic differences in job distribution (often a matter of preference, but sometimes a source of resentment as when top management is consistently imported); and alleged negative self-image problems associated with "servant" aspects of tourism (although this has never been measured or documented). For the North Shore, such potential social costs must be weighed against demonstrated negative family and mental impacts associated with poverty or unemployment.

4. Lifestyle

Existing Conditions

On the project site, the nine tenant households (six of them Mokuleia Ranch employees and families) now lead very rural lifestyles. Other Mokuleia residents along Farrington Highway are a mixture of (1) fairly affluent persons (many of these part-time rather than full-time) whose households are "country retreats" and (2) low- or middle-income longtime residents (including many full-time renters) whose rural lifestyles are based on proximity to the ocean. A few of these are known to depend to some extent on the ocean for subsistence, although exact numbers are unavailable. Because of rising property values and taxes for beachfront land, it may be increasingly difficult for such individuals to retain this lifestyle in Mokuleia as time goes by.

The existing Mokuleia Ranch—with its pastureland and grazing animals—add to the rural character of the Mokuleia area. However, most outside users of the property are involved in activities which might be considered "retreats" from urban life elsewhere as opposed to full-time involvement in country living. Such users would include polo game participants and spectators; persons who rent the old Dillingham Estate manor for social events; and users of Camp Mokuleia (described further in Section IV.P.2 on "Recreational Resources"), which leases some of its current space from Northwestern Mutual (new owner is Mokuleia Land Company).

The wider North Shore area is also generally "rural" in character and lifestyle. Physically, the area is characterized by extensive agricultural (primarily sugarcane) uses; numerous recreational activities; low-density residential areas, with a few pockets of higher-density apartments and townhouses in Mokuleia, Waialua Beach, and Haleiwa; and low-density commercial areas in Haleiwa and, to a lesser extent, Waialua.

Socially, there are a variety of very different types of "rural" lifestyles on the North Shore. The town of Waialua—which contained 41% of the North Shore's 1980 population—is a traditional plantation community with a strong communal orientation and a power structure tied to the plantation and/or the labor union. Other parts of the North Shore are more ruggedly individualistic. The North Shore (including the Sunset Beach area) is one of the world's premiere surfing locations, and many local and Mainland youths are attracted to the area for its water recreation potential; this

subculture is fairly transient, but some of its members have settled in to become longtime community leaders. Still other forms of "rural" lifestyles on the North Shore include scattered small farms, retirees, and professional-level residents who commute daily to Honolulu.

Adjacent to the North Shore, Koolauloa residents represent a similar diversity of "rural" lifestyles, but the town of Wahiawa is characterized more by an urban lifestyle and the homogenous barracks and apartment housing for the military personnel and dependents. As previously indicated, Wahiawa faces poverty problems, which are often more burdensome in urbanized areas than in country locations.

Anticipated Impacts and Mitigative Measures

Development of the proposed recreational community would involve termination of the current month-to-month leases for the three non-employee households (with approximately seven persons) and elimination of current housing for the six employee households (with approximately 24 persons).

As further discussed in Section IV.P.2, it would also involve elimination of the present polo activities (although these may simply be relocated to another part of the property) and termination of the year-to-year lease of six acres to Camp Mokuleia (although the future of these six acres is still under discussion between the developer and the Church).

In Mokuleia along Farrington Highway, the proposed development would fill in most of the existing large pockets of open space makai of the road. Expected increases in property values for beachfront residential property would be accelerated, suggesting more rapid turnover of these properties (with profits to present owners) and eventual replacement of some current tenants with a relatively more affluent population. The proposed development retains significant amounts of open space and low densities, generally consistent with the current character of Mokuleia. However, the area will have a more "manicured" appearance than at present, although this is expected to occur to some extent anyway with the gradual increase in beachfront property values.

The on-site Mokuleia resident population may equal or exceed the off-site population along Farrington Highway by the year 2005, and the quality of social interaction between the two groups may depend largely on whether they participate in common community organizations. Off-site Mokuleia residents will no longer live in an isolated area remote from other people and organized recreational amenities. Rather, they will have ready access to golf courses, restaurants, commercial areas, etc. This change will be valued differently by different people.

For the community of Waialua, the proposed development could be a vehicle for preserving at least some of the present social order and "sense of place" if the plantation suffers further reverses or eventual shutdown. This is a speculative but highly significant impact, in that it stands for the preservation of a community now home to roughly 40% of the North Shore population.

For the North Shore as a whole, other lifestyle impacts may include expanded public services and/or private amenities due to a larger de facto population base; increased traffic; potential for further visitor-oriented commercial development in Haleiwa; added impetus for other forms of urbanization (all subject to further governmental land use decisions); increased housing pressure; and an expanded visitor population.

The quality of resident-visitor interaction is important to both the long-term viability of the proposed project and the quality of life for North Shore residents. Studies reviewed in the project social impact assessment (Community Resources, 1986) suggest that major determinants of resident attitudes and behavior rarely involve economic benefits. Rather, they usually have more to do with residents' age, perceptions of visitor respect for local culture, level of displaced political resentment, and competition for resources such as ocean recreational areas. The proposed project is intended to be a self-contained destination area, which would minimize any tendency of visitors to wander into residential areas or "local" recreational areas. However, it is expected that more visitors will be visible on the North Shore in the future purely through growth in the islandwide visitor level and consequent numbers of persons renting cars to drive around the island. Interviews with rental car agencies and activities desks in various rural Hawaii resort areas suggest that visitors who do leave self-contained resorts tend to tour the island rather than only the nearby areas; thus, any future sense of intrusion will more likely be attributable to increased number of tourists islandwide than to Mokuleia guests alone.

The social impact assessment prepared by Community Resources anticipates possible increases in family and individual stress on the North Shore due to increased housing pressure resulting from City population policies.

Project impacts are expected to be of a dual and opposing nature. On the one hand, the availability of several thousand jobs will further increase housing pressures and associated social stress. On the other hand, without substantial employment opportunities, less affluent current residents may be expected to bear most of these social costs, whereas resort employment (combined with the advantage of already possessing housing within the area) may enable them to cope with anticipated stresses much more adequately than would be the case if the regional economy remains depressed.

Possible job training programs oriented toward already-housed local residents would thus also represent mitigation of increased housing pressure and associated stress.

Another type of social stress is crime. Increased population normally results in increased crime rates due to more opportunities for crime. Some scholarly studies indicate that tourist populations result in more crime than resident populations, although these studies tend to contradict each other in regard to the exact types of crime which increase. Community Resources has reviewed Hawaii crime data in rural resort areas and has also interviewed numerous police personnel in these areas to determine their perceptions of crime consequences from resort development. The study concluded that some relationship between tourism and crime does appear to exist, but in a variety of minor and often indirect ways. Relatively little crime impact is usually observed at resort destination themselves or in nearby residential communities, but there are often greatly increased problems with petty thefts from visitors at beach parks or other tourist attractions. Perpetrators are often juveniles, and delinquency rates have increased after resort development in other rural areas. Such problems are more acute in areas with "street scenes" such as Kailua-Kona or Lahaina. As a self-contained destination area, Mokuleia is less likely to increase crime rates than would the expansion of tourist-oriented "street scenes" in Waikiki or West Maui.

Most Mokuleia resident complaints about crime now involve illegal firearms use (e.g., target practice) in the Kaena Point area or illegal marijuana growing in the mauka areas. In both cases, the increased de facto population caused by the project may be expected ultimately to reduce these illegal activities. Mitigations would include strong project security in the mauka areas and cooperation with police in searching for illegal marijuana patches before the area is opened to the public. For the Kaena Point area, strong warnings to Mokuleia guests of the area's remoteness and poor roads should dissuade most people from exploring the region and thus protect them from harassment.

A final element of the social impact study involved preliminary documentation of area residents' issues and concerns through interviews with community leaders and community dialogue meetings. Persons interviewed were primarily from the Waialua and Mokuleia areas. Their concerns fell into six broad categories:

Jobs and business opportunities—Community informants strongly stressed the need for jobs to preserve the Waialua community, their desire for some type of job training, and, in a few cases, their apprehensions that resort jobs could not substitute for agricultural jobs.

Public facilities and services—Residents saw infrastructure improvements for the resort (water, wastewater treatment, and roadways) as benefitting the entire Mokuleia areas. Most welcomed the prospect of improved public access to the shoreline; although there was some concern over possible competition for recreational facilities throughout the North Shore.

Level of resort clientele—Some residents favor an upscale, exclusive clientele, while others want more "ordinary" guests because they do not want nearby residents to feel excluded.

Traffic—There were numerous questions about both traffic congestion and road safety issues.

Lifestyle changes—Some community informants expressed concern about the project being a precedent for further urbanization in general, or about particular outcomes such as a road around Kaena Point. There were also questions about the types and numbers of people who would live in the new community.

Need for commitment and communication--Many residents inquired about the best possible mechanisms for ensuring that developer promises are kept, and the developer has told them that conditions attached to land use approvals are the best form of commitment. Residents also strongly urged a continued communication process throughout the project planning stage.

5. Low/Moderate and Employee Housing

The availability of low/moderate and employee housing is a concern of both the State and City governments. The Hawaii State Plan and City and County General Plan both express a desire to encourage the availability of low/moderate and employee housing. The availability of affordable housing is a concern shared by the applicant.

Impacts and Mitigating Measures

Increased pressures on North Shore housing costs and availability is anticipated even without the Mokuleia project due to City population policies. The Mokuleia project would inevitably add to such pressures, particularly if an overall labor shortage does develop. Programs to maximize employment among those already-housed in the area and nearby would serve as a housing mitigation function.

Current City policy has been to impose a set aside of affordable housing units equal to at least 10 percent of the proposed housing units in a development. The application of this policy was varied over the years, and it is currently being reevaluated under a proposed Community Benefit Assessment Ordinance. Normally, the low/moderate housing requirement has been imposed through the zoning process by means of a Unilateral Agreement. For Turtle Bay resort rezoning, the Unilateral Agreement approved by City Council contained a requirement that the developer provide low-moderate income housing opportunities within or outside of the project site for residents living in the Koolauloa and North Shore region by constructing and offering for sale, in cooperation with the City Department of Housing and Community Development, a number of dwelling units equal to ten percent of the number of dwelling units not a part of a full service hotel operation (Ordinance 86-99). For West Beach resort rezoning, the Unilateral Agreement provided in lieu of the 10 percent low/moderate income housing, an option for payment of a certain amount to be deposited into the housing assistance fund (Ordinance 86-09).

Like Turtle Bay resort and West Beach resort, similar mitigating measures to meet affordable housing requirements will be part of the Unilateral Agreement for the development at Mokuleia, which will be determined and designed through the legislative process of rezoning. At this level of planning, it is only possible to outline the options for meeting the affordable housing requirement, which at this point there are three: (1) construct the units on site, (2) construct the units off-site, and (3) payment of money. Another option to accomplish the housing requirement is the dedication of land. In terms of housing types, attached and/or detached rentals as well as for sale units will be given consideration. All of these options will be discussed in consultation with the Department of Housing and Community Development, and in meetings with the community as the project proceeds through other levels of planning, especially in the rezoning process and in seeking approvals of an Urban Boundary change through the Land Use Commission.

P. INFRASTRUCTURE AND PUBLIC SERVICES

1. Traffic and Roads

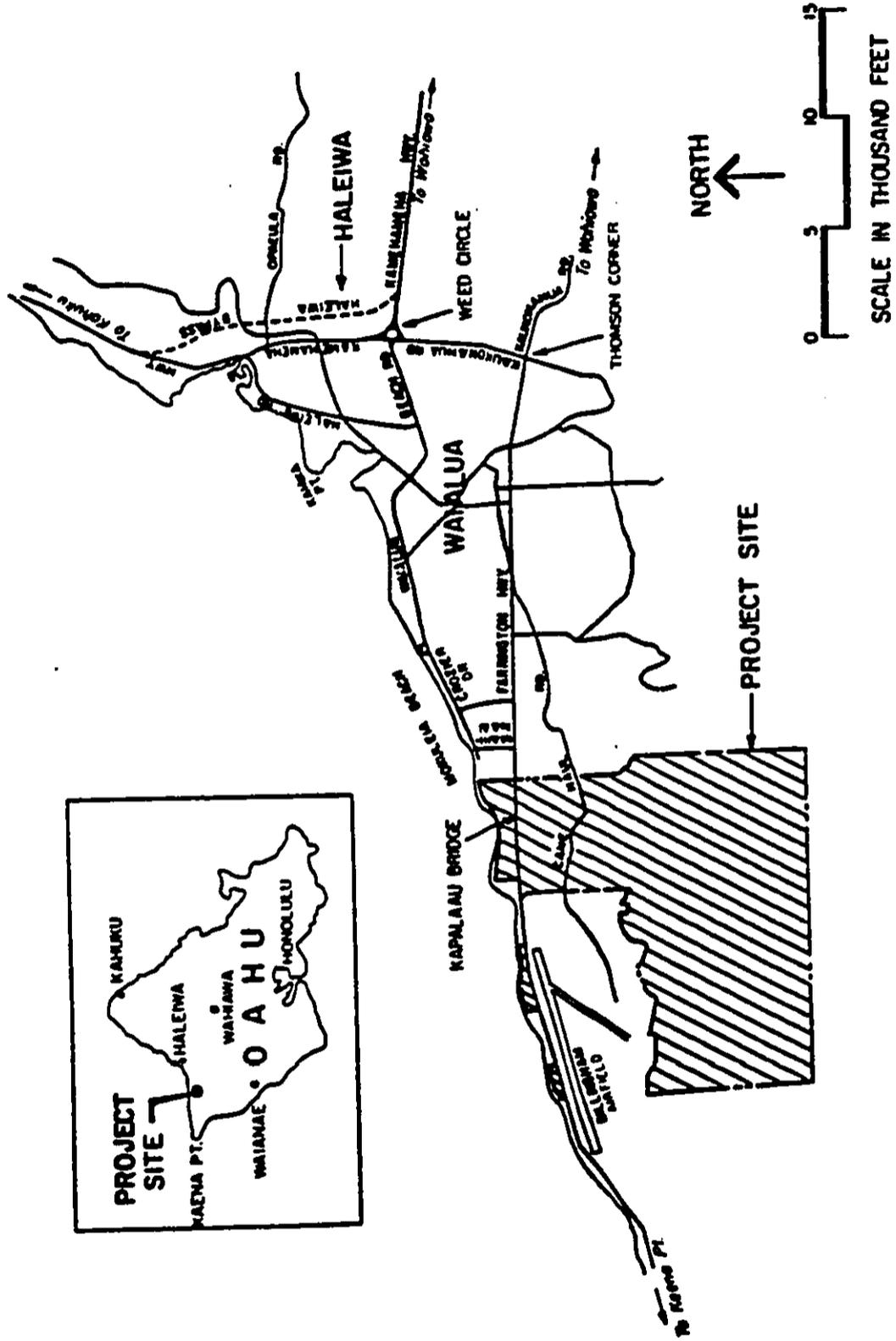
The traffic impact on the proposed recreational destination at Mokuleia on the North Shore of Oahu, was studied by Parsons Brinckerhoff Quade & Douglas, Inc. (Appendix L). Their report is summarized below:

Existing Conditions

Access to the project site is via Farrington Highway which is the only arterial highway serving this area. It is a two-lane, two-way, undivided state highway generally running through residential communities and canefields inland and along the coastline (See Exhibit 19). Farrington Highway varies in width from 20 to 22 feet and is on level terrain with narrow shoulders.

In Waiialua, the highway pavement becomes wider with various cross streets and driveways entering the highway. At Thomson Corner, Farrington Highway connects to Kaukonahua Road which serves Wahiawa and Haleiwa bound traffic. In the southeasterly direction, the road provides access to Wahiawa, and connects to Kunia Road, Kamehameha Highway and the H-2 Freeway via Wilikina Drive. To the north, Kaukonahua Road feeds Weed Circle, a traffic rotary which also serves Kamehameha Highway and Waiialua Beach Road. From here traffic can continue toward Wahiawa, Waiialua, or into Haleiwa and other points north of Haleiwa.

EXHIBIT 19
VICINITY MAP



VICINITY MAP

On this side of the island there are no restraints on capacity other than the highway itself. There is a potential of capacity restraint travelling to the north shore in Haleiwa where left-turn traffic and motorists pulling off to park on the roadside queue traffic in both directions.

Traffic Conditions

Existing traffic volumes were determined from manual field counts and data from previous counts taken by the State Highway Division. Weekday traffic volume (two-way) on Farrington Highway at Kapalaau Bridge near the project site was approximately 1,300 vehicles per day (vpd) in 1984. Earlier counts were higher, averaging 1,800 vpd in the mid-1970's and 1,450 vpd in the early 1980's (Exhibit 20).

Peak hour volumes in the 1984 weekday sample at Kapalaau Bridge occurred between 3:45 and 4:45 PM, during which 116 vehicles per hour (vph) were counted. Analysis of conditions on the two-lane highway during the weekday peak hour using the Highway Capacity Manual shows Level of Service A. Definitions of Level of Service are provided in the traffic report (Appendix L).

Weekend traffic conditions were sampled on April 5-6, 1986, which coincide with the opening of the polo season (see Exhibit 21). Daily two-way traffic volumes at Kapalaau Bridge were estimated to be 2,400 vpd on Saturday and 3,500 vpd on Sunday. Peak hours identified by the field counts are 2:00 to 3:00 PM on Saturday and 1:15 to 2:15 PM on Sunday. Two-way peak hour volumes counted on Farrington Highway west of Mahinaai Street were 237 vph on Saturday and 402 vph on Sunday.

Analyses show Level of Service B in Saturday's peak hour and Level of Service C during Sunday's peak hour. Field observations indicated better levels of service, probably attributable to the relatively short stretch of highway (approximately 3 miles) and the lack of slow moving vehicles in the traffic stream.

Traffic volumes on the other side of Waialua, near Thomson Corner (Kaukonahua Road intersection) were also recorded by the State Highways Division. Weekday volume was approximately 6,210 vpd in 1984. A review of the counted volumes indicates an average growth of 1.2 per cent per year (see Exhibit 20).

EXHIBIT 20

EXHIBIT 20
 HISTORICAL TRAFFIC VOLUMES
 Vehicles/Day

Farrington Highway at:	Kapalaau Bridge			Kaukonahua Road		
	WB	EB	Total	WB	EB	Total
July 1973	908	958	1,866	-	-	-
July 1974	1,019	969	1,988	-	-	-
June 1975	828	1,061	1,889	-	-	-
June 1976	738	775	1,513	2,816	2,944	5,760
April 1977	887	842	1,729	2,744	2,999	5,743
March 1978	944	902	1,846	2,650	3,127	5,777
August 1979	-	-	-	2,688	2,756	5,444
August 1981	633	614	1,247	2,445	2,513	4,958
August 1982	801	823	1,624	2,967	3,217	6,184
August 1983	779	693	1,472	3,020	3,434	6,454
September 1984	685	643	1,328	2,970	3,241	6,211

Source: State of Hawaii, Department of Transportation, Highways Division, Planning Branch. Count Stations C-23-D and 22.

EXHIBIT 21
FIELD TRAFFIC DATA

MOKULEIA TRAFFIC COUNTS
INTERSECTION: FARRINGTON HWY. AT MAHINA'I ST.
COUNT TAKEN ON SATURDAY, 04/05/86 BY LH AND KO
PAGE 1 OF 2

COUNT VOLUMES	A	B	C	D	E	F	TOTAL
10:10-10:15 AM	0	5	0	0	0	0	5
-10:30	0	20	6	0	2	1	29
-10:45	1	18	13	1	0	0	33
-11:00	0	17	21	0	0	1	39
-11:15	2	21	18	1	1	3	46
-11:30	1	19	21	1	1	1	44
-11:45	3	27	15	1	1	2	49
-12:00 PM	2	32	16	1	3	1	55
-12:15	4	23	29	2	0	1	59
-12:30	2	17	21	0	0	2	42
-12:45	0	23	22	0	2	0	47
- 1:00	5	24	22	0	2	0	53
- 1:15	4	26	21	0	0	3	54
- 1:30	2	35	19	2	0	0	58
- 1:45	1	26	18	1	0	2	48
- 2:00	0	24	22	2	1	1	50
- 2:15	0	22	31	2	1	1	57
- 2:30	2	32	34	0	1	3	72
- 2:45	2	30	28	1	1	0	62
- 3:00	1	31	16	2	0	4	54
- 3:15	1	11	32	0	6	0	50
- 3:30	0	12	20	0	0	0	40
- 3:45	0	13	20	1	1	1	36
- 4:00	1	15	27	0	1	2	46
- 4:15	3	16	42	4	2	2	69
- 4:30	2	14	30	0	0	0	46
- 4:45	0	23	30	1	2	0	56
- 5:00 PM	0	11	22	0	1	1	35
10:10-5:00 TOTAL	39	587	624	23	29	32	1334
10:15-5:00 TOTAL	39	582	624	23	29	32	1329

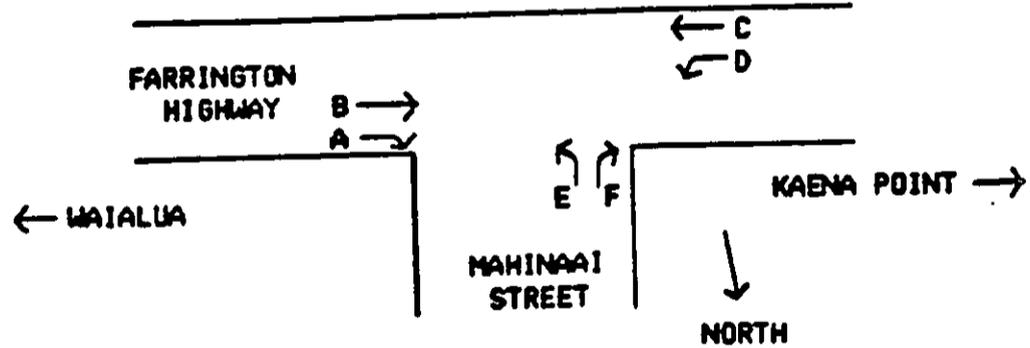


EXHIBIT 21
FIELD TRAFFIC DATA

MOKULEIA TRAFFIC COUNTS
INTERSECTION: FARRINGTON HWY. AT MAHINA'I ST.
COUNT TAKEN ON SUNDAY, 04/06/86 BY KO AND LU
PAGE 2 OF 2

COUNT VOLUMES	A	B	C	D	E	F	TOTAL
10:00-10:15 AM	1	30	12	1	3	1	48
-10:30	0	13	13	0	0	0	26
-10:45	3	36	17	1	1	0	58
-11:00	0	31	20	1	0	0	52
-11:15	1	30	25	1	2	0	59
-11:30	1	39	18	0	0	3	61
-11:45	0	40	21	2	0	3	66
-12:00 PM	2	31	27	0	0	0	60
-12:15	1	31	21	2	1	3	59
-12:30	2	51	29	2	3	1	88
-12:45	0	55	24	0	1	0	80
- 1:00	2	58	27	2	0	2	91
- 1:15	1	47	30	0	0	3	81
- 1:30	2	71	27	0	1	2	103
- 1:45	2	74	31	2	0	1	110
- 2:00	0	50	31	2	0	2	93
- 2:15	1	65	33	0	1	3	103
- 2:30	2	55	23	2	0	0	82
- 2:45	1	42	31	0	0	3	77
- 3:00	1	33	42	0	0	5	81
- 3:15	0	29	56	3	0	2	90
- 3:30	0	33	48	0	1	3	85
- 3:45	1	27	47	1	2	1	79
- 4:00	1	30	59	0	2	0	92
- 4:15	2	31	64	1	0	4	102
- 4:30	3	21	61	0	0	1	86
- 4:45	1	17	58	1	2	1	80
- 5:00 PM	2	23	106	1	0	1	133
10:00-5:00 TOTAL	33	1101	1001	25	20	45	2225
10:15-5:00 TOTAL	32	1071	989	24	17	44	2177

The weekday peak hour volume in 1984 near Thomson Corner was 619 vph between 6:45 and 7:45 AM; the afternoon peak hour occurred between 4:30 and 5:30 PM, in which traffic volume was 500 vph. The maximum volume at this location was estimated to be 770 vph during the peak hour on Sunday.

Existing highway levels of service near Thomson Corner were computed to be "C" during weekday peak hours and "D" in the Sunday peak hour. Using estimated turn volumes for the Sunday peak hour, the longest delays are for vehicles wishing to turn left from Kaukonahua Road (from Weed Circle) toward Wahiawa; Level of Service D would be experienced.

Proposed Action

The proposed action is a recreational development which includes golf courses, campsites, hiking and equestrian trails, and other facilities. Recreational homes, resort hotels and condominiums, and other related commercial areas are planned to support these activities.

Anticipated Impacts and Mitigative Measures

The traffic impacts of the proposed 4,000 unit recreational development were evaluated for two cases: full development in year 2005 and partial development of 2,500 units in year 2000.

Potential traffic impacts of the proposed project were identified by projecting future traffic volumes from existing and planned projects. Using traffic generation analyses, estimates are made to show the increase in traffic due to the project. These projected numbers are summarized in Exhibits 22 and 23.

From these analyses the significant traffic impacts can be expected on Farrington Highway between the project site and Waialua, at Thomson Corner, and within the project site.

Since Farrington Highway will provide access to the project, traffic volumes are expected to increase. The analyses of year 2000 conditions with the proposed project show Level of Service E in the weekend peak hour. Traffic demands on weekdays would be served at Level of Service D or better. For the ultimate development in year 2005, predicted weekday and weekend peak hour traffic demands would result in Level of Service E conditions on the existing highway. Exhibit 24 summarizes the highway conditions.

EXHIBIT 22

EXHIBIT 22
TRAFFIC GENERATION

Vehicles per day (In + Out)	<u>Weekday</u>		<u>Weekend</u>	
	<u>Total</u>	<u>Net*</u>	<u>Total</u>	<u>Net*</u>
<u>Year 2000</u>				
Hotel & Condominiums	11,180	5,160	13,520	6,020
Golf Courses	2,280	460	1,950	390
Commercial	5,920	590	8,390	840
Recreational Homes	<u>2,940</u>	<u>1,580</u>	<u>3,240</u>	<u>1,530</u>
TOTAL	22,320	7,790	27,100	8,780
<u>Year 2005</u>				
Hotel & Condominiums	18,450	7,130	22,310	8,170
Golf Courses	2,280	460	1,950	390
Commercial	7,690	770	10,900	1,090
Recreational Homes	<u>4,020</u>	<u>2,210</u>	<u>4,440</u>	<u>2,150</u>
TOTAL	32,440	10,570	39,600	11,800

* Increase in traffic on Farrington Highway at project limit
(east or Waialua side)

EXHIBIT 23

EXHIBIT 23
NET TRAFFIC - PEAK HOURS

Vehicles per hour	Weekday (AM)		Weekday (PM)		Weekend	
	In	Out	In	Out	In	Out
<u>Year 2000</u>						
Hotel & Condominium	273	79	215	358	341	427
Golf Courses	15	3	5	20	14	28
Commercial	8	8	27	28	40	40
Recreational Homes	<u>55</u>	<u>25</u>	<u>50</u>	<u>80</u>	<u>65</u>	<u>75</u>
TOTAL	351	115	297	486	460	570
<u>Year 2005</u>						
Hotel & Condominium	385	91	287	484	463	576
Golf Courses	15	3	5	20	14	28
Commercial	11	11	34	37	52	52
Recreational Homes	<u>77</u>	<u>35</u>	<u>70</u>	<u>112</u>	<u>91</u>	<u>105</u>
TOTAL	488	140	396	653	620	761

EXHIBIT 24

EXHIBIT 24
 TRAFFIC CONDITIONS
 Farrington Highway

	Traffic Volume(vph)			Level of Service*	V/C Ratio
	WB	EB	Total		
<u>Existing</u>					
Weekday AM Peak Hour	58	43	101	A	0.05
Weekday PM Peak Hour	53	63	116	A	0.06
Saturday Peak Hour	123	114	237	B	0.12
Sunday Peak Hour	276	126	402	C	0.22
<u>2000 With Project</u>					
Weekday AM Peak Hour	409	158	567	C	0.32
Weekday PM Peak Hour	350	549	899	D	0.47
Weekend Peak Hour	736	696	1,432	E	0.71
<u>2005 With Project</u>					
Weekday AM Peak Hour	546	183	729	D	0.42
Weekday PM Peak Hour	449	716	1,165	E	0.62
Weekend Peak Hour	896	887	1,783	E	0.88

* for existing 2-lane highway: 10-foot lanes, no shoulders

Widening of the existing highway would be necessary to increase capacities. Improvements to the two-lane highway such as removing roadside obstructions and widening travel lanes to 12 feet could increase capacity by about 30 percent; the condition during the weekend peak hour, however, would remain at Level of Service E (LSE). Since LSE on two-lane highways describe probable delays due to the inability to pass slow moving vehicles, a passing lane or pull-off areas could be provided to minimize delays. Widening to a multilane facility would increase capacity to approximately four times the peak traffic demand, which does not appear to be appropriate in light of existing conditions elsewhere.

The low level of service may not translate to unacceptable operational conditions. The procedure to calculate capacity and determine the levels of service on a two-lane highway from the Highway Capacity Manual also estimates that the average speed on the highway, if not otherwise regulated, would exceed the posted 35 mile per hour speed limit. The calculation also assumes extended (longer than the four miles of Farrington Highway involved here) segments of the highway, whereby delays due to speed differences would be significant.

At Thomson Corner, the increased traffic demands caused by the project will create long delays for vehicles turning left from Weed Circle toward Wahiawa before year 2000. The analysis also indicates that all of the stop-controlled movements at the intersection will have demands greater than available capacities in year 2005. At Thomson Corner, the traffic report concludes, signalization will be needed. Signalization of the intersection would alternately assign to the various conflicting movements the right to use the intersection; the analyses show, in all cases, below capacity conditions. Traffic volumes and operating conditions at this intersection should be monitored and signalization provided when warranted. With signalization, however, increased air pollution and interruption to vehicle movements will occur.

Traffic impacts beyond the Mokuleia-Waiialua area are expected to be significantly less. Two existing highways, Kaukonahua Road and Kamehameha Highway, provide service south toward Wahiawa. Kamehameha Highway, Haleiwa Road, and the proposed Haleiwa Bypass Road provide service northward through Haleiwa. Traffic volumes between Honolulu and Haleiwa are expected to be affected more by factors other than the proposed project, such as increases in islandwide population, tourism activity, and development elsewhere. Construction of the proposed Haleiwa bypass highway would ease the

expected increases in traffic at Weed Circle. Within Haleiwa, existing commercial activities and recreational areas could become destinations for traffic generated by the proposed project.

The traffic report recommends that Farrington Highway within the project limits be widened to provide a median lane for left turn traffic. The median lane will improve traffic operations by allowing traffic desiring to make left turns from the highway to vacate the through lane; in addition, traffic desiring to enter the highway from a driveway or side street will have a refuge area available so that only one lane of traffic needs to be crossed at a time.

Turn volumes at the intersection of Farrington Highway and the proposed access road were estimated for the weekend peak hour in years 2000 and 2005 to determine localized improvements that will be needed (Exhibit 25). The following recommendations were made for the proposed intersection:

- * Signalize the intersection when traffic volumes or conditions warrant this improvement; the predicted volumes indicate that the unsignalized intersection will reach capacity in the middle of year 2001.
- * The access road (Road A) should be at least four lanes wide; two lanes should be provided on the access road approach to the intersection so that left and right turns onto Farrington Highway can be separated.
- * A separate dedicated left turn lane should be provided for westbound Farrington Highway-to-access road traffic.
- * A deceleration lane should be constructed for eastbound Farrington Highway traffic turning right into the access road.
- * Driveways from the commercial areas, hotels, or other uses should be located as far as possible from the intersection; desirable minimum distances are 400 feet along Farrington Highway and 300 feet along Road A.

Summary

The proposed project will increase traffic volumes on Farrington Highway in the Mokuleia-Waialua area. Levels of service on the existing two-lane highway will reflect the increased traffic, with

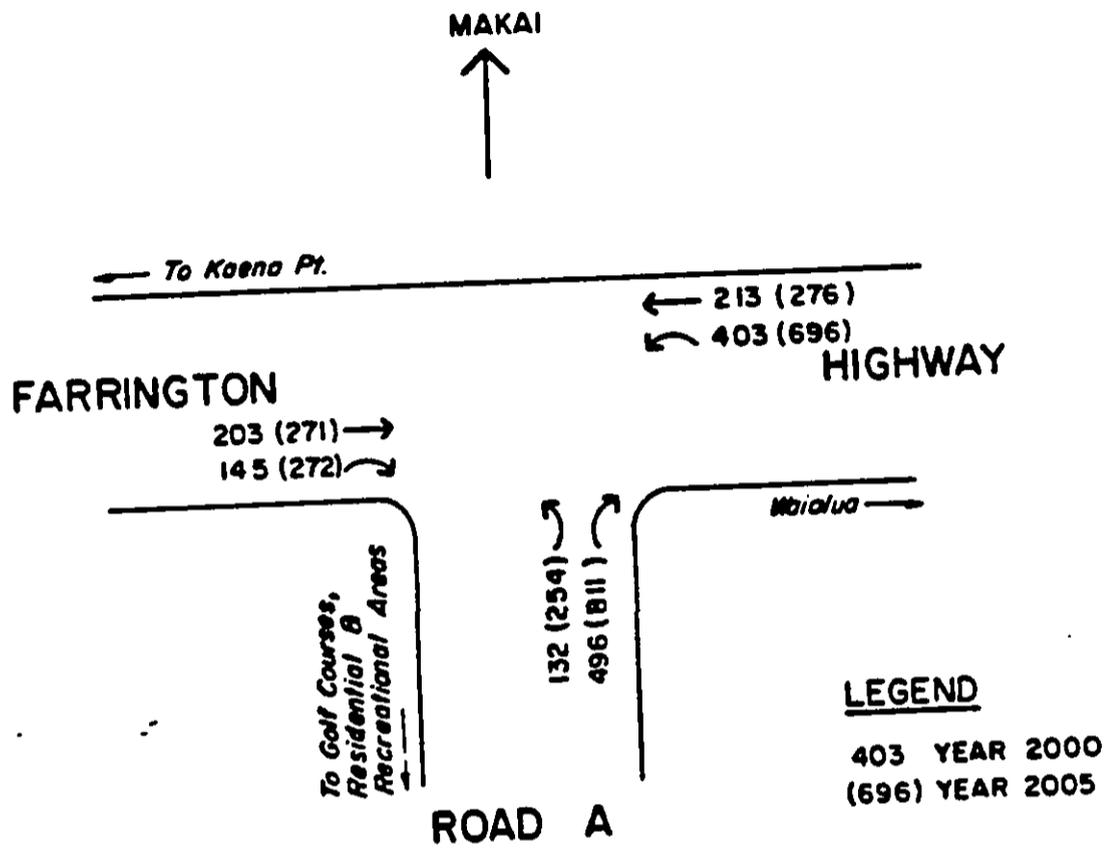


EXHIBIT 25

TRAFFIC ASSIGNMENT

WEEKEND PEAK HOUR

the existing Sunday peak hour level of Service C changing to Level of Service E with completion of the proposed project. The existing highway, however, has sufficient capacity to serve the predicted peak hour volumes.

At Thomson Corner, signalization will be needed. Without signalization, the increased traffic volumes will cause very long delays to traffic movements which would be controlled by existing stop signs or which must yield to oncoming traffic.

The traffic increases on other roadways farther from the project will be smaller due to the distribution of demands; the increase will be a small portion of existing traffic and will not have any significant impact on traffic conditions. Within the project limits, improvements are recommended to minimize the adverse effects of the increased traffic volumes.

2. Recreational Resources

On Site Recreational Resources

On the project site, the primary current recreational activities are private ones--equestrian activities (polo and other facilities at the Crowbar Ranch stables) and camping at Camp Mokuleia.

As detailed in Section III.A.3, the 18 acres leased by the Hawaii Polo Club now comprise Hawaii's major site for polo matches, attended by as many as 2,000 spectators.

Additionally, Mokuleia Land Company now leases, on a year-to-year basis, the easternmost six acres of its 27-acre beachfront parcel to the Episcopal Church. The Church's Camp Mokuleia consists of its own three acres to the east and these six leased acres. Camp activities, available to the general public on a fee basis, include (1) weekend camping programs, which attract a mix of groups and individuals, and (2) summer camping for schools and other organized groups, such as the handicapped, cancer patients, and immigrant children. The camp director estimates 20,000 clients were served in 1985. Most camp facilities are located on the Church's own three acres. The six acres leased from Mokuleia Land Company are primarily in open space but also contain thatched huts used by Kamehameha Schools for a Hawaiiana instruction program; parking for visitors; and beach and recreational facilities for campers. The Church has initiated a fund-raising program to add substantial new facilities to Camp

Mokuleia. The long-range plan for camp improvements assumes ultimate acquisition (purchase or long-term lease) of the six acres now leased from Mokuleia Land Company. The master plan for these six acres envisions constructions of various youth-oriented facilities (cabins, campgrounds, and various sports playing fields), while new adult-oriented facilities would go on the Church's own three acres.

Mauka portions of the property contain a number of hiking trails and a jeep access trail (now washed out in one location) to Peacock Flat. Because of liability concerns, the property owner has recently been reluctant to permit public access to these trails. However, there are reports of illegal use of the land by some hunters.

Currently there is also no legal public access across Mokuleia Land Company property to the shoreline, although entry may be gained by walking along the beach. This shoreline offers the potential for diving, swimming, beachcombing, and shorecasting. However, heavy surf often renders the area hazardous, particularly in the winter months, and community informants report little use of the Mokuleia shoreline below private lands, except by a small number of area residents who are very familiar with conditions there.

Off-Site Recreational Resources

Off-site but nearby on Farrington Highway are several other camping or beach park areas:

In The Beaches of O'ahu, Clark (1977) defines the "Mokuleia Beach Shoreline" as consisting of the six-mile stretch extending from Camp Harold Erdman on the western (Kaena Point) end to Puuiki Beach Park (off of Crozier Drive) on the eastern side. He identifies and characterizes the following specific beach areas:

- (1) Camp Harold Erdman is a YMCA facility. Although access is limited to YMCA uses, its popularity as a summer camp for children — along with year-round availability for leadership training, conferences, retreats, etc. — makes it one of the best-known stretches of the Mokuleia Beach Shoreline to the Oahu public at large. Clark states that water activities include diving, snorkeling, and swimming. He characterizes the ocean as generally calm during the summer but subject to strong currents from October through April.

- (2) Mokuleia Army Beach facilities are limited to military personnel, although it has the widest and cleanest sandy beach of the Mokuleia stretch. However, states Clark, these areas are exposed to very severe rip currents and lateral currents during the winter months, especially during high surf periods. Over the years, this particular section of the Mokuleia Beach Shoreline has been the scene of many serious and fatal swimming incidents.
- (3) Kealia Beach includes the shoreline fronting the two small westernmost shoreline parcels proposed for resort development within this project. According to Clark (p. 105), the "most popular section of the beach is the Pu'u o Hekili area, the site of a former fishing shrine. The wide sand beach here is reached by following any of a number of unimproved roads through the brush to the shoreline. The area is frequented by fishermen and occasionally by campers." (It should be noted that legal access would now occur only along the shoreline, and that camping above the high-water mark is technically trespassing.)

Water activities include diving, swimming, and shorecasting. Clark recommends extreme caution in entering the water during winter months when surf is large. He characterizes the ocean as "relatively safe on calm days," but says along-shore currents are "insistent" even then.

- (4) Mokuleia Beach Park is the only developed public facility within the project area. Water activities include diving, shorecasting, and swimming. Available facilities include a comfort station, cooking stands and picnic facilities, a large grassy playground, public and emergency phones, and 65 parking stalls. The park is windy and shadeless, although the City has tried unsuccessfully to plant trees there (personal communication, Yukio Taketa, Chief, Advanced Planning Section, Department of Parks and Recreation, June 19, 1986). There are tentative plans for a new bath house and parking lot lights.

The beach fronting the 11.7-acre park lies on the leeward side of a sandy point. It is moderately wide but steep, and is somewhat protected by the broken offshore reef. However, Clark (p. 105) adds his usual admonition that there are "dangerous currents from October through April, especially when surf is big."

According to the Custodian of Permits and Records for the City Department of Parks and Recreation (personal communication, Ray Hasegawa, June 19, 1986), limited restroom facilities at the park require limiting the availability of camping permits to a total of 15 (each for up to ten persons) at any one time. He said the park is in little demand among campers most of the year due to its harsh physical character and risky swimming condition; however, on three-day weekends, Mokuleia Beach Park is among Oahu's most popular camping sites, apparently because its remoteness is appealing to city dwellers seeking an escape from urban environments.

- (5) Mokuleia coast, between park and Laau Paena St. residential area, is a shoreline stretch not specifically described by Clark. This includes the coastal area fronting the 27-acre project parcel and the abutting Camp Mokuleia. There is currently no public access except along the sandy shoreline. Residents interviewed indicate that little swimming takes place there but other activities include net throwing, pole casting, daytime and night diving for lobster, and some limu picking around Camp Mokuleia. There are no estimates of extent of useage, although Mokuleia Land Company personnel report observing infrequent use, and other residents say that wintertime rough waters usually limit food-gathering activities to a limited number of persons very familiar with the area.

The public Facilities map for the City Development Plans indicates the City intends to acquire Mokuleia Land Company's entire 27-acre parcel for Mokuleia Beach Park expansion purposes. No money for this purpose is included in the present CIP budget. The Public Facilities map indicates the acquisition is to take place between one and seven years in the future, although the current CIP program states that it will be more than seven years in the future.

- (6) "Mokuleia Beach" is Clark's term for the coastal area fronting the current main residential pocket on Farrington Highway (i.e., Laau Paena St., Mokuleia Beach Colony, etc.); the large 82-acre project parcel which includes the current polo field location; and the private Castle and Cooke recreation area to the east (several cottages serving as an executive retreat for management personnel). As with most of the Mokuleia Beach Shoreline, Clark warns of dangerous currents in the winter months, particularly in times of large surf, but notes that

water activities do include swimming and diving, as well as shorecasting and beachcombing. However, the entire shoreline above the high-water mark is privately-owned, which sharply limits public access. People nonetheless can reach the beach, either through trespassing or along the shoreline, and area residents report recurring litter problems.

The City North Shore Development Plan Public Facilities map indicates a "site-undetermined" public park should be developed somewhere in the vicinity of Kai'ahulu Bay on Mokuleia Land Company's 82-acre parcel. However, the map also indicates that acquisition of such a park site (of indeterminate acreage) is more than seven years in the future, and no City funds have been appropriated to date.

- (7) Puiki Beach Park is privately-owned, with access limited primarily to Waialua Sugar employees. It is located off Waialua Beach Road rather than Farrington Highway. The reef structure there provides better protection against high waves and currents than most other portions of the Mokuleia Beach Shoreline, although the beach is steep, a mixture of sand and pebbles, and the ocean bottom is rocky rather than sandy.

The park serves important social and recreational functions for the Waialua community. Waialua Sugar Company has dedicated a ballfield for the community Little League and makes the four pavilions available for local church and other non-profit groups. Intrusion into, or congestion of, this park would be a sensitive social impact. However, the location is off the main highway which would be used by resort guests, and a sign clearly marks the park as a private facility.

- (8) Kaena Point State Park The Kaena Point State Park wraps around Kaena Point. According to DLNR planners, the emphasis of the park (improvements and usage) is on the Waianae side due to more favorable beaches and camp grounds. Improvements to the North Shore side are not presently foreseen. Possible impacts may include greater visitation to the Kaena Point State Park and triggering the eventual need for improvement.

Future Recreational Needs

The State Comprehensive Recreational Plan (SCORP) is embodied within the State Recreation Functional Plan and is intended to represent a broad view of outdoor recreational opportunities, problems and issues in the State of Hawaii and to propose coordinated action toward improving the quality of outdoor recreational opportunities for State of Hawaii residents and visitors.

SCORP provides the following recommendations for the North Shore area:

The North Shore Planning Area stretched from the area just east of Kawela Bay to Kaena Point. Included are the residential areas of Sunset Beach, Waimea, Haleiwa, Waialua and Mokuleia.

The North Shore has an abundance of existing coastal recreation areas including the Mokuleia Beach Park, Pupukea Beach Park, Waimea Bay Beach Park, Kaiaka Point State Recreation Area, Ehukai Beach Park, Haleiwa Beach Park, Haleiwa Alii Beach Park, and the Haleiwa Boat Harbor. An offshore resource area, the Pupukea Marine Life Conservation District (MLLCD), is managed by the State Division of Aquatic Resources. Inland of Mokuleia area, there are the special resource management areas of Mount Kaala and Pahole Natural Area Reserves.

Future parks planned for the area include Mokuleia Beach Park expansion, Puuiki Beach Park, Haleiwa Beach Park expansion, Haleiwa Regional Park expansion, Kaiaka Point State Recreation Area improvements, Kawaihoa Beach Park, Waimea Bay Beach Park expansion, and Ehukai Beach Park expansion.

Need for Action

Inland Recreation: There is expected to be a medium need for action on inland recreation like hiking, camping and picnicking.

Coastal Recreation: There are high need for action anticipated on swimming, sunbathing, diving, surfing, beach camping and beach picnicking; and a medium need for action on fishing.

Facility Based Recreation: There is expected to be a high need for action on facility based recreation like field games, court games, playground equipment and pool swimming; and medium need for action on tennis and golf.

Other Recreation Activities: There appears to be a high need for action on walking as a recreation activity; and medium need for action on jogging and bicycling activities.

Respondents in the Leeward/Central/North Shore areas regarded beach parks as the most important recreation facilities. The importance of facilities and programs were ranked by respondents from high to low as follows: beach parks, recreation programs, zoo, children's equipment, quiet parks, ballfields, gymnasiums, basket/volleyball courts, pools, campgrounds, tennis, botanic gardens, and golf courses.

Proposed Alternative Actions

Provide for inland hiking and camping recreation activities.

- Implement budgeted improvements such as at the Kaena Point State Park.
- Identify other potential inland recreation areas for future development.

Provide for swimming, sunbathing, surfing and fishing coastal recreation activities. Also provide for beach camping activities.

- Implement budgeted improvements at beach parks such as Haleiwa Alii Beach Park, and Mokuleia Beach Park.
- Consider development of other planned beach facilities like Mokuleia Beach Park expansion, Puuiki Beach Park and other beach parks identified earlier.

Provide for athletic fields, sport courts, swimming pools and tennis.

- Consider improvement of existing or development of new recreation areas to provide for facility based recreation needs.

Provide for golf course activities.

- Consider improvement to the existing Kahuku Golf Course and/or increasing accessibility to existing and proposed private courses at Turtle Bay to accommodate future users.

- Given the expense of constructing and operating a golf course, identify other private development efforts in the vicinity as another alternative to a public initiated projects.

Provide for walking, bicycling, jogging recreation activities.

- Explore options for providing additional trails and paths for walking and hiking activities.
- Pursue implementation of the Statewide Master Plan for Bikeways.
- Consider these recreation activities in improving roadways and construction new roadways.
- Consider development of other planned recreation areas/facilities or identified potential resource sites.

The Public Facilities map for the North Shore Development Plan indicates the City intends to acquire Mokuleia Land Company's entire 27-acre parcel (including the six acres leased to Camp Mokuleia) for Mokuleia Beach Park expansion. No money for this purpose is included in the present public works budget. The Public Facilities map indicates the acquisition would occur between one and seven years in the future, although the current Capital Improvements Program states it will be more than seven years in the future. The City Development Plan also indicates a "site-undetermined" public park somewhere in the vicinity of Kai'ahulu Bay on Mokuleia Land Company's 82-acre beachfront parcel (which includes the 18 acres now used for polo). However, the plan also indicates that acquisition of such a park site (of indeterminate acreage) would be more than seven years in the future, and no City funds have been appropriated to date.

Anticipated Impacts and Mitigative Measures

The project would have numerous impacts, primarily within Mokuleia's Farrington Highway corridor. Not the least of these would be the provision of the project's own recreational characteristics--golf courses, restaurants and evening entertainment, sports facilities, possible theatre complex, etc.

As discussed in Section III.A.3, discussions between the developer and the Hawaii Polo Club are now going on as to possible relocation to expanded polo facilities to another, more mauka portion of the property.

The developer is also still talking with the Episcopal Church about its desire to acquire the six leased acres for Camp Mokuleia. As a good-faith gesture, the property owner has modified its tentative plans for the 27-acre parcel to leave the six-acre portion in landscaped open space, pending further negotiations with the Church. However, if the entire 27 acres are developed for resort use, the nature of the camping experience at Camp Mokuleia would change, since the camp would be limited to a three-acre site between two more urbanized parcels.

While no definite plans or arrangements have been made, the developer's current intent is to improve the jeep access road to Peacock Flat (possibly with general public access); improve hiking trails; develop camping and/or picnic facilities in the mauka areas; and perhaps set aside a zone for hunting. These plans are essentially dependent on finding a contractor who would operate these mauka recreational facilities, financing needed improvements through small user fees. The developer has initiated talks with several prospective operators, including the Episcopal Church (since the mauka recreational activities appear complementary to the Camp Mokuleia experience).

Other likely project impacts include:

- (1) Public access to the shoreline will increase due both to standard City requirements for such access and to the developer's publicly-stated intention to provide such access, as well as public parking facilities. However, at the present stage of project planning, there is no final determination as to the exact location of access trails, or the number of parking stalls. The applicant will comply with the requirements of the Public Access Ordinance 4311.
- (2) Increased use of the beach by resort guests and the general public could present safety problems due to the strong currents which often accompany high surf in winter. This could be mitigated by prominent warning signs, provision of life-guards, and provision of attractive swimming pools in the hotels to provide guests the option to use pools rather than the ocean.
- (3) Project approval as planned would preclude long-range City plans to expand Mokuleia Beach park and establish a new park on Kealia Beach. However, existence of public park sites on the Development Plans in no way ensure the implementation of

these sites as park areas. In the five years that the two sites have been designated on the North Shore Public Facilities Map neither site has been selected for funding and, therefore, remain no closer to reality than they were in 1983 when the North Shore Public Facilities Map was first adopted.

Although the project proposes the deletion of two proposed public parks, it also offer opportunities for increased recreational uses of the beach and mountain areas, perhaps equal to or greater than the potential of the two deleted parks, one of which is site undetermined and planned for seven years and beyond (since 1983). Although specific site locations and plans are not illustrated, it is the applicant's stated intent in the EIS that beach access-ways and parks are an integral component of the development and that they will be provided to meet recreational needs. These recreational needs will be developed and determined through discussions with the community, Departments of Land and Natural Resources and Parks and Recreation, as well as with the City Council, throughout the entire planning process. The exact location, scope and design, and the type and number of beach accessways and parks will reflect the results of these discussions.

Recent experience (Kuilima and West Beach) suggests that the approval process generally provides the public and government agencies with ample opportunities to improve and enhance public recreational amenities as part of the overall political approval process, including accessways to beaches, beach promenades, parks, trails and other uses. Therefore, removal of parksites from the development plan exchanges a potential for government financed recreational opportunities for guaranteed developer financed recreational opportunities.

- (4) The nature of camping and recreational experiences of the existing Mokuleia Beach Park would be altered. The "remote-ness" aspect of those experiences would be lost to the extent that development in the area is perceived as urban. On the other hand, landscaping improvements on the adjacent 27-acre resort parcel and the perception of increased security due to resort development in the area may provide aesthetic and mental incentive which would make the camping and recreational opportunities available at the Mokuleia Beach Park attractive to a larger number of Oahu's residents.

- (5) Some current Mokuleia residents may feel a sense of intrusion or competition with "outsiders" (resort guests and new residents, along with other Oahu residents attracted by increased public access). This could focus on aesthetic aspects of the beach experience, food-gathering, or both. It is doubtful that large numbers of project guests would pick limu or dive in rough waters for lobsters, although a few may try shore-casting. Near-shore ocean food resources have been dwindling islandwide due to population pressures and increased fishing, and continuation of this trend in the Mokuleia area might be attributed (correctly or incorrectly) to project visitors and residents.
- (6) Outside the Farrington Highway corridor, little impact is expected. Puuiki Beach Park—a sensitive area for the Waiialua community—is off the main highway corridor and marked "private." Evidence discussed in Section IV.0.4 suggests that few guests leave destination resort areas, and, when they do, they tend to tour the entire island. Future visitor presence at North Shore recreational areas is expected to increase primarily as a function of islandwide tourism growth. At the same time, it is reasonable to expect that the Mokuleia project may have some disproportionate impacts on visitor presence at particularly scenic nearby spots, such as popular surfing areas in times of high surf.

The State Comprehensive Recreational Plan (SCORP) has identified needs for a variety of recreational activity on the North Shore. Although the proposed development will limit the opportunity to pursue some of these needs, it will, on the other hand, mitigate against these losses by fulfilling many of the other recreational needs listed in SCORP's Proposed Alternative Actions, e.g., provide for golf course activities, tennis courts, inland hiking and camping, trails and paths, and other athletic sports activity.

3. Water Distribution

Existing Conditions

The project is currently served by two private water systems. One water system consisting of a well, reservoir and distribution system serves a small portion of the property being proposed for development and the developed lands along the shoreline located between parcels B and C proposed for development. The well has a capacity of 830,000 gallons per day.

The other water system provides agricultural water for the bulk of Parcel A and Parcel B. The system consists of a well, booster pumps and a distribution system.

In 1980/1981 three new wells were drilled on the property, two at elevation 200' and one at elevation 400'. These wells have a capacity of 4.5 MGD per day.

In 1981 the Waialua area was designated by the Board of Land and Natural Resources as a water control area. This designation requires that the BLNR approve all requests for expansion of preserved uses or development of new sources. (A preserved use is an existing water use prior to designation of the water control area.)

In February of 1986 the Board of Water Supply prepared an Environmental Assessment for proposed improvements to the Waialua-Kahuku regional water systems. MDC as a large land owner and water user, requested to be a consulted party. The improvements being proposed include new source developments in the Mokuleia area. MDC indicated its desire to work with the BWS and to alert the Board to its intention to increase water usage in conjunction with the proposed development of a recreational resort community.

Proposed Actions

MDC proposes to develop a potable water system to be dedicated to the Board of Water Supply to service the potable water requirements of the proposed development. The system will require the improvement of existing wells, installation of transmission lines, water pumping stations and reservoirs. The development is expected to require approximately 2 million gallons per day of potable water.

In addition MDC proposes to develop a new private water system to provide irrigation water for the two golf courses being proposed as part of the master plan. The system will require improvement of existing well or wells and installation of new distribution and storage facilities.

Impacts

Water currently used for agricultural purposes on the property proposed for development will be used for the irrigation of golf courses.

The Department of Health is vested with the responsibility to ensure that public water systems in the State are providing water which is in compliance with the State's drinking water regulations known as Chapter 20, Title 11, Administrative Rules, and are in compliance with all other applicable terms and conditions of Chapter 20. A public water system is defined as a system serving 25 or more individuals at least 60 days per year or having a minimum of 15 service connections. If a new water source is developed to supply this project, the source and distribution system will be subject to the terms of Section 11-20-29 and Section 11-20-30 of Chapter 20 respectively. Section 11-20-29 of Chapter 20 requires that all new sources of potable water serving public water systems to be approved by the Director of Health prior to their use to serve potable water. Such approval is based primarily upon the submission of an engineering report which adequately addresses all concerns as set down in Section 11-20-29. The engineering report must be prepared by a registered professional engineer and bear his or her seal upon submittal.

Section 11-20-30 requires that new or substantially new or substantially modified distribution systems be approved by the Director of Health.

Approval authority for Section 30 has been given to the Board of Water Supply for water distribution systems under their jurisdiction.

Mitigating Measures

The existing wells on the property demonstrate an abundance of water on site for development.

The wells are within a BLNR Water Control area. BLNR will have an opportunity to conduct a review of all of the relevant facts prior to granting the request for water usage by the development.

While the Mokuleia area is within the Waialua Water Control Area it is part of a sub-area which has estimated sustainable yields substantially in excess of the amount actually used. Accordingly, there is more than sufficient water for existing uses and all proposed additional uses.

The system will be developed to Board of Water Supply standards for dedication, therefore ensuring a system development in accordance with long established proven technologies.

The developer will comply with the requirements of Section 11-20-29 and 11-20-30 of Chapter 20, Title 11, Administrative Rules and Regulations. As State law is very explicit in detailing the approval requirements and process for new sources and distribution systems for drinking water, no further mitigating measures are necessary. The developer and his engineering consultants will work closely with the Department of Health and its designees in meeting the requirements of the law.

4. Sewage Disposal

Existing Conditions

Existing sewage on the property is disposed of in cesspools.

The City is studying a wastewater treatment plant (WWTP) which will serve the Waialua and Haleiwa sewerage district. The proposed WWTP does not presently contemplate serving the proposed development since the development is currently not included in the City's North Shore Development Plan. However, this does not preclude possible joint construction and use of the WWTP if required approvals are obtained by the applicant.

If a separate wastewater treatment plant is constructed in conjunction with this development and dedicated to the City and County for operation and maintenance, it will have to be built according to City standards. Effluent disposal should be compatible to the proposed Facilities Plans and water quality management plans for the drainage area.

Proposed Action

A modern sewage disposal system will have to be developed to accommodate the sewage generated by the proposed development.

A complete sewage system normally consists of four elements. They are: (1) a collection system consisting of gravity laterals and mains; (2) a transmission system consisting of pump stations, force mains and gravity mains; (3) a processing plant for the level of treatment recommended by State and City agencies responsible for such recommendations; and (4) an effluent disposal system consisting of injection wells or other approved disposal method.

Impacts

Short term impacts include the construction related impacts of noise, dust, and traffic delays created by construction projects.

Long term impacts of a sewage treatment plant include: visual impact of the plant, potential odor of the plant, noise from plant operations, necessity to dispose of treated effluent, and necessity to dispose of solid waste product generated by the plant.

At the present time the applicant is considering two options for providing the necessary sewage treatment facilities. These options are the independent development of a sewage treatment plant by the applicant for dedication to the City & County of Honolulu, or the participation in the City's plan to develop a sewerage system for the North Shore. The applicant is in the process of evaluating the alternatives.

Advantages and disadvantages of the two alternatives which have been proposed include the following:

	<u>Advantages</u>	<u>Disadvantages</u>
Developer Built Plant:	Ability to match timing of plant construction with development sched.	Higher initial cost of two Plants. Higher long term operating costs.
Participation in City Regional	Lower initial cost and lower operating costs.	Plant may not be in operation in time to meet needs of development in proposed development schedule.

Mitigating Measures

The City Department of Public Works has suggested a developer built plant could be constructed on the site of the city regional facility with coordination of design that would allow for lower long-term operating costs as well as acceleration of construction to meet the projected development timetable.

Site selection for the proposed city regional plant and the proposed developer built plant are undetermined at this time, however would likely be located Mauka of Farrington Highway based on engineering and environmental requirements. The location of the Waste Water Treatment Plant (WWTP) west of Dillingham Field under discussion at the time the Draft EIS was being prepared is no longer under consideration as a location for the Proposed City Regional Plant. The proposed location is now approximately a mile east of the proposed Mokuleia Development and Mauka of Farrington Highway.

Short term impacts from construction can be mitigated by complying with Department of Health regulations regarding construction noise and adhering to City & County ordinance relating to grading and building which contain provisions mitigating against noise and dust.

Long term impacts from operations of the plant can be minimized by careful site selection. Selecting a relatively remote location for the sewage treatment plant will mitigate the visual, noise, and odor impacts. Less remote locations would require visual and noise barriers such as walls, landscaping and buffers. Odor problems can be mitigated by increased monitoring, more sophisticated instrumentation, and proper facility management.

Effluent disposal location and method will be determined in consultation with the Department of Health, the Department of Public Works, and the Board of Water Supply based on geological information and engineering reports.

The entire sewer system design and construction will be subject to review by a number of concerned government agencies.

5. Solid Waste

Existing Conditions

Solid waste generated on the property by residents and by ranching operations is disposed of by a private collection agency.

Impacts

There will be an increase in the amount of solid waste generated. For single family development, waste collection is expected to be provided by the City. Private refuse agencies are expected to provide collection services for other project uses. Private refuse collection companies dispose of the material in private or public landfills. Public landfills may be subsidized by taxpayers.

Mitigating Measures

The proposed development provides \$2 in revenue for every \$1 of expenses in State and County finances. Therefore, to the extent that there is a public subsidy in landfills, the development will be contributing at least its fair share of these costs.

6. Drainage

Existing Conditions

The project site consists of a coastal plain and foothills which terminate in the Waianae Mountains. The site contains a number of drainage ways through which storm runoff from areas inside and outside of the property boundary eventually reach the ocean. There is one major drainage course which runs through the development site. For the most part this drainageway serves a drainage basin which is outside of the property boundary. Portions of the site proposed for development currently are drained by means of sheet flow. Under normal conditions runoff from the drainage basin accumulates in the lower portions of the area proposed for development both mauka and makai of Farrington Highway. These low areas serve as natural retention basins and water that has accumulated in these low areas percolates slowly into the ground or evaporates. Sand berms at the oceanfront normally prevent water from discharging into the ocean. Under storm conditions the natural holding capacity of the lower areas are exceeded by the output of the drainage basin and flood waters overtop the natural sand berms and storm waters are discharged directly into the

ocean. Once the flood waters have been released, wave and wind action restore the sand berms and runoff is no longer discharged into the ocean until flood conditions sufficient to overtop the sand berm again occur.

At the present time no permanent connection between the ocean and the property exists. Drainage is discharged into the ocean under storm conditions. Ocean waters do not flow onto the subject property through the drainage courses because the sand berms are normally in place and because the property is at an elevation higher than sea level.

Proposed Action

Development of the project will include a drainage system built to County standards which will accommodate the existing drainage requirements of the site as well as provide for any increase in runoff due to the addition of improvements which will change the permeability of the surface in some areas.

While a specific drainage plan has not been adopted for the development at this level of planning, it is anticipated that maintaining levels of discharge into the ocean at current or lower levels will be accomplished primarily by increasing the holding capacity of retention basins on the property proposed for development. To this end, the conceptual plan (Exhibit 12) shows large open areas and recreational areas within the lower sections of the property mauka of Farrington Highway. The purpose of concentrating these open areas and recreational areas in the area is to provide areas for flood water retention on the property.

Clarification

The conceptual plan as shown on Exhibit 12 contains a large degree of "artistic license" and is not intended to represent an actual development. A number of agencies and individuals have interpreted the plan as showing the creation of saltwater lagoons with a permanent connection to the ocean. The applicant wishes to emphasize that no such connection is planned. What is planned is that the existing situation of intermittent discharge into the ocean will be continued and that the expanded retention basins necessary to accomplish this will be integrated into the development as a design element. It is further clarified that existing pond and future drainage basins may not necessarily be combined. The following is a basic discussion of the mechanics of the proposed system:

Within the area to be developed drainage will be handled in a conventional manner to standards of the City & County of Honolulu Department of Public Works. Conceptual plans call for the enlargement of or improvement of Makalena Stream throughout the property. Runoff will be directed to a retention basin to be provided mauka of Farrington Highway. The basin will dissipate the speed of the runoff and provide an opportunity for particulate matter to settle out. From the retention basin the runoff will be directed through a bridge (under Farrington Highway) to the ocean.

Impacts

Anticipated impacts include short term construction related impacts such as noise, dust, traffic disruption and air pollution due to use of diesel equipment. Long term impacts should be an improvement in the drainage throughout the project area, a lessening of particulate matter discharged into the ocean during periods of storm runoff, and the visual impact of altered topography due to drainage improvements.

Alteration of the drainage retention basins mauka of Farrington Highway may have some impact on existing wildlife habitats in existing ponds. The elimination of ponding areas makai of Farrington Highway may have an impact on wildlife supported by those ponds.

No impacts of the following nature are anticipated:

Saltwater intrusion into areas mauka of Farrington Highway will not occur as there is to be no connection with the ocean.

Nearshore changes in salinity are not anticipated as there is no permanent connection to the ocean and discharge into the ocean is expected to remain at or below current levels under storm conditions.

Flooding of improvements planned for areas currently shown on Flood Insurance Rate Maps (FIRM) as being subject to flooding, City and County of Honolulu Ordinances which mandate mitigating measures such as minimum floor level elevations and other drainage improvements before permitting development within such areas.

Mitigating Measures

Drainage improvements will be developed to City & County standards to ensure that adequate and appropriate improvements are made. Impacts from short term construction activities will comply with Department of Health Noise Requirements as well as County Grading Ordinances will feature protective measures to mitigate dust and erosion.

Visual impacts of the proposed drainage improvements will be subject to the overall design criteria for the proposed recreational/resort community. These design criteria are expected to include landscaping requirements, setbacks as well as material and texturing requirements which can be used to mitigate changes in visual impacts.

Impacts on wildlife habitats can be mitigated in the following ways:

New retention basins mauka of Farrington Highway can be designed to minimize or eliminate the possibility of mixing drainage waters and existing pond waters by providing for separation between the areas using existing ground or built up areas to separate the habitats from new retention basins. The necessity of these measures is unknown at this time. All of the existing ponds currently receive drainage waters at the present time to some extent.

Actual drainage designs can be developed in consultation with U.S. Department of Interior, Fish and Wildlife Division, and the Department of Land and Natural Resources in order to minimize or eliminate drainage impacts on wildlife.

7. Electric and Telephone Services

Existing Conditions

Power and telephone service to the site is currently supplied by overhead lines along Farrington Highway. Power to these lines is supplied by the Waialua Substation which has limited available capacity to serve the subject development.

Proposed Action

Electrical and telephone infrastructure will have to be upgraded to serve the development.

Impact

The existing electrical system will have to be upgraded to accommodate the new development. Hawaiian Electric will require a new substation to be installed at the proposed Mokuleia Substation site (TMK: 6-8-6:30). This lot is now owned by HECO. This future substation is located on Farrington Highway less than a mile from the subject development. Ultimately, two 46 kv circuits from the Waialua Substation will be required to serve the new substation. These circuits will be built on existing pole lines on Farrington Highway to the new substation. In addition a substation will have to be located on site at the development. Throughout the development an underground electrical system will be installed. Telephone capacity can be increased as necessary.

Mitigating Measures

The developer will work closely with HECO in order to find an appropriate on-site location for a substation as well as to ensure that timely service can be provided.

No other mitigating measures are necessary since the electric company has indicated that adequate service can be provided.

The electrical system within the development will be built to County standard. Utility lines will be underground to mitigate any visual impacts.

The developer will maintain contact with Hawaiian Telephone Co. to assure necessary service levels.

8. Public Access and Parking

Regional public accesses to the beaches are located along the shoreline at the Mokuleia Beach Park. This City and County of Honolulu park abuts the applicant's 27-acre oceanfront parcel.

The project site currently affords public access to the beach and mountain areas on a limited basis.

Access to the portion of the property on the beach side of Kamehameha Highway is allowed for two purposes. One is for polo activities only and these occur on the northern corner of the property. Currently, the three levels of polo participants currently using the site include active participants, who are the players, number about 30; associate members, which make up the "social club" of about 100 members; and between 500 to 2,000 spectators per event (Personal interview with Michael Daily, April 22, 1986). On this portion of the property, there is public access to the beaches along the shoreline only.

Originally intended for members of the Episcopal Church, the Camp now offers facilities and services throughout the year to the general public. It offers weekend camping programs, which attract a mix of groups and individuals, and summer camping for schools and other organized groups, such as the handicapped, cancer patients and immigrant children. In 1985, the church served approximately 20,000 clients. (Personal conversation with Reverend Brian Grieves, May 1, 1986).

Access to the mountain portion of the project is limited due to safety and liability. Requests for access are evaluated to ensure that users have adequate knowledge and liability protection.

Proposed Action

With outdoor recreation being a major component of the proposed project, this development will include provisions for optimizing general public access to the project site. The actual number and locations of public access is undetermined at the time of this writing and this section provides a preliminary scope of what will be included in the public access component.

The beaches are accessible along the shoreline. The developer intends to make this access more convenient by providing right-of-ways through the project area, possibly through the grounds of the hotels and condominiums.

A unique advantage afforded by the project site is mountain access, and this is envisioned for the purposes of camping and hiking. While the mountains would be generally opened to the public, the security and management of the mountain property may require a reasonable user fee.

Anticipated Impacts and Mitigative Measures

The establishment of onsite public access will provide greater effective access to the shoreline and its food gathering resources. While current fishers of the area may eventually feel a sense of crowding, it is noted that the resort clientele who will use the beaches will probably not compete for food resources. Their activities will probably be limited to sunbathing, swimming, surfing and sightseeing.

A potential negative impact of greater beach public access is that it will unavoidably expose more users to rough winter ocean conditions. Also, shoreline littering may increase both near the project area and along the beach fronted by private homes. Mitigation measures for these include posted warnings and/or lifeguard supervision; and maintenance of the beach areas near the project site.

Possible negative impacts of greater mountain access include increased opportunities for crimes dependent on some isolation (e.g. marijuana growing) and the safety of inexperienced hikers and campers. Mitigation measures for these impacts lie in the management and security program for hiking and camping.

The applicant will work with the Department of Parks and Recreation of the City and County of Honolulu and the Department of Land and Natural Resources to implement Park Dedication Ordinance No. 4621 and Public Access Ordinance No. 4311 to ensure the adequacy of both recreational facilities and Beach and Mountain Access.

9. Fire Protection

Existing Conditions

Currently fire protection is provided to the region as follows:

<u>Station/Company</u>	<u>Distance</u>	<u>Response Time</u>	<u>Personnel</u>
Waialua, Engine 14	7.3 miles	10 minutes	5
Wahiawa, Engine 16	11.0 miles	17 minutes	5
Waipahu, Engine 12	21.0 miles	40 minutes	6

Two engines and one ladder is the standard dispatch for all reported structure fires outside the Waikiki and metropolitan areas.

Current Insurance Service Office (ISO) guidelines recommend a standard response distance of not more than four miles for engine and ladder companies, and a ladder company may not be required where there are less than five buildings of three or more stories. A response time of three to five minutes is acceptable.

Anticipated Impacts and Mitigative Measures

The Fire Department has stated that the existing fire protection is considered inadequate for the proposed project in regards to distance and response time, and has requested a minimum of 25,000 square feet be set aside for a jointly funded (public-private) fire station, housing a minimum of one engine and 15 personnel. The applicant is willing to look into this matter.

As part of the proposed potable water transmission system through- out the project area, lines with adequate fire flow capacity and fire hydrants will be installed by the applicant within the pro- posed roadways. The locations of fire hydrants will be reviewed by the Board of Water Supply and the Fire Department when con- struction plans are submitted for approval.

10. Police Protection

The City and County of Honolulu Police Department divides the island of Oahu into four districts as follows:

<u>District #</u>	<u>General Areas Included</u>	<u>Headquarters Location</u>
1	East Honolulu and Primary Urban Center up to Nuuanu	Honolulu
2	Mililani, Wahiawa, and North Shore up to Waimea Bay	Wahiawa
3	Red Hill, Pearl City, Waipahu, Ewa and Waianae	Pearl City
4	Waimanalo to Kahuku	Kaneohe
5	Nuuanu to Airport area	Kalihi Valley

In one of the three beats along the North Shore, Mokuleia is in Beat 227 of District 2 which ranges from Kaena Point to the Waialua Long Bridge. Other North Shore areas provided police protection by the Wahiawa headquarters extend from Long Bridge to Anahulu Bridge (Beat 228) to Waimea Bay (Beat 229).

A main station, the Wahiawa Police Station, is staffed by a major, a captain, 3 watch commanders (lieutenants), and 3 sergeants. Three shifts, or watches, operate from this station. Each shift has about 20 people, including 1 watch commander and 3 sergeants (Personal interview with Major John Gerard, May 29, 1986).

The Wahiawa District had the lowest overall number of major crimes reported during 1984, accounting for 7 percent of the total islandwide number reported (City and County of Honolulu Police Department, 1985).

The Kahuku Police Substation, which is under the Kaneohe Police Station, recently became operational. The Police Department currently has long range plans to establish this as a main station, although implementation of this plan depends on funding. When this change occurs, the entire North Shore, including the project area, will be included in the Kahuku District (Personal communication with Carol Sodeani, City and County of Honolulu Police Department, May 23, 1986).

Proposed Action

The proposed project will introduce a de facto population of 4,680 people within the project site.

Anticipated Impacts and Mitigative Measures

The proposed project will generate occasional, unavoidable demand for police services. While specific crimes related to rural resorts have not been fully addressed in interviews with police personnel nor studied in detail, the following are observations raised by police personnel and other community informants for consideration:

1. Construction related crime generated by the project would probably be typical of other construction sites. These mostly pertain to the theft of construction material, which occasionally occurs on the North Shore now.

2. The only resort in the vicinity of the North Shore is the Turtle Bay Hilton and Country Club in Kahuku. Currently, this resort does not seem to generate unique resort related crime.
3. The most frequent tourist-related crime on the North Shore is theft of valuables from parked cars and beaches, particularly at scenic points, surfing spots, or congested areas. Many people pointed out, however, that these crimes do not stem from any kind of hostility towards tourists. Rather, tourists are easy victims because of the "vacation attitude" of being carefree about your belongings, coupled with the feeling that nothing bad happens in "paradise".

The project area itself and the Mokuleia region do not currently have major crime problems. Crimes in the region reported to police generally are due to the area's relative isolation and include marijuana growing, illegal firearms practice and speeding.

The proposed project would, in effect, reduce the area's current isolation. While increased population generally means a higher number of crimes, this increase may also change the nature of crimes.

4. Other police-related concerns included evacuation management, in the event of tsunamis and other disasters, and the likelihood that the residential component of the project may generate crimes typical of residential subdivisions, such as burglaries and automobile-related crimes.

The proposed establishment of the Kahuku Substation as a full Police Station will not automatically increase police services. The delivery of police services is based on a sufficiency of personnel and other resources. If an increase in population were to occur in a particular area, police services would not increase without an increase in the total authorized police manpower.

The applicant will be taking other measures towards providing on-site security. Buildings and other facilities within the project site will be designed with adequate attention to the principles of general health and safety. In addition, private security services will be provided within the resort facilities and mountain access will be controlled to manage access and security.

11. Schools

Existing Conditions

The public schools nearest to the project area are Waialua Elementary School (grades Kindergarten through six) and Waialua High and Intermediate School (grades seven through twelve).

Waialua Elementary School, located adjacent to the Waialua Recreation Center, currently operates self-contained classrooms, where students generally remain in one classroom throughout the school day. Waialua High and Intermediate, located at the junction near Mokuleia, makes heavy use of portables to accommodate increasing enrollments. Current enrollment at the latter facility is 1,145 students (Personal communication with Gervacio Buenconsejo, June 2, 1986).

Both elementary and secondary schools are currently operating at capacity.

Proposed Action

The proposed project includes a residential component of 700 single family units. In addition 1,200 resort condominiums may ultimately have some residential characteristics.

Anticipated Impacts and Mitigative Measures

Based on preliminary project information, it is estimated that the residential component of the project will generate 40 to 80 elementary school-aged children and 50 to 100 students in grades seven through twelve (State of Hawaii Department of Education letter dated June 27, 1986).

It is noted that the types of housing units are a major determinant in enrollment projections. While it is anticipated that the proposed housing will be market rate units, no price ranges nor desired markets were provided to the Department of Education personnel. The projected enrollment may therefore be modified to accommodate specific market ranges. When this occurs, specific facility accommodations can be better projected. The applicant will maintain communications with the Department of Education in order to ensure that necessary levels of staffing and classrooms will be available at the affected schools.

12. Health Care Facilities

Existing Conditions

The project area is in proximity to two acute care hospitals. Wahiawa General Hospital is located in Central Oahu. This 69-bed acute care hospital contains 50 medical/surgical beds, 5 critical care beds and 14 obstetric beds. As with other hospitals located outside of Honolulu, Wahiawa General Hospital experiences low occupancy. In 1985, an average of 67.3 percent of the hospital beds were occupied (State Health Planning and Development Agency, State Department of Health, 1986).

Kahuku Community Hospital is located on the North Shore. This hospital contains 11 beds, 6 of which are medical/surgical; 2, critical care; and 3, obstetric. Kahuku's 1985 occupancy rate was 47.7 percent (State Health Planning and Development Agency, State Department of Health, 1986). Because of the North Shore's relative isolation from major medical service, Kahuku maintains a helipad for medical evacuation helicopters furnished by the Medical Assistance to Safety in Traffic (MAST) program based at Wheeler Air Force Base.

Proposed Action

The proposed action will introduce a de facto population of 4,680 within the project site.

Anticipated Impacts and Mitigative Measures

There will be an occasional and unavoidable demand for emergency services for the future population of the project site. In the event that neither hospital is able to meet major emergency needs, patients can be flown by MAST to Honolulu.

Because the existing acute care hospitals are currently experiencing low occupancy rates, it is not expected that the proposed project will cause undue strain to either of these hospitals.

It is anticipated that the private and public health care network would develop according to the needs of the population and that these facilities would expand if necessary. It is also noted, however, that historically, rural and suburban residents often tend to utilize hospitals located in metropolitan Honolulu for

their hospital needs, even though they may live a short distance from a rural/suburban hospital. This trend accounts for the relatively low occupancy rates of the out-of-Honolulu hospitals. Unless Wahiawa General and Kahuku Community Hospitals greatly expand their facilities, it is expected that the project residents will continue this trend.

PART V

PROBABLE ADVERSE ENVIRONMENTAL EFFECTS
WHICH CANNOT BE AVOIDED AND MITIGATING MEASURESA. AGRICULTUREAdverse Effect

The redesignation and rezoning of approximately 1,000 acres of agricultural land from agricultural to resort, residential and other uses, will result in lost agricultural land.

Mitigating Measure

Ranching operations conducted by the applicant are not profitable but allow the owner to maintain the appearance and security of the property. An alternative use will be of economic benefit to the owner.

The agricultural impact analysis which is appended to the EIS indicates that there is no adverse impact to the State of Hawaii or City and County of Honolulu agricultural productivity because of the large pool of agricultural lands made available due to reductions in sugar and pineapple acreage and the lack of profitable alternative crops. Therefore no mitigating measures are necessary.

B. NOISE (Construction)Adverse Effect

Construction activities at the site will generate noise.

Mitigating Measures

The State Department of Health (DOH) Title 11, Administrative Rules, Chapter 43, Community Noise Control for Oahu, specifies maximum allowable levels of noise for each use zone contained in the City and County of Honolulu's Comprehensive Zoning Ordinance. Construction activities which exceed the noise limitations of DOH rules require a permit from the DOH. Traffic noise from heavy vehicles traveling to and from the construction site will comply with Vehicular Noise Control of Oahu enforced by DOH.

C. NOISE (Aircraft)Adverse Impact

Portions of the proposed resort development will be subject to L_{dn} in excess of 60 dB during sporadic military training exercises conducted at Dillingham Field.

Mitigating Measure

Restrict resort/residential development within 60L_{dn} and greater areas unless special noise mitigation features are incorporated into structures. In the 55-60L_{dn} noise impact areas, a disclosure will be made to advise developers and tenants that the areas are subjected to noise from aircraft activity.

D. TRAFFICShort Run Adverse Impact

Construction activities may disrupt traffic temporarily when construction activities are conducted in or near roadways.

Mitigating Measures

Contractors will observe State and County ordinances dealing with work conducted on or near roadways.

Long Run Adverse Impact

Traffic will increase due to the establishment of visitor facilities and the new residential development being proposed.

Mitigating Measures

Parsons, Brinckerhoff, Quade & Douglas, traffic engineers, prepared a traffic impact analysis for the proposed Mokuleia Development and found that existing roadways are adequate to handle the traffic generated by the proposed development with certain improvements. The applicant will follow the recommendations of the traffic study. The applicant will work with the State Department of Transportation and the City Department of Transportation services in order to coordinate the implementation of the recommendations.

E. WATER CONSUMPTIONAdverse Impact

The proposed Mokuleia Development will require approximately 2.0 million gallons of potable water per day. In addition the development will require approximately 1.5 to 2.0 million gallons per day of irrigation water.

Mitigating Measures

The Mokuleia Aquifer is a sub-zone of the Waialua Water Control area controlled by the Board of Land and natural resources. Studies indicated that the Mokuleia Area has an abundance of water and a sustainable yield of 20 million gallons per day. Less than 40% of

that yield is in use today. Use of additional water at the Mokuleia Development will provide economic benefits to the North Shore area without causing any water shortage.

F. LIFESTYLE CHANGES

Adverse Impact

The social impact assessment identifies concerns about changes in lifestyle which might be prompted by the proposed development.

Mitigating Measures

The social impact assessment indicates that lifestyle and perceived lifestyle changes are subjective in nature. In addition that different individuals may be impacted differently or perceive the impacts as different. For example, an unemployed person or person facing an uncertain employment future in a struggling industry or a person that commutes over an hour each way to work may welcome the availability of jobs generated at the proposed project. On the other hand, a person who has sought out the rural lifestyle on the North Shore knowing the drawbacks may not be happy about the prospect of further development in the North Shore area although new jobs or economic growth will occur.

The applicant has made a conscious effort to keep the lines of communication open with the community in order to discover the community concerns. The applicant will continue this communication through the planning period and beyond. The communication program will allow the applicant to continue to identify and attempt to mitigate the concerns of the community.

G. INCREASED NEED FOR UTILITY SERVICES

Adverse Impact

Additional demand will be placed on the utility companies to serve the new project.

Mitigating Measures

The applicant has been in contact with the Telephone and Electric Companies to advise them of the proposed project. Both companies indicate that current facilities in the area are inadequate to serve the proposed development. However, both companies indicate that the services can be upgraded in the development time frame outlined for the project. The applicant will pay for improvements to the system as required by the utility companies. The companies will be kept informed of the development's progress. The applicant's consultants will continue to coordinate plans with the utility companies.

H. INCREASED NEED FOR PUBLIC SERVICES

Adverse Impact

The need for public services such as police, fire, schools, parks and recreational facilities will increase due to the increase in visitor and resident population generated by the project

Mitigating Measure

As indicated in the impact on State and local finances, the proposed development will generate \$2 in revenue for every \$1 in additional expenditure required. In addition the developer will comply with County ordinances which require dedication of land for parks.

I. SEWAGE AND SOLID WASTE

Adverse Impact

Additional population will generate increased sewage for treatment and increased solid waste for disposal.

Mitigating Measures

The applicant will provide treatment facilities for the proposed development or will participate with the County in the development of the Mokuleia STP so that the facility is adequate to serve the proposed development. Operations of sewage treatment plants have traditionally been paid through user fees or subsidized by tax revenues. Solid waste disposal for commercial development in Honolulu is provided by private enterprise and presumably the costs are covered by the fees paid. Residential solid waste disposal is generally provided by the County. Given the revenue/expenditure ratio of the proposed development is a minimum of two to one the development will pay more than its fair share for these services.

J. WETLANDS

Adverse Impact

Increased human activity may impact ecosystem supporting endangered waterbirds.

Mitigation Measures

Work with division of Fish & Wildlife and Dept. of Land and Natural Resources to develop program to minimize human impact. Measures may include setbacks, landscaping and fencing.

PART VI

ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS
OF RESOURCES AND THE RELATIONSHIP BETWEEN LOCAL
SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE
MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Construction and operation of the proposed recreational resort development at Mokuleia will result in the irretrievable commitment of resources. During the construction phase labor, land, building materials and capital will be committed to the development of the project. Once committed labor is irretrievable, and building materials may have some salvage value but it is likely to be small. Capital committed to the project cannot be used for other projects and the land, once improved with infrastructure and buildings, is likely to remain committed to the designated use during the economic life of those improvements.

Ongoing operation of the development as a resort recreational community will result in the long term commitment of land with agricultural potential to resort, recreational, residential and commercial uses. This loss of agricultural land is not expected to have a negative impact on the agricultural production or potential production of the State of Hawaii or the City and County of Honolulu because of the large amounts of agricultural land that has been released and is forecasted to be released from sugar and pineapple operations.

Water consumption will be increased with the proposed development; however, the Mokuleia aquifer from which water will be supplied is in surplus and there are no known proposals which would alter this situation. Currently excess water from the Mokuleia aquifer is discharged into the ocean unused. Operation of the development will require the long term commitment of labor to provide the services and maintenance necessary for the proper functioning of the development.

In the long run assuming a successful enterprise the capital committed to the development of the project will be paid back and can then be used for alternative uses. A successful economic venture may in fact lead to capital creation which in the long run would provide an increase in the capital available for investment.

The proposed Mokuleia development will result in a change in land use which will involve environmental trade-offs.

In the short run, development of the proposed project will result in the reduction of lands available for agricultural use and a number of negative environmental impacts necessitated by construction activities including construction noise, dust and traffic impacts. These same construction activities will contribute to the economic well being of the local construction industry including contractors, construction workers, and material suppliers. The increased economic activity will contribute to the well being of the State and County economies.

The major long-term benefit of the proposed project is the creation of an economic asset which will provide long-term job opportunities and an expansion of Hawaii's major export industry. Beneficiaries of the positive economic impact will be hotel employees, hotel operators, other tourist businesses, the land owner, and State and local tax revenues. Negative impacts are outlined in Section V, Adverse and Unavoidable Effects.

The proposed project poses no long-term risks to health and safety.

Development of the project will result in the foreclosure of alternative uses for the land during the economic life of the project.

PART VII

UNRESOLVED ISSUES

Environmental Impact Statements (EIS's) typically make preliminary suggestions for mitigations. Actual requirements, however, are imposed through the political and regulatory process, which may involve negotiations between government decision makers and private landowners or developers.

Public input during the EIS and/or subsequent hearing process can affect the outcome of these negotiations. In recent years, some requirements have been made on a standardized basis. For example, for projects containing residential units, an "inclusionary zoning" requirements of ten percent for low-to-moderate income units is often executed. These types of mitigation requirement are sometimes unrelated to EIS impact findings or mitigation recommendations.

At the City level, "unilateral conditions", or one-sided voluntary agreements by the project proponent, have normally been attached not to Development Plan approvals but to final zoning approvals. Presumably the latter stage is the point in time closest to project implementation and thus the best time for government decision makers to assess true needs. Also, zoning is a more detailed level for government control than Development Plan approvals--hence, the more appropriate level for imposing conditions.

Because there have been questions about the legality and equity of unilateral conditions, the City and County of Honolulu is now considering several new measures which would revise the present system:

1. "Development Agreements", a bilateral agreement process which would vest rights to develop at an early stage in return for firm detailed commitments by the developer to provide socio-economic and other mitigation measures; and
2. A "Community Benefit Assessment" (CBA) ordinance, which would set the total dollar amount for such mitigations according to formulas which consider such factors as location, extent of up-zoning, etc. The current CBA concept would rely on the EIS to recommend priorities for allocating assessed dollars (or other in-kind measures) among the various potential mitigation measures.

As of this writing, it is uncertain whether either of these measures will actually be adopted or, if so, in what exact form.

It should be also noted that the development plan process is only one of many processes that the applicant will have to follow and receive approval prior to development of the project. Each process focuses on different issues and requires different levels of details for evaluation. Below is a summary of major processes required, actions on which are taken separately:

(1) GENERAL PLAN

The General Plan is a STATEMENT OF LONG RANGE social, economic, environmental and design objectives and policies for the general welfare and prosperity of the people of Oahu. IT IS NOT A LAND USE PLAN for the development of specific parcels of land.

Issue: Should the General Plan Resort Policies be amended to add the AREA OF MOKULEIA as a SECONDARY RESORT AREA.

Scope: Limited to the following areas:

Need for additional resort areas.

What are the alternatives for meeting this need?

Suitability of the Mokuleia Area as a Secondary Resort Area compared to the alternatives.

Contribution to the general welfare and prosperity.

Consistency with the Hawaii State Plan.

2. DEVELOPMENT PLAN

Development Plans are relatively detailed guidelines for the physical development of the Island. IT IS A LAND USE PLAN that shows the type of land use for EVERY PARCEL OF LAND on Oahu. It also includes statements of standards, principles and controls for the various land use categories. IT IS NOT, HOWEVER, A ZONING ORDINANCE. Amendments to the Development Plans are PROJECT SPECIFIC for a SPECIFIC PARCEL OF LAND.

Issue: Should the North Shore Development Plan be amended to reflect a RECREATIONAL RESORT COMMUNITY on lands owned by Mokuleia Land Company that includes:

313 acres for Resort (3,300 units)

331 acres for Residential (700 units)

342 acres for Golf Course (36 holes)

33 acres for Commercial

Scope: Areas of review include:

Consistency with the General Plan Objectives and Policies.

Consistency with the provisions of the North Shore Development Plan.

Review of Project concept/land use patterns.

Review of Project impacts and mitigating measures.

3. STATE LAND USE CLASSIFICATION

The State of Hawaii has classified lands on Oahu into three (3) categories: (1) Conservation, (2) Agriculture, (3) Urban.

Issue: Should the lands proposed for development by Mokuleia Land Company be reclassified from Conservation/Agriculture to Urban.

Scope: Areas of review include:

Project scope, concept, and need.

Review of project impacts on environment, resources, and services in the area.

Conformity with Hawaii State Plan/Functional Plans/Coastal Zone Management.

Consistency with Honolulu's General Plan/Development Plan.

4. ZONING

Zoning consists of an ORDINANCE and a MAP. The ORDINANCE sets specific DEVELOPMENT and DESIGN standards for the location, height, bulk and size of structures, yard areas, off-street parking facilities, and open spaces, and the use of structures and land for Agriculture, Industry, Business, Resort, and Residences. The ZONING MAP places all property into various ZONING DISTRICTS.

Issue: Should the land proposed by Mokuleia Land Company for development be rezoned to:

Residential

Commercial

Resort

Scope: Areas of review include:

Consistency with General Plan/Development Plan/State Land Use Classification.

Project details including density, floor space, bulk, heights, type of activities, parking, circulation and accessways, open space, etc.

Social impact assessment.

Unilateral agreement provisions.

5. SHORELINE MANAGEMENT PERMIT

A Shoreline Management Permit (SMP) is required for any development within the Shoreline Management Area (SMA) boundaries established by the City Council.

Issue: Property makai of Farrington Highway is in the Shoreline Management Area and will require the issuance of a Shoreline Management Permit.

Scope: Areas of review include:

Provisions for adequate access to beach areas.

Provisions for solid and liquid waste treatment, disposition, and management.

Impact of wildlife preserves/recreation areas.

Impact on scenic amenities/coastal views.

Impact on water resources/protection from flood and tsunami hazards.

Impact on soil conditions/vegetation/shoreline processes.

Impact on historical/archaeological resources.

Consistency with General Plan/Development Plan/Coastal Zone Management Program.

The issues listed below are areas that will probably require continuing discussion and assessment during the above described processes, including the process of Legislative approvals, in order to arrive at the most appropriate method of mitigation.

1. Wetlands

The applicant has indicated support of the Hawaiian Waterbird Recovery Plan and its intention to continue to provide suitable habitats after development of the project. Information provided within the EIS indicates that areas currently being used by endangered birds were created accidentally as the result of mining operations within the past ten years and are not part of the area's natural or historic ecosystem. The applicant's biological consultant and various agencies have suggested a number of alternative mitigation measures which could be adopted to preserve and improve the current habitats. The applicant believes that it is inappropriate at the development plan level of planning to commit to a specific habitat preservation and improvement program when the most viable mitigation measures are not readily apparent. The applicant has committed to work with the Department of Interior, Division of Fish and Wildlife and the Department of Land and Natural Resources in order to achieve an acceptable resolution to this issue. None of the information received during the EIS process indicated that proposed development and use of the site as a waterbird habitat were mutually exclusive.

2. Parks, Ocean and Mountain Access

The EIS discusses park, ocean and mountain access with an expanded discussion of recreational needs as provided in the State's SCORP report. The applicant has indicated that "private" recreational amenities will be an integral part of the proposed development plan. The applicant has recognized the need for additional park areas as well as mountain and ocean access which are required by law. In addition to the legal requirements the applicant recognizes the

political process inherent in the approval process and believes that specific park and access programs are best achieved within the framework of that process.

3. Housing (low, moderate and employee)

The EIS discusses a number of alternative methods by which housing requirements imposed on developers have been met. The most recent communication from the city's Department of Housing and Community development indicates that the city's policy is currently under review. In the past the issue of low moderate housing has been addressed at the time of a Boundary Amendment and at the time of a request for change in zoning. The applicant recognizes that there will be a requirement and that there are a number of alternatives for meeting that requirement however cannot know what public policy will be at the time that approvals will be granted (and presumably what low moderate or other housing requirements will be imposed.)

4. Sewage Treatment Plant

The applicant has proposed two alternatives for handling the sewage generated by the proposed development: participation in the City's proposed regional plant for the area or development for dedication to the city of a WWTP to serve the development.

At the present time it is not possible to determine if participation in the city's proposed system is feasible because of the uncertainty of the timing of both the city system and the proposed development.

The department of public works has proposed that the developer built plant be built on the site of the proposed city plant as an alternative to two plants in two separate locations. The applicant will study this option.

The applicant's first preference is to participate in the City's proposed regional plant however a final commitment cannot be made until a number of aspects of that participation can be more definitely determined including the following: locations of the city plant, cost of participating in the development, timing of the city plant, funding of the city portion of the plant, and special engineering considerations.

The applicant believes that two viable options for providing for the sewage needs of the proposed project have been discussed and that the technology and public approval processes are sufficiently developed so

that the sewage of the project could be handled in an effective and environmentally sound manner under either alternative.

5. Dillingham Field

Based on information received by the applicant there appears to be some confusion as to the impact of aircraft operations at Dillingham Field on the proposed development. A study of noise impacts commissions by the applicant indicated that the proposed development could be developed based on current noise standards. Both the FAA and the State Department of Transportation indicated no objections assuming that recommended noise limits and disclosure were made to potential developers and residents. Neither the FAA or the Department of Transportation (Operator of the Field under long term lease from the Military) indicated any safety concerns in their comments or in subsequent conversations with the applicant.

A 1979 study of the Dillingham Airfield indicated an AICUZ covering portions of the proposed development, however on April 6, 1987 communication from Director of Facilities Engineering provides a March 6, 1984 letter recommending that an ICUZ be established for Dillingham Field. Verbal communications indicated that the recommendation had not been acted upon.

Safety Zones for Dillingham field have not been established by the Military although Planning Criteria established in 1981 and provided by the military indicate a methodology for their determination. The letter from Director Facilities Engineering indicated that the field is under civilian control and that the civil authorities should be contacted. Telephone contact indicated no safety concerns.

Clarification of the situation will require further communication with military commands in Hawaii to obtain a clear military position. This communication will be initiated by the applicant and additional studies undertaken if deemed necessary.

PART VIII

ALTERNATIVES TO THE PROPOSED ACTION

The purpose of this section is to develop, describe, and weigh alternatives to the proposed action which can involve significant trade-offs among the uses of environmental resources.

For the purpose of this EIS four (4) alternatives have been considered. None of the alternatives are considered economically feasible.

A. No Action

This alternative would result in no action being implemented. The impact of this alternative would be that the project site would remain, at best, essentially as it is today. However, because current operations on the site have been unprofitable, it is very likely that the ranching activities would be reduced, and perhaps totally eliminated. Further, other activities like the equestrian uses will probably have to be terminated for the same reason. This alternative would suggest that the owner of the land reassess the compatibility of this investment within its investment portfolio.

Among the alternatives to be considered would be to continue to hold the property in its current state for future development, selling the property to another investor in total or selling portions of the property to a variety of investors. The property is currently subdivided into a number of saleable parcels. Additionally, the owner could consider some other development option for the property; however, none of the other alternative developments appear feasible.

None of the adverse environmental effects which would result from the development of the property as proposed would occur; however, none of the positive impacts would be achieved either, including infrastructure improvements, provisions for mountain and beach accesses, added recreational opportunities, creation of jobs and the long-term economic benefits to the area and the residents.

Should the property be sold off in pieces the opportunity to master plan one of the last large oceanfront to mountain properties on Oahu would be lost.

B. Agricultural Development

While the site does possess lands with agricultural potential for more intensive use, the pool of agricultural land which has been released from sugar and pineapple cultivation has continued to increase in the recent past and is expected to increase in the future statewide and on

Oahu. This pool of land continues to await the development of profitable export crops.

This alternative would not be economically feasible to implement.

C. Residential Development

Residential development on a large scale is another option considered but rejected as being impractical, both from a marketing standpoint and in terms of its impact on public services and facilities in the area. Also, it would not provide long term employment benefits.

Mokuleia is not an area to encourage major residential growth, where residents would have to travel great distances to their place of employment. The environmental impacts, especially on public services and facilities such as schools and transportation, will be more severe than the proposed action. In addition, State and County revenue/expenditure ratio can be expected to decline when compared to a resort project with employment and economic activities.

D. Recreational

The North Shore of Oahu is an area which has a number of recreational amenities which are heavily used by the general public. These include numerous surfing beaches as well as the numerous beach parks. The North Shore also contains a number of private recreational facilities including the Boy Scout Camp at Pupukea and the YMCA facilities at Camp Erdman. The State of Hawaii has for many years been acquiring lands in the Kaena Point area for the proposed Kaena Point State Park, a large regional park which will eventually provide a wide array of recreational activities to the General Public.

The Mokuleia site has the potential for providing excellent recreational opportunities. The land owner has reviewed the recreational potential of the property including golf, equestrian activities, polo, hiking, camping, and others, and has determined that none of the activities alone or in combination would be economically viable.

The existence of the proposed Kaena Point Regional Park Plan located less than two miles west of the proposed Mokuleia Development and the existing Mokuleia Beach Park between two of the existing Mokuleia Development Parcels raises questions as to the need for additional public facilities in the area. This, combined with the increasing demand for limited public funds, makes the possibility of acquisition by a State or local government remote.

Thus the lack of economic viability for a private developer and the lack of funds and the existence of other planned projects in the area make the acquisition and development of the Mokuleia site by government remote.

E. Alternative Site Designs

The current proposal for the Mokuleia development has been developed based on recommendations from architects, engineers and other professionals as well as input from government agencies and community groups in the Mokuleia area. The current proposal was developed to provide for the greatest number of positive impacts and the least number of negative impacts. Implications of intensifying or reducing the major uses of the property are discussed below:

<u>Resort Use</u>	<u>Positive Impacts</u>	<u>Negative Impacts</u>
Increased:	Potential increased economic activity	Increased density of development less in character with the area.
	Increase in jobs created both in construction and in permanent jobs.	Increased impact on traffic, air quality, and community lifestyle.
	Increased economic viability of the development.	
Decreased:	Less density, more in character with the area.	Less potential economic activity and potential for fewer jobs created.
	Reduced impact on traffic and air quality and on community lifestyle.	May inhibit economic viability of development even with increases in other alternatives such as housing at the expense of recreational and open space uses.
		Reduced economic viability of the development.
 <u>Housing Use</u>		
Increased:	Provided additional housing units.	Increases residential population above those permitted in the North Shore Development Plan.
	Increased economic viability of the development. However, demand questionable for large scale housing project.	Increased traffic congestion and decreased air quality.
Decreased:	Reduced traffic and improved air quality.	Decreased economic viability of the development.

<u>Recreation Use</u>	<u>Positive Impacts</u>	<u>Negative Impacts</u>
Increased:	Additional availability of recreational opportunities in the area.	May increase the density of other development to maintain economic viability. Reduced economic viability of the development.
Decreased:	Permits greater use of land for uses with higher economic value. Increased economic viability of the development.	Decreases recreational opportunities.

At the present time the Mokuleia Development Proposal is in the preliminary design phase. It is very likely that with further agency and public input that alterations will be made in the development concept. These alterations will be made within the constraints of economic viability, government planning guidelines and community desires. Each alteration will have to be considered individually and collectively to assure that the final plan is acceptable to all parties.

PART IX

THE RELATIONSHIP OF THE PROPOSED ACTION TO
LAND USE POLICIES AND CONTROLS FOR THE AFFECTED AREASA. HAWAII STATE PLAN

The proposed Mokuleia development would be consistent with the following objectives and policies of the Hawaii State Plan, as stated in Chapter 226 of the Hawaii Revised Statutes:

Objective and policies for population (Section 5)

(b)(3) Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands.

Comment: The proposed project will provide a wider range of employment and business opportunities to the Waialua community. It will provide more choices of lifestyle and jobs for this community, particularly for the young people who grew up in the area and want to remain in their hometown.

Additionally, the project may eventually help provide more incentive to the nearby students to seek more education, in order to qualify for the higher-paying managerial jobs.

Objectives and policies for the economy in general (Section 6)

(a)(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people.

(b)(8) Encourage labor-intensive activities that are economically satisfying and which offer opportunities for upward mobility.

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

(b)(13) Encourage businesses that have favorable financial multiplier effects within Hawaii's economy.

Comment: The proposed project will provide the North Shore with employment and business opportunities. In 1985, the North Shore had 5.1 percent unemployment. The proposed project will generate an estimated 4,890 direct, indirect and induced jobs on Oahu.

These jobs would increase the range of employment choices within a reasonable traveling distance for residents along the North Shore, particularly those in Waialua.

The primary single source of employment is the sugar mill, which provided 3,000 jobs at its peak and currently employs about 460. This project would, in effect, create an alternative employment base.

While the exact breakdown in job choices cannot be determined at this time, the State Tourism Manpower Simulation Model provides a preliminary basis for estimating the type of jobs which might be generated by the proposed Mokuleia development (State of Hawaii, Department of Planning and Economic Development, 1978). Estimated percent distribution by industry and occupation of direct, indirect and induced employment generated by the proposed expansion is as follows: 31 percent of all jobs could potentially be in eating and drinking establishments; 28 percent, in resort and hotel facilities; 22 percent in transportation related sectors; 14 percent in the service sectors; and 5 percent in the retail areas.

Also expected to result from the project is the expansion of business opportunities, particularly in Haleiwa. Commercial developments in this town have been gradually changing to appeal more to the visitor market.

Objectives and Policies for the economy — visitor industry (Section 8)

(b)(3) Improve the quality of existing visitor destination areas.

(b)(4) Encourage cooperation between the public and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities.

(b)(7) Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the visitor industry.

(b)(9) Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawaii's cultures and values.

Comment: Waikiki is virtually Oahu's only community which offers a full range of resort facilities. Currently, the area is intensely developed. It is unrealistic to expect Waikiki to undergo major physical changes which will either accommodate increasing lodging demands or provide an alternative to high density resort.

While Waikiki continues to be the "symbol" of Hawaii for many visitors, there is a growing need to provide alternate resort settings which, unlike the high-rise nature of the origin of many visitors, emphasizes the beauty of the island's natural resources. While such alternative settings will be provided to some extent by the proposed expansion of the Kuilima resort and the proposed West Beach development, this proposal will add another dimension by providing both mountain and beach recreational resources and accesses within one development. Such a setting will be conducive to fostering an appreciation of Hawaii's cultural relationship to the land.

Other factors which would attract hotel guests to Mokuleia include:

1. Unique location on Oahu

- accessible to and from Waikiki, the Honolulu central business district and all areas of Oahu
- oceanfront, rural environment

2. Range of recreational opportunities

- onsite golf course, possible polo field, hiking trails, riding trails, camping grounds, tennis, ranch and sports center
- beach activities including swimming, surfing, windsailing and boating

3. Range of entertainment and commercial services

- entertainment at hotel facilities
- variety of food and beverage services at hotel and commercial facilities

The proposed project would significantly contribute to the general welfare and prosperity of residents in the area by offering employment opportunities and encouraging business investments. An employment program for residents of surrounding communities is another possibility that is being explored.

Objectives and Policies for the physical environment — land-based, shoreline, and marine resources (Section 11)

- (b)(2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.
- (b)(3) Take into account the physical attributes of areas when planning and designing activities and facilities.
- (b)(4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.
- (b)(9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.

Comment: Because the project area encompasses mountain and beach features, it allows for a wide range of both land-based and water-based activities. Land-based activities will be related to residential and resort uses, as well as outdoor recreation, such as golfing, tennis, equestrian-related activities, and camping and hiking. Water-based activities will be related to ocean recreation, such as swimming, diving, boating, and windsailing. These two groups, as well as their subgroups, will be ensured compatibility with each other through the use of physical design barriers, such as buffer zones, and through management practices.

The successful marketability and execution of both the land-based and water-based activities will depend, to a large extent, on the natural beauty of the area. Much of the natural resources and ecological systems will be protected through careful planning and the use of buffer areas between sensitive areas and high intensity uses.

A major physical characteristic of the project area is its topography. The site extends from relatively flat beach frontage to the dramatically steep Waianae Mountains.

The steepness of the mountain slopes does not permit extensive building and the applicant has excluded the 1,900 acres which fall into this category. Proposed uses for the remaining areas, which are relatively flat or gently sloping, will conform to the topography as appropriate.

While the shoreline provides access to the ocean, it is fronted to a large degree by private property which limits convenient ocean access. Mountain access is restricted also by continuous private property. The project will improve the region's overall public access to the resources of the mountains and the ocean.

The determination of the number of right-of-ways, as well as the amenities in conjunction with these accesses, will be based on discussions with the appropriate City and County agencies and with the community.

The natural drainage pattern is another physical characteristic which will be accommodated in the project. Portions of the low-lying area near Farrington Highway are subject to flooding. A preliminary mitigation measure being considered is a catchment pond system to accommodate runoff. It is anticipated that these water areas will be a major feature of the golf course and will provide for passive recreation activities.

Objectives and policies for the physical environment — scenic, natural beauty and historic resources (Section 12)

(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.

(b)(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage.

Comment: The proposed project will maintain the scenic views and aesthetic enjoyment of the ocean and the mountains through its proposed low density and recreation-oriented community. Additionally, the project will provide for more active enjoyment of these areas by providing access to the beach and the mountains. As stated earlier, mountain access will be controlled by some type of management to ensure preservation of the area and the safety of users.

A study of the site's historic and archaeological resources has been conducted by Archaeological Consultants of Hawaii, Inc. and their findings are presented in other parts of this EIS.

Objectives and policies for facility systems — water (Section 16)

(b)(4) Assist in improving the quality, efficiency, service and storage capabilities of water systems for domestic and agricultural use.

Comment: The proposed project will improve the existing water system in the area by replacing it with a new water system designed to meet the project's needs.

Objectives and policies for socio-cultural advancement — leisure
(Section 23)

(b)(2) Provide a wide range of activities and facilities to fulfill the recreation 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.

Comment: This proposal is being designed around the passive and active recreation potentials of the site. The property mauka of Farrington Highway will offer recreational opportunities for a wide range of people and income levels. Currently envisioned are two 18-hole golf courses, tennis courts, polo fields and related equestrian activities, and mountain trails for hiking and camping.

The main recreational feature of the properties makai of Farrington Highway is the beach and the project will provide convenient public access to the shoreline. Users, including resort clientele and the general public, will have opportunities to sunbathe, swim, fish and gather seaweed and seashells.

Priority Guidelines

Priority Guidelines means those guidelines which shall take precedence when addressing areas of statewide concern. The proposal to amend the Development Plan to permit the proposed resort development at Mokuleia is most likely to impact on the Economic (Section 226-103), Population Growth and land resources and Affordable Housing (Section 226-106) of the priority guidelines.

While there are numerous priority guidelines dealing with State policy for every activity in the State, there are a number of priority guidelines which appear to deal directly with the proposal for a resort development at Mokuleia.

Economic (Section 226-103)

(a)(8) Provide public incentive and encourage private initiative to develop and attract industries which promise long-term growth potentials and which have the following characteristics.

- (A) An industry that can take advantage of Hawaii's unique location and available physical and human resources.
- (B) A clean industry that would have minimal adverse effect on Hawaii's environment.
- (C) An industry that is willing to hire and train Hawaii's people to meet the industry's labor needs.
- (D) An industry that would provide reasonable income and steady employment.

(b)(2) Encourage the development and maintenance of well-designed, adequately serviced hotels and resort destination areas which are sensitive to neighboring communities and activities and which provides for adequate shoreline setbacks and beach access.

Comment: Many of the existing hotel and destination resort developments on Oahu and the Neighbor Islands have met the criteria for desirable industries as discussed in Section 103(a)(8)(A)-(D). Planning and review is an important part of the City and County of Honolulu's Development Plan Process, ensuring participation by various government agencies and the public, thus encouraging the desired development. Additionally, the mandate of Guideline (b)(2) would also be encouraged by providing potential hotel and resort developers with an alternative location on the Island of Oahu.

Population Growth and Land Resources

(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: Approval of the proposed resort project at Mokuleia area will allow for the planning and review process of the State and County governments to evaluate land use proposals for the area.

Resort development on Oahu's North Shore will provide for economic diversification of the area, particularly for the community of Waialua and within the moderate population growth scenario planned for the area. Existing state laws and county ordinances ensure increased public access to shoreline and mountain conservation areas.

Affordable Housing (Section 226-106)

Comment: While none of the seven priority guidelines of the affordable housing section appear to apply directly to the proposed Mokuleia resort development at Mokuleia, to the extent that jobs created in the area provide employment for people already living in the area who are unemployed or underemployed, the affordability of housing for those people will be enhanced. In addition, economic development in labor intensive activities such as resort development give developers and hotel operators a vested interest in assuring that their employees will be suitably housed. This has led to innovative housing and/or transportation alternatives in some jurisdictions.

In summary, amendment of the Development Plan to include a resort development at Mokuleia will be in consonance with a number of the goals stated in the priority guidelines of the Hawaii State Plan.

B. STATE FUNCTIONAL PLANS

The broad goals and objectives of the Hawaii State Plan are translated into detailed courses of action by the State Functional Plans. Ten of the 12 mandated Functional Plans were adopted by the Twelfth State Legislature in April 1984. The Agricultural and Educational Functional Plans were adopted by the Thirteenth Legislature in April 1985. This section identifies the relationship of the proposal to relevant State Functional Plan objectives.

State Agricultural Functional Plan

Objective B, Policy 4: Encourage productive agricultural use of the most suitable agricultural lands.

Comment: Most of the project area is currently designated Agriculture on the State Land Use Map and on the North Shore Development Plan. It is also zoned for agriculture.

A study conducted by Decision Analysts, Inc., examined the potential impact of this proposal on agriculture and aquaculture. It is further discussed in other sections of this EIS. This study has indicated

that it is extremely doubtful that the proposed development will affect adversely the statewide growth of diversified agriculture or aquaculture either immediately or over the long term.

One reason for this finding is that the acreage requirement for diversified agriculture or aquaculture activities that are agronomically suited for the Mokuleia area is relatively small. Less than 1,200 acres would be required to increase Hawaii's self-sufficiency in produce crops to a realistic level which can accommodate the growth of the de facto population to the year 2000. The study also explored various agricultural alternatives, and found that they either produce low returns per acre, were too experimental to guarantee a profitable return, had stiff competition from the mainland and/or a small local market, or were generally unsuitable for this land.

Another basis for the study's finding is that an enormous and growing supply of Hawaii's prime agricultural land has already been freed from sugar and pineapple production. Since 1970, over 42,000 acres of Hawaii's land have been freed from sugar production and over 39,000 acres from pineapple production. Some of this land has been or will be converted to urban, diversified agriculture and aquaculture uses. Some of the formerly pineapple land was converted for sugar production. Making allowances for the various conversions, uncommitted acreage which remains available to diversified agriculture and aquaculture amounts to many tens of thousands of acres, with a large share of this on Oahu. Further, the supply of fallow prime agricultural land probably will increase given the unfavorable outlook for sugar prices. In fact, some unprofitable mills remain in operation temporarily only because of lease and/or energy agreements.

Many of the lands freed or to be freed from sugar and pineapple production have excellent agricultural qualities and climatic conditions, and are well-suited for crop and aquaculture production. Most of these lands already have available water and some additional land has been made available to diversified agriculture in government-sponsored agricultural parks throughout the State.

State Housing Functional Plan

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

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

Objective B, Policy 1: 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.

Comment: The proposed project includes 700 single family and/or attached residential units. The market assessment performed by John Child and Company (June 1986) suggests that the residential component include community lots (less than one acre in a planned resort community) and acreage lots (one acre or more generally found in rural areas). Also possible would be attached and planned unit developments. These projects would increase the housing choices on Oahu through its introduction of residential units and lots in planned recreational communities.

The general location of the proposed residential units is the gently sloping area at the foot of the mountains. While this location offers panoramic views of the coastline, it is also buffered from the more intensely used recreation and resort areas to be located near Farrington Highway, thus affording privacy as well.

All components of the recreational community, including residential uses, will be subject to community input and public agency requirements. Affordable housing requirements will be discussed with the appropriate agencies and to ensure that community issues and concerns are addressed, extensive dialogue with the community is underway.

State Recreation Functional Plan

Objective A, Policy 2: Ensure that intended uses for a site respect community values and are compatible with the area's physical resources and recreation potential.

Objective A, Policy 3: Emphasize the scenic and open space qualities of physical resources and recreation areas.

Objective C, Policy 1: Maintain an adequate supply of recreation facilities and programs which fulfill the needs of all recreation groups.

Objective D: Assure the provision of adequate public access to lands and waters with public recreation value.

Objective E, Policy 3: Coordinate visitor and resident recreation interests to achieve compatible recreation usage.

Comment: This proposal is being designed around the passive and active recreation potentials of the site.

The property mauka of Farrington Highway will offer recreational opportunities for a wide range of interests while maintaining the open space quality. Currently envisioned are two 18-hole golf courses, which will, in effect, become permanent open space. Other recreational areas currently anticipated are tennis courts, polo fields and related equestrian activities, and mountain trails for hiking and camping.

The main recreational feature of the properties makai of Farrington Highway is the beach and the project will provide convenient public access to the shoreline. Users, including resort clientele and the general public, will have opportunities to sunbathe, swim, fish and gather seaweed and seashells.

State Tourism Functional Plan

Objective B, Policy 3: Encourage greater cooperation between the public and private sectors in developing and maintaining well-designed and adequately serviced visitor industry and related developments.

Objective B, Policy 4: Ensure that visitor facilities and destination areas are carefully planned and sensitive to existing neighboring communities and activities.

Objective C: Enhancement of career and employment opportunities in the visitor industry.

Objective C, Policy 2: Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the visitor industry.

Objective D: Development of better relations and mutual awareness and sensitivity between the visitor industry and the community.

Comment: The current planning effort of this project will produce a comprehensive blueprint of what will happen on the property in the next twenty years. This blueprint will help ensure that all of the uses are compatible with each other, will help the community form predictable expectations, and will give some indication of the timing and requirements of public facilities and services.

The project planning includes consideration of social, visual, and environmental factors, including employment, job training, recreational needs, scenic enhancement, shoreline protection, and provisions for adequate services and facilities. Planning for the project is also taking into consideration community concerns and needs. Extensive public awareness and participation in the project is being encouraged to help ensure that community needs are met and that all of the uses are compatible with each other.

C. GENERAL PLAN FOR THE CITY AND COUNTY OF HONOLULU

The General Plan is the City and County commitment to the desirable and attainable future of Honolulu. This section discusses how this project conforms to and implements the General Plan.

Objectives and Policies for Population

Objective B, Policy 2: Provide adequate support facilities to accommodate future growth in the number of visitors to Oahu.

Comment: Based on the anticipated supply and demand relationships for visitor units on Oahu, the visitor industry could be expected to require about 18,900 to 22,700 additional rooms by 2005 (John Child and Company, June 1986). Already intensely developed, Waikiki cannot be expected to accommodate these projected needs, even though it will continue to dominate Oahu's visitor accommodation industry. The proposed project will help the island's visitor industry by further accommodating the lodging needs with the proposed 3,300 resort units.

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 the islandwide resident population remains unchanged.

Comment: The project's development concept focuses on land uses and recreational facilities which would be enjoyed by Hawaii families as well as visitors. Land uses are planned to complement the existing image and character of the area. The development is proposed as a low-density, recreation oriented master-planned community.

The project's proposed 700 residential unit development would be consistent with the population distribution range established for the North Shore by the General Plan. The General Plan allocates between 1.6 to 1.8 percent of Oahu's total 2005 population to the North Shore.

In the "Residential Development Implications of the Development Plans," the City Department of General Planning projects a 2005 housing need of 6,000 units for the North Shore, which would support a population of 15,600. This estimated population represents 1.6 percent of the projected islandwide population of 954,500.

If the upper range of 1.8 percent is used, then the North Shore population could reach 17,200. To support this population, an additional 600 to 800 units can be planned for and still be within the population guidelines of the General Plan. These units would be in addition to the current estimated housing deficiency of 100 units.

Objectives and Policies for Economic Activity

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

Objective A, Policy 2: Encourage the development of small businesses and larger industries which will contribute to the economic and social well-being of Oahu residents.

Comment: The proposed project will provide the North Shore with employment and business opportunities. In 1985, the North Shore had 5.1 percent unemployment. The proposed project will generate an estimated 4,890 direct, indirect and induced jobs on Oahu.

These jobs would increase the range of employment choices within a reasonable travelling distance for residents along the North Shore, particularly those in Waialua. The primary single source of employment is the sugar mill, which at its peak provided 3,000 jobs and now maintains a current employment of 460. This project would, in effect, create an alternative employment base.

The proposed project would also increase the range of business opportunities for area residents. The market support for retail space at Mokuleia would result from shopping needs of onsite visitors and residents, off-resort visitors and neighboring North Shore residents. These four markets are estimated to generate total annual retail sales ranging from \$5 million in 1990 to over \$27 million in 2005.

It is estimated that the demand for retail facilities could support about 18,200 square feet in 1990 and 100,700 square feet in 2005 (John Child and Company, 1986).

Objective B: To maintain the viability of Oahu's visitor industry.

Objective B, Policy 6: Permit the development of secondary resort areas in West Beach, Kahuku, Makaha, and Laie.

Objective B, Policy 7: Manage the development of secondary resort areas in a manner which respect existing lifestyles and the natural environment, and avoids substantial increases in the cost of providing public services in the area.

Comment: The applicant has proposed an amendment to the General Plan to include Mokuleia as a secondary resort area.

The market study for this project indicates that, while Waikiki is expected to dominate Oahu's visitor accommodation industry, its share could be expected to decline from its current level of about 93 percent to about 75 percent in 2005. Based on the expansion plans at Kuliima and the proposed Mokuleia development, the North Shore is projected to capture a 12.5 percent market share of room demand. West Beach, Leeward Oahu and other areas would capture the remaining 12.5 percent (John Child and Company, 1986).

Based on the anticipated supply and demand relationships for visitor units on Oahu, the visitor industry could be expected to require about 18,900 to 22,700 additional rooms by 2005. This represents a requirement of 9,500 to 13,300 rooms in addition to the inventory which is currently being planned for Oahu.

Already intensely developed, Waikiki cannot be expected to accommodate these projected needs. The proposed project will help the island's visitor industry by further accommodating the lodging needs with the proposed 3,300 resort units.

Both the surrounding and islandwide communities have an image of the Mokuleia area being associated with recreational activities. Land uses are therefore planned to complement the existing image and character of the area. As a result, the development is proposed as a low-density, recreation-oriented community.

The property mauka of Farrington Highway will offer recreational opportunities for a wide range of interests while maintaining the open space quality. Currently envisioned are two 18-hole golf courses, tennis courts, polo fields and related equestrian activities, mountain trails for hiking and camping.

The main recreational feature of the properties makai of Farrington Highway is the beach and the project will provide convenient public

access to the shoreline. Users, including resort clientele and the general public, will have opportunities to sunbathe, swim, fish, and gather seaweed and seashells.

Planning for the proposed project is also taking into consideration community concerns and needs. The developer is currently meeting with community members to see how this development could address some of these concerns.

Public costs of providing the necessary infrastructure will be greatly minimized by the developer's funding of the project's needed improvements. Currently being proposed for improvement by the developer are the following:

Sewerage system improvements, including a new wastewater treatment plant, trunk sewer lines, and sewage lift stations (alternatively, participation in the City's new Waiialua STP is under consideration).

Water systems improvements, including new wells, the water reservoirs and lift stations, and the construction of water transmission mains; and

Roadway improvements, including miscellaneous improvements to Farrington Highway and a primary access road through the project area from Farrington Highway.

Objective C: To maintain the viability of agriculture on Oahu.

Objective C, Policy 4: Provide sufficient agricultural land in Ewa, Central Oahu, and the North Shore to encourage the continuation of sugar and pineapple as viable industries.

Objective C, Policy 5: Maintain agricultural land along the Windward, North Shore and Waianae coasts for truck farming, flower growing, aquaculture, livestock production, and other types of diversified agriculture.

Comment: Most of the project area is currently designated Agriculture on the State Land Use Map and on the North Shore Development Plan. It is also zoned for agriculture.

A study conducted by Decision Analysts, Inc., examined the potential impact of this proposal on agriculture and aquaculture. It is further discussed in other sections of this EIS. This study has indicated

that it is extremely doubtful that the proposed development will affect adversely the statewide growth of diversified agriculture or aquaculture either immediately or over the long term.

Objective E, Policy 1: Encourage the training and employment of present residents for currently available and future jobs.

Comment: The project will make a significant contribution toward preventing large-scale unemployment, especially along the North Shore and in particular the Waialua area. Close to 5,000 direct, indirect and induced jobs are estimated. Efforts to employ local residents to these jobs through employment training programs is one option being discussed with the community.

Objectives and Policies for the Natural Environment

Objective A, Policy 4: Require development projects to give due consideration to natural features such as slope, flood and erosion hazards, water-recharge areas, distinctive land forms and existing vegetation.

Objective A, Policy 6: Design surface drainage and flood control systems in a manner which will help preserve their natural settings.

Objective A, Policy 7: Protect the natural environment from damaging levels of air, water and noise pollution.

Objective A, Policy 8: Protect plants, birds, and other animals that are unique to the State of Hawaii and the Island of Oahu.

Objective A, Policy 10: Increase public awareness and appreciation of Oahu's land, air, and water resources.

Comment: The existing land features of the site have been carefully considered in the design of the project, leaving the steep terrain in its natural state for recreational enjoyment. There are no plant communities or individual species located on the project site in need of protection (Char's Biological Study, June 1986). Landscaping of the project site will give consideration to the use of native plants suitable to the environment and the need for waterbird habitats will be closely coordinated with the U.S. Fish and Wildlife Service.

Portions of the low-lying areas near Farrington Highway are subject to flooding. Runoff originates offsite and continues onto the project site to the flat area along Farrington Highway. A major feature of

the development will be the enhancement of the natural drainage ways as a recreational and aesthetic amenity within the project. Building designs will take into account and protect against potential hazards of flood or tsunami inundation, and proper measures will be taken to ensure that air, water and noise standards are met.

The project design is focused on the natural setting of the site, and its relationship to the mountains and the ocean. The development will foster a greater awareness and appreciation of the recreation and scenic values and assets of the area.

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

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

Objective B, Policy 4: Provide opportunities for recreational and educational use and physical contact with Oahu's natural environment.

Comment: The surrounding community often refers to the mountains in Mokuleia as the "Pali". Like the Koolau range, these mountains are breathtaking and spectacular. This proposal will preserve this view by keeping it free of structures.

Access to the mountains will be planned and managed to permit Hawaii's families and visitors first-hand enjoyment. Several trails now lead from the lowlands to Peacock Flats, a plateau of the Waianae Mountains. These and other similar trails could be developed to offer the opportunity to experience and enjoy the rugged, natural beauty of the region. Camp grounds, developed in conjunction with the hiking trails, could augment the recreational facilities and appeal of the community.

On the properties makai of Farrington Highway, the project will provide convenient public access to the shoreline.

Objectives and Policies for 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 and which are adequately served by public utilities.

Comment: The project's physical setting, preliminary development concepts, and recreation orientation are unique among planned commu-

nities. The project would increase the housing choices on Oahu by providing a living environment for those wishing to live in a recreation-oriented area. The project will provide employment opportunities and stimulate the growth of existing and new businesses in the area. The development's retail facilities are located to be convenient to the project's residents, as well as neighboring residents.

Objectives and Policies for Transportation and Utilities

Objective A, Policy 5: Improve roads in existing communities to reduce congestion and eliminate unsafe conditions.

Comment: The traffic study for this project examined its potential traffic impacts and estimated that, while the existing Farrington Highway will experience an increase in traffic volume, the roadway has sufficient capacity to serve the predicted peak hour volumes (Parsons Brinckerhoff Quade and Douglas, Inc., 1986). The project roadway improvements will be guided by the recommendations contained in the traffic study.

Objective B, Policy 1: Develop and maintain an adequate supply of water for both residents and visitors.

Objective B, Policy 5: Provide safe, efficient, and environmentally sensitive waste-collection and waste disposal services.

Comment: The project will improve the existing water system by replacing it with a new water system designed to meet the project's needs. New water wells, water reservoirs, and other water improvements will be made to upgrade water service in the area.

The City and County of Honolulu is currently proposing to develop a wastewater treatment plan in the Waialua area and the applicant is discussing with the City participating in this effort.

Objective D, Policy 5: Require the installation of underground utility lines wherever feasible.

Comment: All standard utility lines in the project will be installed underground.

Objectives and Policies for 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.

Objective A, Policy 7: Locate new industries and new commercial areas so that they will be well related to their markets and suppliers, and to residential areas and transportation facilities.

Comment: All improvements to serve the needs of the project will be provided by the developer in accordance with the requirements and standards of government agencies. The extent of the improvements will be resolved through the planning and zoning processes.

Commercial establishments in the Waialua region are currently limited to a sprinkling of food supermarkets and eating establishments and Waialua residents must travel to Haleiwa and elsewhere for most retail needs. Located three miles west of Waialua Town, the proposed commercial component will provide convenient shopping areas and eating establishments within easy driving distance for Waialua residents. It will also be within walking distance for onsite resort clientele and residents.

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

Objective D, Policy 2: Integrate the City and County's urban-design plan into all levels of physical planning and developmental controls.

Objective D, Policy 3: Encourage distinctive community identities for both new and existing districts and neighborhoods.

Objective D, Policy 4: Require the consideration of urban-design principles in all development projects.

Objective D, Policy 5: Require new developments in stable, established communities and rural areas to be compatible with the existing communities and areas.

Objective D, Policy 7: Promote public and private programs to beautify the urban and rural environments.

Comment: The proposed plan for a secondary resort area at Mokuleia is based on a two-fold objective. First, the plan strives to recognize, enhance, preserve and improve the area's scenic qualities, recreational environment and rural character. Second, the plan must also contribute to the general well-being of the people living in the area by creating employment opportunities by stimulating growth and by expanding existing businesses.

In keeping with this objective, the plan calls for a low density project which would be compatible to the rural character of the area. The project is centered around a recreational theme that would offer residents and visitors a wide range of leisure-time activities. All the services and facilities, including lodging, dining, recreation, entertainment and commercial uses will be managed in a manner that will benefit both residents and visitors. Special attention will be given to creating a job environment that will diversify the employment opportunities of the area.

The City and County of Honolulu Urban Design Guide will be consulted in the design of the physical plan for the project. The concepts and guidelines of this guide will be incorporated into the physical planning and developmental controls of the proposed project.

In addition to physical compatibility, the project will consider the community's existing needs in the current dialogue program conducted by the developer.

The proposed project will maintain the beauty of the existing area through its landscaping and preservation of the open space quality.

Objectives and Policies for Public Safety

Objective B, Policy 2: Require all developments in areas subject to floods and tsunamis to be located and constructed in a manner that will not create any health or safety hazard.

Comment: The coastal portions of the project, makai of Farrington Highway, are in the Shoreline Management Area, and included in the Flood Hazard Districts of the City. Developments in these areas will require the issuance of a Shoreline Management Area Permit, and construction and location of structures will be designed to meet the safety standards of the City.

Objectives and Policies for Culture and Recreation

Objective B, Policy 1: Encourage the restoration and preservation of early Hawaiian structures, artifacts, and landmarks.

Objective B, Policy 2: Identify, and to the extent possible, preserve and restore buildings, sites and areas of social, cultural, historic, architectural, and archaeological significance.

Comment: An archaeological study of the area was performed by Archaeological Consultants of Hawaii, Inc., and the findings of the study are presented in other parts of this EIS. The applicant intends to follow the recommendations contained therein.

Objective D: To provide a wide range of recreational facilities and services that are readily available to all residents of Oahu.

Objective D, Policy 6: Provide convenient access to all beaches and inland recreation areas.

Comment: The project will improve the region's overall access to the resources of the mountains and the ocean. While the shoreline provides access to the ocean, it is fronted to a large degree by private property which limits convenient ocean access. Mountain access is likewise restricted by continuous private property. This project will provide convenient mauka and makai access.

The property mauka of Farrington Highway will offer recreational opportunities for a wide range of interests while maintaining the open space quality. Currently envisioned are two 18-hole golf courses. These will, in effect, become permanent open space. Other recreational areas currently anticipated are tennis courts, polo fields and related equestrian activities, and mountain trails for hiking and camping.

The main recreational feature of the properties makai of Farrington Highway is the beach and the project will provide convenient public access to the shoreline.

It is anticipated that a determination of the number of right-of-ways, as well as the amenities in conjunction with these accesses, will be made in the course of working with the City and County agencies and the community.

D. DEVELOPMENT PLAN FOR THE NORTH SHORE, CITY AND COUNTY OF HONOLULU

Development Plans are relatively detailed guidelines for the physical development of specific regions. They provide for land use and public facilities planning as well as indicate the sequence in which development will occur. This section discusses how the proposed project conforms to and implements the Development Plan.

Development Plan Common ProvisionsSection 4: General Urban Design Principles and Controls

Public Views: Public views include views along streets and highways, mauka-makai view corridors, panoramic, and significant landmark views from public places, views of natural features, heritage resources, and other landmarks, and view corridors between significant landmarks. Such public views shall be protected by appropriate building heights, setbacks, design and siting controls established in the CZC....

Comment: The proposed development contains four oceanfront parcels. The (Kaena) view of the ocean from Farrington Highway in the area varies. Beginning west of the proposed development, ocean views are good due to the proximity of Farrington Highway to the ocean and the lack of vegetation or development between the highway and the ocean. There is little view from Farrington Highway to the ocean over the easternmost parcel proposed for development. The width of the parcel and the heavy vegetation make views of the ocean impossible. From this parcel to Mokuleia Beach Park views of the coast and ocean are obscured by a combination of single-family home development and heavy vegetation. (Note: This area contains an additional parcel proposed for development.) There is some view of the ocean from Farrington Highway at the Mokuleia Beach Park; however, it tends to be obscured due to the coastal sand berm made up of windblown sand. East of the park is another parcel proposed for development. Views to the ocean from the highway are non-existent due to the heavy growth of vegetation on the parcel. East of this parcel only sporadic ocean views exist due to the single-family development that lines the coast. The easternmost parcel proposed for development provides for ocean views from the highway in the area of the polo field; however, the ocean views on the bulk of the parcel are obscured due to heavy vegetation. East of the proposed development, ocean views from Farrington Highway are non-existent due to the increasing distance from the coast to the highway and the intervening agricultural and residential uses of the land.

The proposed project will be designed to provide ocean views as much as possible. The resort facilities makai of Farrington Highway will be clustered together and designed so as to minimize structural view obstructions. No structure will exceed 6 to 7 stories.

The view of the mountains is spectacular and this will be maintained through ample open space and a low density development.

Open Space . . . The City's mountains, hills, shoreline and streams shall be considered as major scenic, open space and recreational resources. Adequate public access to these resources shall be incorporated as part of developments adjacent to them . . .

Comment: See discussions in previous section on public views and General Plan Objectives and Policies for Culture and Recreation, Objective D.

Vehicular and Pedestrian Routes: Landscaping shall be provided along major vehicular arterials and collector streets as a means to increase the general attractiveness of the community and the enjoyment of vehicular travel for visitors and residents . . . Pedestrian corridors shall be provided in heavy traffic areas, such as in resort, commercial, and apartment districts . . . Major roadway intersections, particularly along arterial and collector roadways, that serve as key community orientation points shall be made easily identifiable . . . Landscaping controls shall be established for ground level parking areas in order to provide pleasing environments and to help minimize the visual dominance of paved surfaces . . .

Comment: The project access to and from Farrington Highway will be the major roadway intersection. This is intended to be designed to be made easily identifiable through the use of distinctive landscaping, lighting and signage. Landscaping will also be provided along collector streets within the project site. The location and design of pedestrian walkways will be coordinated with other land use features of the plan to ensure convenient and attractive access. Driveways for the resort and recreational facilities will be located as far away as possible from the Farrington Highway intersection to minimize traffic, as well as to provide an attractive setting. All ground level areas will, along with the rest of the development, be generously landscaped.

General Height Controls: Maximum allowable heights for structures in each land use classification and for designated special areas are specified in the special provisions of each development plan. They are intended to establish a general policy for the maximum overall height in the area rather than set specific zoning standards . . .

Comment: See discussion under Special Provisions for the North Shore Development Plan.

Rural: Rural areas are characterized by a preponderance of open and agricultural lands with limited development clustered in small, low density residential areas which have a strong sense of community and

country-like environment. Large-scale agricultural operations or small farms are major economic activities and constitute the predominant land use. Business centers are generally modest in size, low in intensity of use and primarily oriented to meeting the day-to-day shopping and service needs of the surrounding area's residents...

Comment: The proposed project is located in an area designated Rural under the General Plan. While resort development is not specifically categorized under the language of the DP Common Provisions, the development program with its low density recreational theme will embody within its design components " a strong sense of community and a country-like environment."

The overriding thesis of the proposed development is to complement the natural beauty and environment of the area with a low density development reflective of its rural setting.

The resort facilities will be clustered and landscaped in a manner which recognize the natural attributes of the site. (Helping to retain the openness of the site and to diffuse the aura of an urban character, two golf courses will be carefully blended into the project site.) Care will be taken to protect and enhance opportunities for views of the ocean and the mountains with special concern being given to protecting and preserving the shoreline, streams, ridgelines, and steeply sloping area. Public access ways to the shoreline and mountain resources which are currently unavailable to the general public will be adequately addressed under the proposed program.

The proposed commercial center will be low rise and scaled to meet the basic needs of the development. Opportunities will be available for "community-based economic activities which utilize locally available raw materials and the skills of craftpeople living in the area."

The commercial center proposes to incorporate the existing pond at Crowbar Ranch as a central design theme so as to capture the openness and special qualities of the existing waterway.

A guiding principle for rural areas is:

a. The visual attractiveness that distinguishes rural from urban and country from City shall be maintained.

To accomplish this objective, structures generally will be one and two stories in height. Where structures of 6-7 stories in height occur,

they will be placed and landscaped so as to retain the pervading atmosphere of a rural setting. Parking areas, streets, building designs, building and plant materials and colors will be assessed on the basis of their harmony with a country-like environment.

Section 5, General Principles and Controls for Parks, Recreation and Preservation Areas

Parks and Recreation Areas, Community-Based Parks and Recreation Sites, Park Standards for Suburban and New Development Areas: Suburban and new development areas shall include land for open space and recreation purposes at a minimum of two acres per thousand persons.

Comment: The project is intended to focus upon, improve and expand on the recreational amenities within the area. The development will be a low density project centered around a recreational theme that would offer residents and visitors a wide range of leisure-time activities, including water-oriented uses, hiking and camping, golf, as well as spectator-type activities. The location, size and scope of recreational facilities will be coordinated with the Department of Parks and Recreation and in consultation with the community. The requirements of the Park Dedication Ordinance (4621) and the Public Access Ordinance (4311) will be met.

Section 6: Identification of areas, sites and structures of historical significance

General . . . The continued use, enhancement or preservation of areas, sites and structures [of historical, archaeological or architectural significance] shall be incorporated or promoted in any applicable action by the City.

Comment: A preliminary archaeological investigation was conducted by Archaeological Consultants of Hawaii, Inc. The results of the investigation are presented in other parts of this EIS. Prior to actual development, a more complete survey will be conducted, and steps will be taken to implement the recommendations of the archaeological consultant.

Section 10: Social Impact of Development

Social Impact Factors: In evaluating any proposed development, the objectives relating to the distribution of social benefits shall be

considered. The following factors shall be examined as they pertain to such objectives:

- a. Demographic
- b. Economic
- c. Housing
- d. Public service
- e. Physical; Environmental

Comment: The social impact of the proposed development has been examined and the results, including any mitigation measures, are essentially contained in the following reports that are part of this EIS: A Social Impact Assessment by Community Resources, Inc., the Economic and Fiscal Impacts by John Child and Company, an Archaeological Investigation by Archaeological Consultants of Hawaii, Inc., and a Biological Survey by Char and Associates.

Development Plan Special Provisions for the North Shore

The Special Provisions describe the unique features and goals of the specific region. The specific urban design considerations provide guidelines for open space, public views, height controls and density controls.

Comment: There are no special provisions related to resort development in the North Shore Development Plan. Through the public participation process and review procedures, special provisions guiding the development will be incorporated to reflect the desired urban design principles and controls for the project.

Other Controls and Regulations

E. HAWAII COASTAL ZONE MANAGEMENT PROGRAM

As contained in Section 205A-2 of the Hawaii Revised Statutes, the objectives of the Hawaii Coastal Zone Management Program are designed to protect valuable and vulnerable coastal resources such as coastal ecosystems, special scenic and cultural values and recreational opportunities. The program is also designed to reduce coastal hazards and to improve the review process for activities proposed within the designated zone. The project conforms to following objectives and discussions pertinent to this conformance are contained in previous section of this EIS.

Objectives for Recreational Resource: Provide coastal recreational opportunities.

Comment: See discussion under State Recreation Plan.

Objective for Historic Resources: Protect, preserve and where desirable, restore those natural and man-made historic and prehistoric resources in the coastal zone and management areas that are significant in Hawaiian and American history and culture.

Comment: See discussion under General Plan Objectives and Policies for Culture and Recreation.

Objective for Scenic and Open Space Resources: Protect, preserve and, where desirable, restore or improve the quality of coastal scenic and open space resources.

Comment: See discussions in General Plan Objectives and Policies for Culture and Recreation, Objective D.

Objective for Economic Uses: Provide public and private facilities and improvements important to the State's economy in suitable locations.

Comment: See discussions under State Tourism Functional Plan.

Objective for Coastal Hazards: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion and subsidence.

Comment: See discussions under General Plan Objectives and Policies for Public Safety.

There are some long-term impacts of the proposed development which should be recognize.

The development of resort facilities makai of Farrington Highway will alter some of the ocean views from the highway. Development will also necessitate the removal or relocation of some existing plant material which will modify the present character of the area.

With the introduction of new activities into the area, and the opening up of previously restricted recreational resources, more people will be attracted to the site. Traffic will increase and the residual effects of automobiles and trucks will cause various changes in the environment in the way of noise and petroleum emissions.

Finally, while development will comply with all Federal, State and County coastal hazard regulations there always remain the threat of storm damage for any coastal development.

F. SPECIAL MANAGEMENT RULES AND REGULATIONS OF THE CITY AND COUNTY OF HONOLULU

The City and County of Honolulu Department of Land Utilization and City Council review development proposed in the Special Management Area based on the guidelines set forth in Section 4., Ordinance 84-4. The coastal portions of the project, makai of Farrington Highway, are in the Shoreline Management Area. The developer will apply for an SMA permit as necessary.

PART X

AN INDICATION OF WHAT OTHER INTERESTS AND
CONSIDERATIONS OF GOVERNMENT POLICIES ARE THOUGHT
TO OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

The proposed project will serve government economic interests and implement government economic policies. The following Objectives and Policies of the Hawaii State Plan are cited as examples:

Section 6, Economy in General

- (a)(1) Increased and diversified employment opportunities to achieve full employment, increased job income and job choice, and improved living standards for Hawaii's people.
- (b)(8) Encourage labor-intensive activities that are economically satisfying and which offer opportunities for upward mobility.
- (b)(10) Stimulate the development and expansion of economic activities which benefit areas with substantial or expected employment problems.
- (b)(13) Encourage businesses that have favorable financial multiplier effects within Hawaii's economy.

The following Objectives and Policies from the City & County of Honolulu General Plan are cited:

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

Objective A, Policy 2: Encourage the development of small businesses and larger industries which will contribute to the economic and social well-being of Oahu's residents.

The economic benefits of the proposed development outweigh the adverse impacts identified in the EIS.

. PART XI
LIST OF NECESSARY APPROVALS

<u>Approval</u>	<u>Approving Authority</u>	<u>Status</u>
General Plan Amendment	City Council	Application filed
North Shore Development Plan Land Use Amendment/Public Facilities Amendment	City Council	Application filed
Rezoning	City Council	Application to be filed
Special Management Area Permit	City Council	Application to be filed
Grading Permits	Department of Public Works	Application to be filed
Building Permits	Building Department	Application to be filed
Shoreline Certification	State Surveyor	Application to be filed
Subdivision Approval	Department of Land Utilization	Application to be filed
State Land Use Boundary Amendment	State Land Use Commission	Application to be filed
Department of Army Permit	U.S. Army Corps of Engineers	Application to be filed
Section 7 Consultation (Endangered Species)	U.S. Fish and Wildlife Service	Request for consultation to be filed
Federal Consistency (with Coastal Zone Management Act)	State Department of Planning and Economic Development (DPED)	Application to be filed
Conservation District Use Permit	State Department of Land and Natural Resources	Application to be filed
Stream Permit	State Department of Land and Natural Resources	Application to be filed
Approval of Drainage System	State Department of Transportation/ County Department of Public Works (DPW)	Application to be filed
Approval of Wastewater Disposal System	State Department of Health/County Department of Public Works/County Department of Land Utilization	Application to be filed

<u>Approval</u>	<u>Approving Authority</u>	<u>Status</u>
Approval of Potable Water System	State Department of Land and Natural Resources/State Department of Health/County Board of Water Supply	Application to be filed
Historic Sites Review	State Department of Land and Natural Resources	Application to be filed
Permit for Construction within State Highway Rights-of-Way	Department of Transportation/County Department of Transportation Services	Application to be filed
Permit for installation of utility lines within State Highway Rights-of-Way	Department of Transportation	Application to be filed
Electric Connection Approval	Hawaiian Electric (HEI)	Application to be filed
Telephone Connection Approval	Hawaiian Telephone Company	Application to be filed

PART XII

AGENCIES, ORGANIZATIONS AND PERSONS WHO WERE SENT
A COPY OF THE NOTICE OF PREPARATION (NOP)

The EIS Notice of Preparation ("NOP") was officially published in the Office of Environmental Quality Control ("OEQC") Bulletin on June 8, 1986. The following agencies, organizations and persons received a copy of the NOP.

A. Federal Agencies

1. U.S. Army Corps of Engineers
2. U.S. Dept. of Agriculture, Soil Conservation Service
3. U.S. Dept. of Interior, Fish and Wildlife Services
4. U.S. Dept. of Transportation, Federal Aviation Administration

B. State Agencies

1. Dept. of Agriculture
2. Dept. of Education
3. Dept. of Health
4. Dept. of Land and Natural Resources
5. Dept. of Planning and Economic Development
6. Dept. of Social Services and Housing
7. Dept. of Transportation, Highways and Airports Division
8. Representative Joe Leong
9. Senator Gerald Hagino
10. Office of Environmental Quality Control
11. University of Hawaii Environmental Center
12. University of Hawaii Water Resources Research Center

C. City and County Agencies

1. Mayor's Office
2. Department of General Planning
3. Board of Water Supply
4. Dept. of Housing and Community Development
5. Dept. of Land Utilization
6. Dept. of Parks and Recreation
7. Building Department
8. Dept. of Public Works
9. Dept. of Transportation Services
10. Honolulu Police Department
11. Honolulu Fire Department

D. Community Organizations

1. American Lung Association of Hawaii
2. Audubon Society of Hawaii
3. Bishop Estate
4. Castle & Cooke, Inc.
5. Conservation Council for Hawaii
6. Haleiwa Community Association
7. Hawaiian Electric Co.
8. Hawaiian Telephone
9. Kahuku Community Association
10. Kahuku Housing Corporation
11. Kahuku Village Association
12. Koolauloa Community Council
13. Koolauloa Neighborhood Board No. 28
14. Life of the Land
15. Mokuleia Community Association
16. North Shore Career Training Corporation
17. North Shore Neighborhood Board No. 27
18. North Shore News
19. North Shore Realtors Association
20. North Shore Visitors Association
21. Office of Hawaiian Affairs
22. Sierra Club, Hawaii Chapter
23. Sunset Beach Community Association
24. Wahiawa Community and Businessmen's Association
25. Waiialua Community Association
26. Waimea Falls Park
27. Wahiawa Neighborhood Board

Requests for consulted party status came from J. Parnell and the Kahaluu Coalition. Requests for an informational copy of the NOP came from Belt Collins, and one of the consulted parties listed in the NOP requested that the Department of Labor and Industrial Relations, Office of Employment and Training be a consulted party. The four parties were sent copies of the NOP. Verbal requests to be notified when the Draft EIS was available were received from a Mr. Galloway and a Mr. Lam. The applicant will notify both parties of the availability of the Draft EIS.

Publishing and distribution of the NOP generated 27 written responses including the four listed above. The following summary lists the responding agencies, organizations and persons and indicates the date of the applicant's response to the comments. Following the summary sheet are copies of the correspondence received and the correspondence sent by the applicant in response.

<u>Agencies, Organizations and Individuals</u>	<u>Date of Comment</u>	<u>Date Comment Received</u>	<u>Date of Response</u>
A. Federal Agencies			
1. U.S. Army Corps of Engineers	07/01/86	07/07/86	02/17/87
2. U.S. Dept. of Transportation, Federal Aviation Administration	06/20/86	06/23/86	02/17/87
3. U.S. Dept. of Interior, Fish and Wildlife Services	06/25/86	06/26/86	No response required
B. State Agencies			
1. Dept. of Agriculture	07/08/86	07/09/86	02/17/87
2. Dept. of Education	06/27/86	07/07/86	02/17/87
3. Dept. of Health	07/08/86	07/09/86	02/17/87
4. Dept. of Planning and Economic Development	07/08/86	07/09/86	02/17/87
5. Dept. of Transportation, Highways and Airports Division	06/30/86	07/07/86	02/17/87
6. University of Hawaii Water Resources Research Center	07/03/86	07/09/86	02/17/87
C. City and County Agencies			
1. Building Department	06/20/86	06/25/86	02/17/87
2. Honolulu Fire Department	07/09/86	07/11/86	02/17/87
3. Dept. of Housing and Community Development	07/01/86	07/09/86	02/17/87
4. Dept. of Land Utilization	07/11/86	07/15/86	02/17/87
5. Dept. of Parks and Recreation	06/30/86	07/03/86	02/17/87
6. Honolulu Police Department	06/24/86	06/26/86	02/17/87
7. Dept. of Public Works	06/27/86	06/30/86	02/17/87
8. Dept. of Transportation Services	07/02/86	07/09/86	02/17/87
9. Board of Water Supply	07/07/86	07/09/86	02/17/87
D. Community Organizations			
1. Belt, Collins & Associates	06/19/86	06/23/86	No response required
2. Hawaiian Electric Co.	07/08/86	07/10/86	02/17/87
3. Kahaluu Coalition	06/18/86	06/23/86	08/13/86
4. Mokuleia Community Association	06/27/86	06/30/86	02/17/87
5. North Shore Career Training Corporation	06/26/86	06/30/86	02/17/87
6. North Shore Neighborhood Board No. 27	06/27/86	06/30/86	02/17/87
7. J. A. Parnell	06/18/86	06/23/86	08/13/86
8. Sierra Club, Hawaii Chapter	07/10/86	07/11/86	02/17/87
9. Wahiawa Community & Businessmen's Association	07/23/86	07/28/86	02/17/87



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 2M
FT. SHAFTER, HAWAII 96813 - 5440

REPLY TO
ATTENTION OF

July 1, 1986

Mr. Barry R. Okuda
c/o Barry R. Okuda, Inc.
Paahii Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

Thank you for the opportunity to review and comment on the EIS Preparation Notice for the proposed development at Mokuleia, Waialua, Oahu. The following comments are offered:

a. Suggest the applicant contact Operations Branch (telephone: 438-9258) for the Department of the Army permit requirements.

b. The flood hazards have been addressed on page 3 of the report covering the project description-conceptual plan.

Sincerely,


Kinuk Cheung
Chief, Engineering Division

rec'd 7/7

BARRY R. OKUDA, INC.

BARRY R. OKUDA
PRESIDENT

February 17, 1987

Mr. Kinuk Cheung, Chief
Engineering Division
Department of the Army
U.S. Army Engineer District, Honolulu
Building 230
Ft. Shafter, Hawaii 96858-5440

Dear Mr. Cheung:

Subject: Response to Comments on the EIS Preparation Notice for the Proposed Development at Mokuleia, Oahu

Thank you for your comments to the EIS Prep Notice on the Mokuleia Development. We respond as follows:

Comment a.

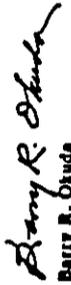
The applicant has contacted the Department of the Army regarding permit requirements.

Comment b.

No response necessary.

Thank you for your comments.

Sincerely,


Barry R. Okuda

BRO:cp
020



U.S. Department
of Transportation
Federal Aviation
Administration

AIRPORTS DISTRICT OFFICE
BOX 50244
HONOLULU, HI 96850-0001
Telephone: (808) 546-7129

June 20, 1966

Mr. Barry R. Okuda
Pouahā Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

We have received the Environmental Impact Statement Preparation Notice transmitted on June 16, 1966, for the proposed development at Mokuiaia, Mafala, Oahu. Our only comment regards the evaluation of noise impacts. The Notice states that the traffic noise along Farrington Highway will be evaluated, but there is no mention of aircraft noise impacts. Due to the proximity of Dillingham Airfield, the impact from aircraft noise should also be assessed since this area is subject to aircraft over flights.

Sincerely,

David J. McIlhousie

David J. McIlhousie
Airport Engineer/Planner

Henry A. Sumida
Airports District Office Manager

BARRY R. OKUDA, INC.

BARRY R. OKUDA
INCORPORATED

February 17, 1967

U.S. Department of Transportation
Federal Aviation Administration
Airports District Office
Box 50244
Honolulu, Hawaii 96850-0001

Attn: Mr. Henry A. Sumida

Subject: Response to Comments on the EIS Preparation Notice for the Proposed
Development at Mokuiaia, Oahu

Gentlemen:

Thank you for your comments on the subject Prep Notice. We respond as follows:

A Project Noise Study has been prepared by Darby and Associates. The Darby study examined the potential of aircraft noise impacts. The information in the Darby study will be summarized and included in the Draft EIS. In addition, the entire study will be appended to the Draft EIS for those wishing to review the noise impacts in more detail.

The Darby study indicates that only Resort sites 6, 7 and 8 (see maps in study) would be subject to noise levels between L_{dn} 55 and L_{dn} 60 from civilian power operations. In addition, Mr. Darby states that buildings on sites 7 and 8 could be designed to shield those on the outside of the buildings on the ocean side from levels above L_{dn} 55. None of the projected noise levels from civilian operations exceed the L_{dn} 60 exterior limit recommended by Darby and Associates.

The Darby study also indicated that Resort sites 6, 7 and 8 and a portion of site 5 may be subject to 65 L_{dn} to 75 L_{dn} noise levels from sporadic military training exercises using helicopters. The sporadic and infrequent nature of these exercises lead the applicant to conclude that they should be considered as temporary short term impacts. Noise levels from these unpredictable operations are no greater than those experienced from sugar harvesting or construction activities and historically of much shorter duration.

JUN 23 1966



United States Department of the Interior

FISH AND WILDLIFE SERVICE
190 ALA MOANA BOULEVARD
P O BOX 50181
HONOLULU, HAWAII 96810

ES
Room 6307

JUN 7 1986

Mr. Henry A. Sumida
February 17, 1987
Page 2

Agela, thank you for your comments.

Sincerely,

Barry R. Okuda

Barry R. Okuda

BRD:cp
030

Enclosure

Mr. Barry R. Okuda
c/o Barry R. Okuda, Inc.
Pauahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Re: Environmental Impact Statement Preparation Notice, Proposed
Development at Mokuieia, Wainalua, Oahu

Dear Mr. Okuda:

The Service has completed its review of the subject Notice of
Intent and has no comments to offer at this time. Please provide
us with a review copy of the Draft Environmental Impact
Statement.

We appreciate this opportunity to comment.

Sincerely yours,

Ernest Kosaka
Ernest Kosaka
Project Leader
Office of Environmental Services

cc: NMFS - MPPO
BLNR
EPA, San Francisco

No Response Required



Save Energy and You Serve America!

Rec. 6/26/86

GEORGE B. ARYONOH
GOVERNOR



JACK E. BUNA
CHAIRPERSON, BOARD OF AGRICULTURE

SUZANNE D. PETERSON
DEPUTY TO THE CHAIRPERSON

State of Hawaii
DEPARTMENT OF AGRICULTURE
1420 So. King Street
Honolulu, Hawaii 96813
July 8, 1986

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

Mr. Barry R. Okuda
c/o Barry R. Okuda, Inc.
Paushi Tower, Suite 1900
1601 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

Subject: Environmental Impact Statement Preparation Notice
(EISPW) for Mokuleia Development, Waialua, Oahu
TRM: 6-8-03: 1, 6, 10, 14
6-8-03: 5, 6, 11, 15, 16, 17, 19, 20, 30,
31, 33, 34, 35, 38, 39 and 40
6-8-08: 22
Acres: 2887.2

The Department of Agriculture has reviewed the subject
EISPW and offers the following comments.

According to the EISPW, the Mokuleia Development
Corporation is proposing a multi-purpose resort comprised of
commercial, residential, and recreational developments utilizing
1,019 acres of the 2,887.2 acre total project site. The
proposed development is situated on five sites identified as
Parcels "A", "B", "C", "D", and "E". The latter four parcels are
situated makai of Farrington Highway. According to our
information, Parcel "A" has been used for grazing and is
bordered to the east and west by sugarcane fields.

The EISPW mentions some of the Soil Conservation Service
(SCS) Soil Service soil series found on the five parcels. A
full description of all the applicable SCS soil types should be
included in the Draft EIS along with similar references to the
Land Study Bureau Detailed Land Classification for Oahu (1972)
and the Agricultural Lands of Importance to the State of Hawaii
(ALISH) system (1972). The following classification system
should also be considered in the Draft EIS.

Mr. Barry R. Okuda
July 8, 1986
Page -2-

LAND EVALUATION AND SITE ASSESSMENT SYSTEM

The Hawaii State Constitution requires the State to provide standards and criteria to conserve and protect agricultural lands, promote diversified agriculture, increase agricultural self-sufficiency and assure the availability of agriculturally suitable lands. The Constitution also provides for the identification of "important agricultural lands". Once identified, these lands may be reclassified or rezoned only after meeting the criteria established by the State Legislature and approved by two-thirds vote of the body responsible for the reclassification or rezoning action.

The Land Evaluation and Site Assessment (LESA) Commission was assigned the task of identifying and recommending, for adoption by the Legislature, a system to identify important agricultural lands (IAL). The recommendations of the Commission, if approved by the Legislature, would carry out the Constitutional mandate to protect important agricultural lands.

From the illustrative maps (1:24,000 scale) which apply the IAL methodology as part of the work of the LESA Commission, nearly all of the area identified as Parcel A(1) (approximately 890 acres) is within the illustrative "Important Agricultural Land" (IAL) boundary as defined by the LESA Commission ("A Report on the State of Hawaii Land Evaluation and Site Assessment System", February 1986). The IAL are lands capable of producing high agricultural yields, lands which produce commodities for export and local consumption, lands not currently in production but needed to attain desired projected levels of agricultural activities and income, and lands designated by public policies as important agricultural lands resulting from some unique quality, setting or use.

The Parcel A(1) site has Land Evaluation (LE) ratings of 71, 77, 79, 81, 86 and 94 on a scale of 12 to 96 (Land Evaluation Data with Weighted LE Rating - Oahu) Exhibit A; LESA Commission Report). Briefly, the LE ratings represent the physical characteristics of the soil resources of Hawaii. The LE ratings are a composite of the Soil Conservation Service Soil Survey, Land Study Bureau Detailed Land Classification, and the Agricultural Lands of Importance to the State of Hawaii system. Site Assessment (SA) factors or criteria which express the relative quality of a site or area based upon its non-physical characteristics, further indicate the agricultural viability of a parcel, site or area.

Mr. Barry R. Okuda
July 8, 1986
Page -3-

Although the LESA Commission Report and corresponding legislative bill were not acted upon by the Legislature this past session, the Department of Agriculture believes that the definition and identification of "Important Agricultural Land" by the methodology proposed by the LESA Commission provides the most comprehensive and rational indication of the relative importance of agricultural lands in the State.

OTHER ISSUES

- The Draft EIS should include discussion on the following issues:
- the effect of the proposed development on the ongoing cultivation of sugarcane in fields adjacent to the portion of the project on the mauka side of Farrington Highway;
 - Chapter 165 of the Hawaii Revised Statutes, which limits the circumstances under which existing farming operations may be deemed a nuisance;
 - the broader economic and resource impact on the State from the irrevocable loss of approximately 890 acres of prime agricultural lands;
 - a description of the existing agricultural use on the subject parcels and the potential of establishing viable alternative agricultural uses on the project site;
 - the impact on agriculture in the surrounding area resulting from the withdrawal from the Maialua Groundwater Control Area of 2.1 million gallons per day of potable water and an unstated amount of lesser quality irrigation water for the golf courses;
 - the relationship of the proposed development to existing and other urban developments in the North Shore Development Plan area;
 - how the proposed project conforms to the State Agriculture Functional Plan and its objectives and policies, particularly, Implementing Action B(5)(c);

Mr. Barry R. Okuda
July 8, 1986
Page -4-

We will provide further comment upon our receipt and review of the Draft EIS.

Sincerely,

Jack K. Suwa
JACK K. SUWA
Chairman, Board of Agriculture

cc: DPED
DLJ
DGP
OEOC

rec'd 7/9

BARRY R. OKUDA, INC.

February 17, 1987

Ms. Susan Peterson, Chair
Board of Agriculture
Department of Agriculture
P.O. Box 22159
Honolulu, Hawaii 96822-0159

Re: Response to Comments on the EIS Preparation Notice for
the Proposed Development at Mokuiaia, Oahu

Dear Ms. Peterson:

Thank you for your comments of July 9, 1986 on the subject Prep Notice. We respond as follows:

A summary of the Agricultural Impact Study prepared for the project by Decision Analysts Hawaii, Inc. will be included in the Draft EIS; in addition, the complete study will be included as an appendix to the EIS.

Comment 1 (Page 1, Paragraph 1)

Parcel A has been used for grazing by the applicant. The cattle operations have been unprofitable for a number of years.

Comment 2 (Page 1, Paragraph 2)

Information about the soil classifications under Soil Conservation Service Land Study Bureau and ALLSM will be included in the EIS.

Comment 3, LESA

As discussed in your comment, LESA has not been enacted as of this date. However, the applicant will discuss the LESA concept in the EIS.

Page 3, Other Issues

1. Impact on Existing Sugar Cultivation Adjacent to the Proposed Site

Wai'alea Sugar Company cultivates sugar on either side of Parcel A. It is anticipated that appropriate buffering of developments adjoining the cane fields will be in the plan. We are working closely with the

Ms. Susan Peterson, Chair
February 17, 1987
Page 2

management of the sugar company. Wai'alea Sugar operates numerous cane fields which border existing residential development in Wai'alea, Mokuiaia and other North Shore areas. The existence of a mixture of land uses on the North Shore has in the past shown an ability of agriculture and other uses to coexist. In addition continued increases in yields due to improved farming techniques and improved technology will allow Wai'alea Sugar to abandon higher cost fields without reduction in production.

2. Chapter 165, Right to Farm

The applicant is aware of the Right to Farm Act and is willing to proceed with the project. The applicant believes that setbacks, landscaping and the low density nature of the proposed development will make it possible for its coexistence with current agricultural operations.

3. Impact on State Agriculture

The Agricultural Impact Report prepared by Decision Analysts Hawaii, Inc. examines this issue and concludes that there will be no impact.

4. Existing Agricultural Use and Alternative Crops

Portions of the site proposed for development are used for grazing as well as equestrian activities. Development would preclude the use of the lands for grazing. Some equestrian activities may continue within the area proposed for development. Grazing activities conducted on the site have been unprofitable for a number of years. The Decision Analysts Study also addresses the potential for alternative crops/uses. The study concludes that while alternative agricultural uses may be possible on the sites proposed for development, there exists today a large inventory of equally suitable or better agricultural land which is fallow which could accommodate any foreseeable need for the growth of diversified agriculture.

5. Impact of Proposed Water Use on Surrounding Agricultural Uses

The EIS discusses the abundance of water available in the Mokuiaia aquifer. According to DJM information, usage in Mokuiaia is less than 40% of sustainable yield, including both domestic and irrigation needs. Moreover, the Board of Water Supply is proposing the increased source development in the area with the potential for exporting that water to Wai'alea. It appears that there will be adequate water supply for the existing and proposed uses in the area.



STATE OF HAWAII
DEPARTMENT OF EDUCATION

P. O. BOX 2209
HONOLULU, HAWAII 96813

JUNE 27, 1986

OFFICE OF THE SUPERINTENDENT

Mr. Susan Peterson, Chair
February 17, 1987
Page 3

6. The Compatibility of the Proposed Development with Other North Shore Urban Developments

The applicant is proposing General Plan and Development Plan Amendments. The approval process will weigh the proposed development's compatibility with existing and other planned developments. The Draft EIS will discuss the numerous steps the applicant has taken to ensure the compatibility of the project with the North Shore area, including proposed densities, height limits, landscaping and other visual items. In addition the applicant has established communications with area residents to ensure input from the local populace.

7. Compliance with Agricultural Functional Plan, Implementing Action B(5)(c)

Implementing Action B(5)(c) essentially requires that there be an overriding public interest to justify the changing of agricultural land to other uses. The EIS provides a format for weighing the positive and negative aspects of the proposed development. This information can then be used by the approving authorities, including the State Land Use Commission and the City Council, in determining if this test has been met. It is the applicant's opinion that the benefits of the proposed action strongly outweigh its adverse impacts, including the reduction of agriculture designated acreage.

Thank you for your comments. We look forward to your Department's comments on the Draft EIS.

Sincerely,

Barry R. Okuda
Barry R. Okuda

BR01avp

Mr. Barry R. Okuda
c/o Barry R. Okuda, Inc.
Pauahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

SUBJECT: EIS Preparation Notice for Mokuleia Project

Our review of the proposed residential unit that allows 700 single family units and 1,200 condominium units indicates that it may generate the following additional enrollment in our schools:

SCHOOL	GRADES	APPROXIMATE ENROLLMENT
Maialua Elementary	K-6	50 - 100
Maialua High/Inter.	7-12	40 - 80

The elementary and secondary schools are currently operating at capacity; therefore, additional classrooms may be required to accommodate the needs at both schools.

We would appreciate being informed of the progress of the development on a timely basis in order that adequate classroom space is assured at the affected schools.

Should you have any questions, please contact Mr. Minoru Inouye at 737-4743.

Sincerely,

Francis M. Hatanaka
Francis M. Hatanaka
Superintendent

FMI:jl

cc OBS
G. Kawada, Central Dist.

REC'D 7/7

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY STATEMENT



STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 5090
HONOLULU, HAWAII 96813

BARRY R. OKUDA, INC.

February 17, 1987

Mr. Francis M. Matanaka
Superintendent
Department of Education
P. O. Box 2360
Honolulu, Hawaii 96804

Re: Response to Comments on the EIS Preparation Notice for
the Proposed Development at Mokuiaia, Oahu

Dear Mr. Matanaka:

Thank you for your comments of June 27, 1986. We respond as follows:
A discussion of the project's impact on educational facilities will be
included in the Draft EIS.

It is the applicant's intention to continue communications with the
Department of Education in order to ensure that adequate classroom
space and staffing levels will be planned at the affected schools.

Again, thank you for your comments.

Sincerely,

Barry R. Okuda
Barry R. Okuda

BM01evp

Mr. Barry R. Okuda
c/o Barry R. Okuda, Inc.
Pauahi Tower, Suite 1900
1001 Bishop St.
Honolulu, Hawaii 96813

July 8, 1986

Dear Mr. Okuda:

Subject: Environmental Impact Statement Preparation Notice for Proposed
Development at Mokuiaia, Waialua, Oahu

Thank you for allowing us to review and comment on the proposed EIS preparation
notice. We provide the following comments:

Drinking Water

The Preparation Notice for this development states that the applicant will design
and construct a water system to support this project, a 4,000 unit resort at Mokuiaia. The
developer plans to dedicate the water system to the Board of Water Supply to operate and
maintain. A separate irrigation system will also be developed for the golf course.

The Department of Health is vested with the responsibility to ensure that public
water systems in the State are providing water which is in compliance with the State's
drinking water regulations known as Chapter 20, Title 11, Administrative Rules, and are in
compliance with all other applicable terms and conditions of Chapter 20. A public water
system is defined as a system serving 25 or more individuals at least 60 days per year or
having a minimum of 15 service connections. If a new water source is developed to supply
this project, please be advised that this source and distribution system will be subject to
the terms of Section 11-20-29 and Section 11-20-30 of Chapter 20 respectively.

Briefly, Section 11-20-29 of Chapter 20 requires all new sources of potable water
serving public water systems to be approved by the Director of Health prior to their use
to serve potable water. Such approval is based primarily upon the satisfactory submission
of an engineering report which adequately addresses all concerns as set down in Section
11-20-29. The engineering report must be prepared by a registered professional engineer
and bear his or her seal upon submittal.

In 1981, Mokuiaia Homesteads submitted draft engineering reports for source
approval of three groundwater wells in Mokuiaia. These wells and the proposed water
system were intended to support an agricultural subdivision. Our records indicate that the
approval process was incomplete and the three wells did not receive Section 29 approval.
If these three wells are intended to support the proposed resort project, Section 29
approval must be completed. The project engineer should contact the Drinking Water
Program concerning Section 29 requirements.

Mr. Barry R. Okuda
July 8, 1986
Page 2

Section 11-20-30 requires that new or substantially modified distribution systems for public water systems be approved by the Director of Health. Approval authority for Section 30 has been given to the Board of Water Supply for water distribution systems under their jurisdiction.

Should you have any questions regarding Chapter 20, Title 11, Administrative Rules, please contact the Drinking Water Program at 548-2235.

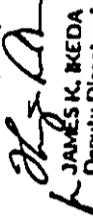
Noise

1. Concerns regarding the proposed development are directed toward probable noise impacts due to the integration of various land use designations.
 - a. Noise from activities associated with the use of recreational areas can have adverse effects, in terms of annoyance, on adjacent residents. The proposed concept of siting residential units adjacent to golf course areas may result in noise disturbances from activities including ground maintenance and club activities.
 - b. Noise from activities associated with commercial and resort facilities can have an adverse effect on the residential communities within the development. Increases in vehicular traffic, including heavy vehicles utilized for deliveries and services, buses travelling to and from the resort areas and vehicles within off-street parking areas, may also result in negative noise impacts.
 - c. Noise from stationary equipment, such as air conditioning/ventilation units, exhaust fans, pumps and generators, specifically designed for hotel/condominium units and commercial facilities, must be attenuated to meet the allowable noise levels specified in Title 11, Administrative Rules Chapter 43, Community Noise Control for Oahu.
2. Additional concerns are directed to possible external noise impacts on the proposed development.
 - a. Noise from aircraft and associated activities at Dillingham Airfield may have an adverse effect on the proposed development, especially residential areas. It should be noted that EPA has established, as a guideline, a Ldn of 55 dB for residential areas.
 - b. Areas east and west of the proposed location are presently utilized for agricultural purposes. Noise associated with these activities can have a negative impact on residential areas. Additional disturbances may occur from heavy vehicles utilized to transport agricultural products while travelling through or near the development.
3. Plans must be included for implementation of mitigative measures to minimize noise from those concerns cited above.

Mr. Barry R. Okuda
July 8, 1986
Page 3

4. 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 regulations.
 - b. Construction equipment and on-site vehicles requiring an exhaust of gas or air must be equipped with mufflers.
 - c. The contractor must comply with the conditional use of the permit as specified in the regulations and conditions issued with the permit.
5. Traffic noise from heavy vehicles travelling to and from the construction site must be minimized in existing residential areas and must comply with the provisions of Title 11, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.

Sincerely yours,


JAMES K. KEDA
Deputy Director for
Environmental Health

cc: C&C Department of General Planning

Rec 7-10-86

BARRY R. OKUDA, INC.

Mr. James K. Ikeda
February 17, 1987
Page 2

February 17, 1987

Mr. James K. Ikeda
Environmental Health
Department of Health
P. O. Box 3378
Honolulu, Hawaii 96813

Re: Response to Comments on the EIS Preparation Notice for the
Proposed Development at Mokuiaia, Oahu

Dear Mr. Ikeda:

Thank you for your comments of July 9, 1986 on the subject Prep Notice. We
respond as follows:

Drinking Water

The applicant is proposing to construct and dedicate a new water system to
the Board of Water Supply to serve the proposed development. The system
will be designed to comply with all laws and regulations, including Chapter
20, Title 11, Administrative Rules, and all other applicable laws and con-
ditions of Chapter 20. If a new water source is developed to serve the
project, then Sections 11-20-29 and 11-20-30 of Chapter 20 will be met.
Engineers, Surveyors of Hawaii has been retained on the water and engineer-
ing consultant for the project. Compliance with the above-mentioned regu-
lations and other approval requirements of the new system will be met in a
timely manner.

Noise

1. Noise from Mixture of Land Uses

a. Recreational noise

The potential for recreational noise will be addressed in the EIS.

b. Resort and commercial uses

The potential for noise from resort and commercial uses to impact on
residential uses will be discussed in the EIS.

c. Noise from stationary equipment

Noise from these sources will be within limits imposed by Title 11,
Administrative Rules Chapter 43, Community Noise Control for Oahu.

2. External Noise

a. Aircraft noise

These noise impacts will be discussed at length in the Draft EIS.

b. Agriculture noise

The potential noise impact of agricultural operations are addressed
in the Draft EIS.

3. Mitigative Measures

Comment 4, Community Noise Control for Oahu

a. Contractors will obtain a noise permit if construction noise exceeds
allowable levels.

b. Construction vehicles and on-site vehicles requiring an exhaust of
gas or air must be equipped with mufflers.

c. The contractors must comply with conditional uses specified in the
permit.

4. Vehicular Noise Control for Oahu

Contractors must comply with Title 11, Administrative Rules Chapter 42.

In addition to the comments discussed in your letter, the noise study dis-
cusses the impact of traffic noise from Farrington Highway on proposed
resort and residential properties. In addition this project's noise devel-
opment is subject to noise impacts from a case haul road used when the sugar
fields west of the proposed development are harvested. These impacts and
mitigating measures are discussed in the noise study by Darby & Associates
and in the Draft EIS.

Thank you for your comments.

Sincerely,

Barry R. Okuda
Barry R. Okuda

BM0:awp



DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

STATE OF HAWAII, DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

1001 BISHOP STREET, SUITE 1900, HONOLULU, HAWAII 96813

GEORGE B. ANTONIO
DIRECTOR
KIM M. BROWN
DEPUTY DIRECTOR
MARK A. BROWN
DEPUTY DIRECTOR
LINDA K. BROWN
DEPUTY DIRECTOR

DAVID A. ANDERSON
DEPUTY DIRECTOR
JAMES H. ANDERSON
DEPUTY DIRECTOR

Ref. No. P-4584

July 9, 1986

Mr. Barry R. Okuda
c/o Barry R. Okuda, Inc.
Puuahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

Subject: EIS Preparation Notice for Proposed Development at
Mokuiaia, Oahu

We have reviewed the subject EIS preparation notice and recommend that the EIS include the following items:

1. A discussion of the relationship of the proposed development to the County General Plan and Development Plan. The 1985-86 annual review of the North Shore Development Plan indicates that, based on the projected population on the North Shore by the year 2005, only modest development proposals could be accommodated. The review also indicates the desire of the community for preservation of agriculture and the provision of open space amenities. Increasing urban uses are appropriate if they are in compliance with population distribution policies and achieve other General Plan policies, such as providing for affordable housing.
2. A discussion on the availability of water. In 1981 the Board of Land and Natural Resources designated the Mokuiaia portion of the Mokuiaia-Kahuku water use district as a ground water control area. The Board of Water Supply has also classified the Mokuiaia-Mokuiaia Water System, as a "limited additional" water supply area.
3. A discussion of the need for the proposed resort development on Oahu, relative to the projected future tourism growth, need for additional hotel/resort condominium units, and the existing and proposed supply of units.
4. A discussion of the employment created by the proposed development and the adequacy of support facilities such as employee housing in the area.
5. An identification of the various permit approvals that will be required for the development.

Mr. Barry R. Okuda
Page 2
July 9, 1986

6. The proposed timeframe for the development of the project with a breakdown by phases, if appropriate.
7. A discussion of how the proposed development meets appropriate objectives, policies and priority directions of the Hawaii State Plan, and the policies and implementing actions of applicable State Functional Plans.
8. A discussion of impacts on recreational resources in the area. The EIS should describe existing recreational activities in the area and any potential conflicts or curtailment of present uses. Plans for the provision of public shoreline accessways and related facilities should also be discussed, including their number and locations along the shoreline.
9. A discussion of coastal hazards. The EIS should also address the impacts relating to erosion along beaches in the area and any planned setback of structures from the shoreline. Lastly, the EIS should describe the impacts of development on scenic and open spaces in the surrounding areas, including the effects on public views to and along the shoreline.

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

Very truly yours,

Kent M. Keith
Kent M. Keith

cc: Office of Environmental Quality Control rec'd 7/9

BARRY R. OKUDA, INC.

BARRETT & OKUDA
INCORPORATED

February 17, 1987

Mr. Roger A. Ulveling, Director
Department of Planning & Economic
Development
250 South King Street
Honolulu, Hawaii 96804

Dear Mr. Ulveling:

Subject: Response to Comments on the EIS Preparation Notice for the Proposed Development at Mokuia, Oahu

Thank you for your comments of July 8, 1986, on the subject Prep Notice. We respond as follows:

1. Compliance with General Plan and Community Desires

Compliance with General Plan: The Draft EIS will describe in detail how the proposed development complies with various State and County plans including the General Plan of the City and County of Honolulu.

Consideration of Community Desires: As part of the planning process, the applicant commissioned a social impact study in order to better understand community concerns. In addition, the applicant has implemented a comprehensive communication program with groups and organizations as well as individuals in the North Shore area in order to include community concerns in the planning process. The communications program is ongoing and input into the planning process is continuing. The development program being proposed was evolved with community concerns in mind.

2. Water Supply

The Mokuia area is a subzone of the Waihua-Kahuku ground water control area. The Mokuia Aquifer has had a surplus of water while the other areas of the Waihua Water Control Area were estimated to be in use nearer to their maximum safe sustained yields. Surpluses in the Mokuia Aquifer have for years been discharged into the ocean at the edges of the land. Any withdrawal from the Mokuia Aquifer in excess of the property's existing "preserved use" will require DLNR approval which is the monitoring authority for Control Areas.

Mr. Roger A. Ulveling
February 17, 1987
Page 2

The Board of Water Supply's classification of the Waihua-Kahuku Water System as a limited additional water supply area is related to the area's existing system. The applicant will develop a new water system to serve the project and dedicate it to the Board of Water Supply. The area's ability to produce more water is recognized by the Board of Water Supply. In February of 1986, the Board prepared an Environmental Assessment for public comment on its proposal to develop additional water sources in the North Shore and to develop distribution capabilities that would allow the Board to export this excess water to the Waianae Coast.

There should be no shortage for this project and adequate controls on water in the area will assure that the project will not adversely impact on the area's water resources.

3. Need for Additional Resort Facilities

The applicant commissioned a market study for the proposed development. The study by John Child and Company is summarized in the Draft EIS and the entire study is appended to the Draft EIS.

4. Employment Impacts and Adequacy of Support Facilities

The EIS contains the results of an Economic Impact Study done by John Child and Company and a Social Impact Study prepared by Community Resources, Inc. These studies analyze in detail the economic impacts including employment created and the adequacy of support facilities.

5. Identification of Permits

The EIS contains a listing of necessary permits for the project.

6. Development Timetable

The market analysis for the project indicates project completion in 2005. Thus the project including the approval process is envisioned to require approximately 20 years to complete. A more detailed analysis of the absorption rates for various types of product is contained in the market analysis.

7. Compliance with Hawaii State Plan

See response to Comment # 1.

8. Recreational Resources and Shoreline Access

Recreational activities and facilities are a major focus of the proposed Mokuia Development. Recreational resources are discussed extensively in the Draft EIS. The location and number of beach and mountain accesses and related parking facilities are to be worked out with the appropriate State (DLNR) and County (Department of Parks) agencies with community input. The applicant will be

Mr. Roger A. Uivelling
February 17, 1987
Page 3

working closely with the government agencies and the public to assure that the best possible alternatives are considered. Existing recreational uses such as polo will be addressed in overall planning of the project.

9. Coastal Hazards

The applicant commissioned reports on the impacts of tsunamis and hurricanes. Information on potential beach erosion and rising sea levels has been given to engineering and architectural consultants for recommendations of appropriate setbacks and other mitigative measures. These impacts as well as the scenic and visual impacts of the project are discussed in the Draft EIS.

Thank you for your comments.

Sincerely,

Barry R. Okuda

Barry R. Okuda

BR0:cp
032

GEORGE R. ANTONIO
DIRECTOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
155 KALANIANA'OHU AVENUE
HONOLULU, HAWAII 96813

June 30, 1986

WAYNE J. TAMASAKI
DIRECTOR

DIVISION OF TRANSPORTATION
JONATHAN K. SHIMADA, P.E.
WALTER M. HO
CHERYL D. BOON
ADAM D. WICKERT

HONOLULU, HAWAII
STP 8.1422

Mr. Barry R. Okuda
c/o Barry R. Okuda, Inc.
Pauahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

EIS Preparation Notice
Proposed Development at Mokuieia, Oahu

The traffic impact analysis report and noise study should be submitted to our department for review.

For your information, all work required within the State Highway Right-of-way must be reviewed and approved by our Highways Division. Further, commitment of providing highway improvements by the developer should not be limited to their property abutting Farrington Highway. Any additional improvements elsewhere, required as a direct result of the proposal's impact, should also require a similar commitment by the developer.

We appreciate this opportunity to provide comments.

Very truly yours,

Wayne J. Tamasaki
Wayne J. Tamasaki
Director of Transportation

Rec'd 7/7

BARRY R. OKUDA, INC.

BARRY R. OKUDA
HONOLULU

February 17, 1987

Mr. Wayne Yamashita, Director
Department of Transportation
869 Puachobeni Street
Honolulu, Hawaii 96813

Dear Mr. Yamashita:

Subject: Response to Comments on the EIS Preparation Notice for the Proposed Development at Mokuleia, Oahu

Thank you for your comments of June 30, 1986, on the subject Prep Notice. We respond as follows:

A Traffic Analysis by Parsons Brinkerhoff, Quede and Douglas and the Noise Study by Darby and Associates have been prepared. These studies will be summarized in the Draft EIS and the complete studies appended to the EIS.

The applicant has noted and will comply with your comments regarding a permit being required for work to be done within the State Highway right-of-way. Highway improvements such as those suggested in the traffic report will be coordinated with you and your staff.

Thank you for your comments.

Sincerely,

Barry R. Okuda

Barry R. Okuda

BRO:cp
018

University of Hawaii at Manoa



Water Resources Research Center
Holmes Hall 233 • 2540 Dole Street
Honolulu, Hawaii 96822

3 July 1986

Mr. Barry R. Okuda
c/o Barry R. Okuda, Inc.
Pa'uahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

SUBJECT: Environmental Impact Statement Preparation Notice for the Proposed Development at Mokuleia, Oahu, Hawaii, Mokuleia Development Corporation, June 1986

We have reviewed the subject EISPN and offer the following comments:

1. If the development builds its own sewage treatment plant, serious consideration should be given to using the treated effluent for golf course irrigation.
2. Contrary to the statement on page 5, the Keena Series are not well suited for development. They have a high shrink-swell ratio which is not conducive to good bearing characteristics. In addition, on slopes the soil will tend to creep particularly when the profile has been cut for whatever reason, be it for street or lot grading. The upslope side will begin to creep downslope, probably because the compression has been released by the cut, and retaining walls generally cannot withstand the pressure.

Thank you for the opportunity to comment. This material was reviewed by WRRC personnel.

Sincerely,

Edwin T. Murabayashi
Edwin T. Murabayashi
EIS Coordinator

ETM:jm

rec'd 7/19

BARRY R. OKUDA, INC.

BARRY R. OKUDA
PRESIDENT

February 17, 1987

Mr. Edwin T. Murabayashi, EIS Coordinator
University of Hawaii at Manoa
Water Resources Research Center
Holmes Hall 283
2540 Dole Street
Honolulu, Hawaii 96822

Dear Mr. Murabayashi:

Subject: Response to Comments on the EIS Preparation Notice for the Proposed
Development at Motulele, Oahu

Thank you for your comments of July 3, 1986, regarding the subject Prep Notice. We
respond as follows:

1. Re-use of Sewage Effluent for Golf Course Irrigation

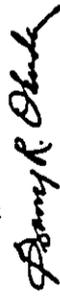
The applicant notes your comment urging the use of treated sewage effluent for
golf course irrigation. Currently the alternatives being studied for the sewerage
system do not include the re-use of effluent; however, your suggestions will be
given due consideration.

2. Soil Salinability

The applicant has retained Engineers and Surveyors Hawaii, Inc. to make
recommendations regarding soil types and engineering requirements. Preliminary
recommendations will be included in the Draft EIS.

Thank you for your comments.

Sincerely,



Barry R. Okuda

BRO-CP
031

BUILDING DEPARTMENT
CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
600 BISHOP STREET
HONOLULU, HAWAII 96813



HERBERT K. MURAKA
DIRECTOR AND BUILDING SUPERINTENDENT

PB 86-491

BARRY R. OKUDA, INC.

BARRY R. OKUDA
PRESIDENT

February 17, 1987

Mr. Herbert K. Muraka, Director
Building Department
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Muraka:

Subject: Response to Comments on the EIS Preparation Notice for the Proposed Development at Mokuieia, Oahu

Thank you for your comments of June 20, 1986, on the subject Prep Notice. We respond as follows:

The applicant will be working with the State Department of Land and Natural Resources to try to provide access to the mountains. At the present time the existing access road has experienced some stability problems. The applicant will work with the State on an acceptable access. The access may be dependent on the development plans finally approved by government agencies.

Thank you for your comments.

Sincerely,

Barry R. Okuda
Barry R. Okuda

BRO:cp
017
30

June 20, 1986

Mr. Barry R. Okuda
c/o Barry R. Okuda, Inc.
Paushi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

Subject: EIS Preparation Notice Proposed Development at Mokuieia

Thank you for the opportunity to review and comment on the EIS Preparation Notice for the proposed Development at Mokuieia.

We are concerned that the proposed development will affect the existing access road to the State's Mokuieia Radio site where the City's radio equipment are located. We request that an adequate access road to the radio site be provided and the road easement be granted to the State.

Very truly yours,

Herbert K. Muraka
HERBERT K. MURAKA

Director and Building Superintendent

cc: J. Harada

JUN 25 1986

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1435 BEECHER STREET ROOM 200
HONOLULU HAWAII 96813



FRANK P. PASH
CHIEF

FRANK K. KAIHOBANGIANG
FIRE CHIEF

LEONARD S. CARRARA
PROPERTY CLERK

July 9, 1986

Mr. Barry R. Okuda, President

-2-

July 9, 1986

Should you have any questions, please contact Battalion Chief Kenneth Word at 943-3838.

Very truly yours,

Frank K. Kaihobangiango
FRANK K. KAIHOBANGIANG
Fire Chief

FKK:KMI:lm

Rec 7-11-86

Mr. Barry R. Okuda, President
Barry R. Okuda, Inc.
Pauahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

**SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPM)
FOR PROPOSED DEVELOPMENT AT MOKULEIA, OAHU, HAWAII**

Thank you for the opportunity to review and comment on the subject EISPM. Current fire protection is provided as follows:

Station/Company	Distance	Response Time	Personnel
Mataloa, Engine 14	7.3 miles	10 minutes	5
Mahihahaione, Engine 16	11.0 miles	17 minutes	5
Malapuu, Ladder 12	21.0 miles	40 minutes	6

Two engines and one ladder is the standard dispatch for all reported structure fires outside the Maiki and metropolitan Honolulu area. Existing fire protection is considered inadequate for the proposed project in regards to distance and response time. Current Insurance Services Office (ISO) guidelines recommend a standard response distance of not more than four miles for engine and ladder companies (a ladder company may not be required where there are less than five buildings of three or more stories). A response time of three to five minutes is acceptable.

As indicated, the current level of service is inadequate and we request a minimum of 25,000 square feet be set aside for a jointly funded (public-private) fire station, housing a minimum of one engine and 15 personnel.

DEPARTA OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

505 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 533-8111



BARRY R. OKUDA, INC.

BARRY R. OKUDA
INCORPORATED

February 17, 1987

Mr. Frank K. Kahoohanohano, Chief
Honolulu Fire Department
1455 S. Beretania Street, Room 305
Honolulu, Hawaii 96814

Dear Chief Kahoohanohano:

Subject: Response to Comments on the EIS Preparation Notice for the Proposed Development at Mokuleia, Oahu

Thank you for your comments of July 9, 1986, re the subject Prep Notice. We respond as follows:

The information provided in your letter has been incorporated into the Draft EIS. Your requirement of a fire station in the project is noted by the applicant. As processing for approvals progresses, there will be a need for more detailed discussion by the applicant with you and your staff to assure adequate fire protection for the proposed development.

We thank you for your comments.

Sincerely,

Barry R. Okuda

Barry R. Okuda

BR0:icp
019

July 1, 1986

Mr. Barry R. Okuda
c/o Barry R. Okuda, Inc.
Paiahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

Subject: Environmental Impact Statement - Preparation Notice
Project: Proposed Mokuleia Development
Area: 1,019 Acres
Fee Ownership: Northwestern Mutual Life Insurance Company
Proposal: Resort 313 Acres
Residential 331 Acres
Condo Units - 1,200
Single Family Units - 700 1,900
Golf Course 342 Acres
Commercial 33 Acres
1,019 Acres

We appreciate the opportunity to comment on the preparation notice for the proposed Mokuleia development.

The proposed development of residential units in the agricultural district of the State Land Use District Map has been reviewed by the Department of Housing and Community Development. The Department is mandated to provide housing units for the low- and moderate-income families on Oahu. We note that a Development Plan and zoning change are needed, and in accordance with the current Departmental policy, we wish to request that at least 10 percent of all residential developments to be set aside for these groups. This request applies to all zone changes, cluster and planned development-housing applications. Establishing such a requirement is a reasonable means of recapturing the economic benefit conferred by favorable land use allocations and distributing that benefit for the general public benefit. We are

Mr. Barry R. Okuda
July 1, 1986
Page 2

currently reviewing our policy relating to the 10 percent set aside and will inform you of any specific policy adjustments adopted.

We request that Motuleia Development Company specify the location of the units, as well as the type of unit (1-bedroom, 2-bedroom, etc.) to be provided for the low- and moderate-income families.

If you have any questions, please contact Mr. James Miyagi of our Housing Division at 523-4264, who will assist the developer in formulating a program to provide these units.

Sincerely,

WILLIAM K. N. PANG

REC'd 7/19

BARRY R. OKUDA, INC.

BARRY R. OKUDA
PRESIDENT

February 17, 1987

Mr. Mike Moon, Director
Department of Housing and Community
Development
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Moon:

Subject: Response to Comments on the EIS Preparation Notice for the Proposed
Development at Motuleia, Oahu

Thank you for your comments of July 1, 1986, re the subject Prep Notice. We respond as follows:

The applicant recognizes the need to provide an appropriate amount of housing for the low and moderate income market. At the present time, no specific provision has been made in the plan for such units; however, the applicant proposes to work with your department to develop a plan to meet the needs of the community and to be compatible with the development concept being proposed.

Thank you for your comments.

Sincerely,



Barry R. Okuda

BRO:cp
026

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
430 SOUTH KING STREET
HONOLULU, HAWAII 96813

Mr. Barry R. Okuda
Page 2



FRANK P. EAS
DIRECTOR

JOHN P. WHALEN
DIRECTOR

(RF)

July 11, 1986

Mr. Barry R. Okuda
Barry R. Okuda, Inc.
Pauahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

Environmental Impact Statement (EIS) Preparation Notice
Mokuleia Development Company Resort Proposal
Tax Map Keys 6-8-02, -03, -08; Various

Having reviewed the EIS Preparation Notice, we offer the following comments:

1. The project includes four non-contiguous parcels along the shoreline. What effect would development of these sites have on adjoining land uses?
2. The market study to be included in the EIS should justify the need for additional resort land in light of future resort development planned and already approved at West Beach and Kuliima.
3. According to tax records, the four shoreline parcels vary in depth from about 80 to about 750 feet. (Actual parcel depth may be less due to shoreline erosion, depending on the actual current location of the shoreline, or vegetation line.) According to the study Beach Changes On Oahu As Revealed by Aerial Photographs, Mokuleia is a "Hazard Area" subject to severe storm waves. The EIS should examine the history of

beach changes at the specific beach segments proposed for development. It should also analyze the potential effects of rising sea levels on these beaches in the next 100 years. These studies will provide a basis for recommending adequate long-term building setbacks along the shoreline.

4. Portions of Parcels B and C fall within the A4 Flood Zone; a portion of Parcel C also falls within the V22 Coastal High Hazard Zone. Parcels D and E have not been studied for vulnerability to flooding; a full study should be performed on these areas, in order to determine flood elevations, hazard factors, and general suitability for development.

If you have any questions, please contact Mr. Robin Foster of our staff at 527-5027.

Very truly yours,

John P. Whalen
JOHN P. WHALEN
Director of Land Utilization

JPM:sj
0267B

cc: OGP

Rec'd 7-15-86

BARRY R. OKUDA, INC.

February 17, 1987

Mr. John Whalen, Director
Department of Land Utilization
650 South King Street
Honolulu, Hawaii 96813

Re: Response to Comments on the EIS Preparation Notice for the
Proposed Development at Mokuleia, Oahu

Dear Mr. Whalen:

Thank you for your comments of July 11, 1986 regarding the subject Prep
Notice. We respond as follows:

(1) Impact on Adjoining Land Uses

The applicant believes that there will be relatively little impact
on the land uses adjoining the four non-contiguous oceanfront
parcels proposed for development.

At the present time these adjacent parcels contain a variety of
land uses including residential, recreational and quasi-public
(church camp). It is the applicant's intention to develop design
guidelines including setbacks, building envelopes, landscaping,
buffers and various other design elements that would ensure a
harmonious relationship between new and existing land uses. It is
common to have resort, residential and recreational uses
co-existing as elements of a development.

The applicant intends to work with the Departments of General
Planning and Land Utilization as well as through continuing
dialogue with the community in order to develop an urban design
program which will ensure the development's compatibility with
existing uses.

(2) Market Study

The market study, indicating the need for additional resort
development beyond that approved in the City and County's General
and Development Plans, will be included in the Draft EIS.

Mr. John Whalen, Director
February 17, 1987
Page 2

(3) Beach Erosion and Rising Sea Level

These two topics will be covered in the Draft EIS.

(4) Flood Hazards

The applicant commissioned Dr. Charles Bretschneider to perform a
study of the tsunami and hurricane impacts on the proposed
development. The results of this study will be included in the
Draft EIS as well as a complete copy of the study. The firm of
Engineers, Surveyors of Hawaii is developing the drainage plan for
the property and will incorporate information from the
Bretschneider study in its recommendations for mitigating measures.

Sincerely,

Barry R. Okuda
Barry R. Okuda

BR0:avp

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



Mr. Okuda
Page 2
June 30, 1986

We recommend that contact be made with our department to discuss the Mokuleia project's recreational needs and park dedication requirements as soon as possible.

Should you have any questions, please contact Mr. Jason Yuen at 527-6315.

Tom Nakato
TOM T. NAKATO, Director

TTH:el

Rec'd 7/3

Mr. Barry B. Okuda
c/o Barry B. Okuda, Inc.
Paahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

Subject: Environmental Impact Statement Preparation Notice
Mokuleia Development - Malalua
Tax Map Key 6-8-07, 03, and 08

We have reviewed the Environmental Impact Statement Preparation Notice for the Mokuleia Development in Malalua and make the following comments and recommendations:

The size of the proposed Mokuleia project would have a significant impact on our public park facilities in the Malalua area. It is important that an adequate recreational system be planned to serve both the resort and residential needs of the project.

The report does not address the recreational impact and needs of the project. This should be included in future Environmental Impact Statement reports and all City applications.

We would also like to apprise you that there are two City Ordinances which are significant and must be addressed in future assessments of the project. Compliance with these Ordinances are required in order for the project to receive City approval.

These Ordinances are:

1. Park Dedication Ordinance No. 4621. This law requires that irks be provided to serve the project. Based on the 2,000 condoma: a and residential units proposed for development, approximately 11 acres of land will be required to be set aside for park purposes. These park lands must meet City standards and park dedication requirements.
2. Public Access Ordinance No. 4311. This law requires that adequate public access to shoreline and mountain areas must be provided. Establishment of required accesses must be reviewed and approved by the City as a condition of approval of the project.

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

100 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK P. PAN
CUSTOM



DOUGLAS G. GIBB
CHIEF
WARREN FERREIRA
DEPUTY CHIEF

OUR REFERENCE EC-DB

June 24, 1986

BARRY R. OKUDA, INC.

BARRY R. OKUDA
PRESIDENT

February 17, 1987

Mr. Hiram Kamaha, Director
Department of Parks and Recreation
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Kamaha:

Subject: Response to Comments on the EIS Preparation Notice for the Proposed Development at Moaiula, Oahu

Thank you for your comments of June 30, 1986, on the subject Prep Notice. We respond as follows:

With outdoor recreation being a major component of the proposed project, this development will include provisions for optimizing general public access to the project site as well as providing a wide range of recreational opportunities for both visitors and residents.

The applicant is aware of Park Dedication Ordinance No. 4621 and Public Access Ordinance No. 4311 and intends to comply with these ordinances. During the approval process the applicant will work with the City Department of Parks and Recreation and the State Department of Land and Natural Resources to achieve the results intended by these ordinances.

The Draft EIS will contain an assessment of public access and recreational opportunities.

Thank you for your comments.

Sincerely,

Barry R. Okuda

Barry R. Okuda

BRD:cp
025

Mr. Barry R. Okuda
c/o Barry R. Okuda, Inc.
Paahai Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

The Honolulu Police Department desires to be consulted during the preparation of the Environmental Impact Statement for the proposed development at Moaiula, Moaiula, Oahu. Our concerns are for public safety, in general, and the impact on the availability and delivery of police services.

Thank you for allowing us to become involved in the planning for this proposed development at this early stage.

Sincerely,

DOUGLAS G. GIBB
Chief of Police

BY *Warren Ferreira*
WARREN FERREIRA
Deputy Chief of Police

100 SOUTH KING STREET HONOLULU HAWAII 96813

Rec - 6/26/86

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
630 SOUTH KING STREET
HONOLULU, HAWAII 96813



MADE IN HAWAII
PRINTED AND BOUND IN HAWAII

ENV 86-141

BARRY R. OKUDA, INC.

BARRY R. OKUDA
INCORPORATED

February 17, 1987

Mr. Douglas G. Gibb, Chief
Honolulu Police Department
1455 South Beretania Street
Honolulu, Hawaii 96814

Dear Chief Gibb:

Subject: Response to Comments on the EIS Preparation Notice for the Proposed Development at Mokuieia, Oahu

Thank you for your comments of June 14, 1986, on the subject Prep Notice.

A member of the consulting team preparing the Draft EIS has contacted the police department for input and the information will be included in the Draft EIS.

Thank you for your comments.

Sincerely,

Barry R. Okuda

Barry R. Okuda

BRO:cp
024

June 27, 1986

Mr. Barry R. Okuda
c/o Barry R. Okuda, Inc.
Paahai Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

Re: EISPN for Proposed Development at Mokuieia, Hawaii (TMK: 6-8-02, 6-8-03, and 6-8-08: Various Parcels)

We are responding to your letter, dated June 16, 1986, concerning the preparation of a draft EIS for the subject proposed developments at Mokuieia. We have the following comments:

1. Will the streets and right-of-way be developed according to City Standards? If so, will the infrastructures be dedicated to the City for maintenance or will they be privately maintained?
2. A drainage report as stated in the EISPN should be prepared and submitted to the Drainage Section, Division of Engineering, for review and approval.
3. A sewerage master plan for the proposed development should be prepared and submitted to the Division of Wastewater Management for review and approval.
4. Two options for the treatment and disposal of wastewater generated by the development are mentioned in the EISPN. The options should be fully discussed in the Draft EIS, including the location of the treatment plant site and effluent disposal alternatives.

Mr. Barry R. Okuda

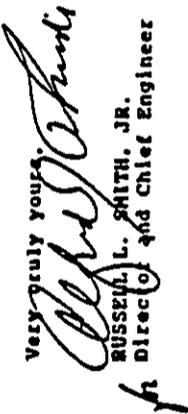
-2-

June 27, 1986

5. The first wastewater treatment option suggested is to construct a system which will serve only the development. Under this option will the system be constructed according to the City Standards? After the construction of the system, will it be dedicated to the City for operation and maintenance, or will it be retained by the developers and operated as a private sewage treatment plant (STP)?

6. The second wastewater treatment option suggested is to construct joint treatment and disposal facilities with the City and County. The costs will be shared by the City and the developers based on a formula which will be developed.

Since the Facilities Plans for the Waiolu-Haleiwa District will be finalized by June 1987, the selection of the recommended option should not be prolonged. For your information, the City's wastewater treatment plant site has not been finalized as of this date.

Very truly yours,

 RUSSELL L. SMITH, JR.
 Director and Chief Engineer

Rec'd 7/3

BARRY R. OKUDA, INC.

BARRY R. OKUDA
INCORPORATED

February 17, 1987

Mr. Albert Thiede, Director
Department of Public Works
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Thiede:

Subject: Response to Comments on the EIS Preparation Notice for the Proposed Development at Mokuleia, Oahu

Thank you for your comments of June 27, 1986, on the subject Prep Notice. We respond as follows:

1. Dedication of Streets
The applicant proposes to develop the major streets in accordance with City standards with probable dedication of these roads to the City.
2. Drainage Report
A drainage report is being prepared by Engineers, Surveyors of Hawaii, Inc. and will be submitted to Public Works for review.
3. Sewerage Master Plan
A sewerage master plan is being prepared and will be submitted to the Division of Wastewater Management for review and approval.
4. STP Options
A full discussion of the various STP options will be included in the Draft EIS. At the present time the applicant and consultants are still studying the options and no decision has been made.
5. It is likely that the system will be designed to City standards and dedicated to the City.
6. See # 4.

1001 BEECH STREET PALM BEACH TOWN, FLORIDA 33480 TELEPHONE 561-833-1100 FAX 561-833-1104

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



Mr. Albert Thiede
February 17, 1987
Page 2

Thank you for your comments.

Sincerely,
Barry R. Okuda
Barry R. Okuda

BRO:cp
023

FORM NO. 100
1-78

July 2, 1986

Mr. Barry R. Okuda
c/o Barry R. Okuda, Inc.
Pauahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

Subject: Proposed Development at Mokuleia, Waialua, Oahu
EIS Preparation Notice

This is in response to your letter of June 16, 1986.

We have reviewed the EIS Preparation Notice for the subject project and recommend that the following items be included in the traffic portion of the document to facilitate our review:

1. An assessment of projected traffic demand along local interior streets to determine adequate roadway widths to accommodate for the smooth flow of traffic;
2. The proposed layout of the internal roadway system;
3. The anticipated phasing of the entire development at ultimate build-out.

If you have any questions, please contact Kenneth Hirata of my staff at 527-5009.

Sincerely,

John P. Birten
JOHN P. BIRTEN
rec'd 7/9

HONOLULU MUNICIPAL BUILDING
TE-3169
PL 1.0353

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA
HONOLULU, HAWAII 96813



FRANK F. FALE, Mayor
DOREEN B. GOOTI, Chairman
EMERIL A. WAIKAI, Vice Chairman
MILTON J. ADLER
BYRONDA HOKAHOHONA
RUSSELL L. SMITH, JR.
WAYNE J. YAMASAKI
KAZU HAYASHIDA
Manager and Chief Engineer

July 7, 1986

Mr. Barry R. Okuda
c/o Barry R. Okuda, Inc.
Paahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

Subject: Your Letter of June 16, 1986 on the Proposed
Development at Mokuleia, Waiialua, Oahu

Thank you for the opportunity to comment on the Environmental
Impact Statement Preparation Notice for the proposed
development at Mokuleia, Waiialua, Oahu. We offer the
following comments:

1. A revised water master plan should be submitted for
our review and approval.
2. Parcels B, C, D and E, as shown on Map 2, are
located in the "Pass Zone". However, only portion
of parcel A is located in the "Pass Zone". Shallow
ground disposal of waste systems such as cesspools
shall be permitted only in the "Pass Zone" where
disposal shall be limited to a maximum depth of
30 feet. All sewage disposal plans shall be
coordinated with the Sanitation Branch, State
Department of Health.
3. The Mokuleia area is part of the Waiialua Ground
Water Control Area which is controlled by the State
Board of Land and Natural Resources (BLNR).
Therefore, permission to withdraw water from the
ground water basin must be obtained from BLNR.

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

Very truly yours,

Kazu Hayashida
KAZU HAYASHIDA
Manager and Chief Engineer

lcc'd 7/9

Part 1001 - man's progress and - see 1001

BARRY R. OKUDA, INC.

BARRY R. OKUDA
PRESIDENT

February 17, 1987

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

Dear Mr. Hayashida:

Subject: Response to Comments on the EIS Preparation Notice for the Proposed
Development at Mokuleia, Oahu

Thank you for your comments of July 7, 1986, re the subject Prep Notice. We respond
as follows:

1. Water Master Plan
A revised water master plan will be submitted for your review and approval.
2. Effluent Disposal
Your comments on effluent disposal are noted and will be addressed in the Sewer
Master Plan. Coordination and approval of the plan will be through the various
governmental agencies with an interest in sewage disposal including the Board
of Water Supply, Department of Public Works and the Department of Health.
3. Source Developments/Increased Water Withdrawal
The applicant is aware that the project is in the Waiialua Ground Water Control
Area and the Board of Land and Natural Resources permission is required for
increased withdrawal of water from the ground water basin.

Thank you for your comments.

Sincerely,

Barry R. Okuda

Barry R. Okuda

BRO:cp
021

1001 BISHOP STREET, PAHAHI TOWER, SUITE 1900, HONOLULU, HAWAII 96813 • (808) 521-1704

July 8, 1986

BELT, COLLINS & ASSOCIATES
Engineering • Planning
Landscape Architecture

June 19, 1986
86-1236

Barry R. Okuda
c/o Barry R. Okuda, Inc.
Paauhahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

I would appreciate a copy of the EIS Preparation Notice for Mokuleia Development Corporation's proposed development at Mokuleia (DECC Building, June 8, 1986). Belt, Collins and Associates is currently revising the Waialua-Haleiwa Wastewater Facility Plan EIS for the City and County of Honolulu, and the information contained in your report will be useful to us.

Sincerely,

Pamela R. Gring
Pamela R. Gring

No written response required.
Copy of Prep Notice hand delivered to Belt Collins 6/27/86.

JUN 23 1986

Honolulu, 405 Canal Street, Honolulu, Hawaii 96813 Telephone: (808) 537-1311 Telex: 881111 HCOLS
Honolulu, 405 Canal Street, Honolulu, Hawaii 96813 Telephone: (808) 537-1311 Telex: 881111 HCOLS



Barry R. Okuda
c/o Barry R. Okuda, Inc.
Paauhahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Mr. Barry R. Okuda
c/o Barry R. Okuda, Inc.
Paauhahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

Subject: Preparation Notice for Environmental Impact Statement (EIS) for Proposed Development at Mokuleia

We have reviewed the above EIS and have the following comments:

1. The development area is confined to the lowlands, which are relatively flat near the ocean and which increase in slope until they become the Waianae mountains. Since a substation is required, close coordination is necessary in order that a relatively level site is selected.
2. The notice correctly points out that the existing electrical system feeding the area needs to be upgraded.
3. The existing Waialua Substation has limited available capacity to serve the subject development. Hawaiian Electric Company (HECO) will require new substation capacity to be installed at the proposed Mokuleia Substation (tax map key 6-08-06130). This lot is now owned by HECO. This future substation is located less than a mile from the subject development on Farrington Highway.

A Hawaiian Electric Industries Company

Mr. Barry R. Okuda
July 8, 1986
Page 2

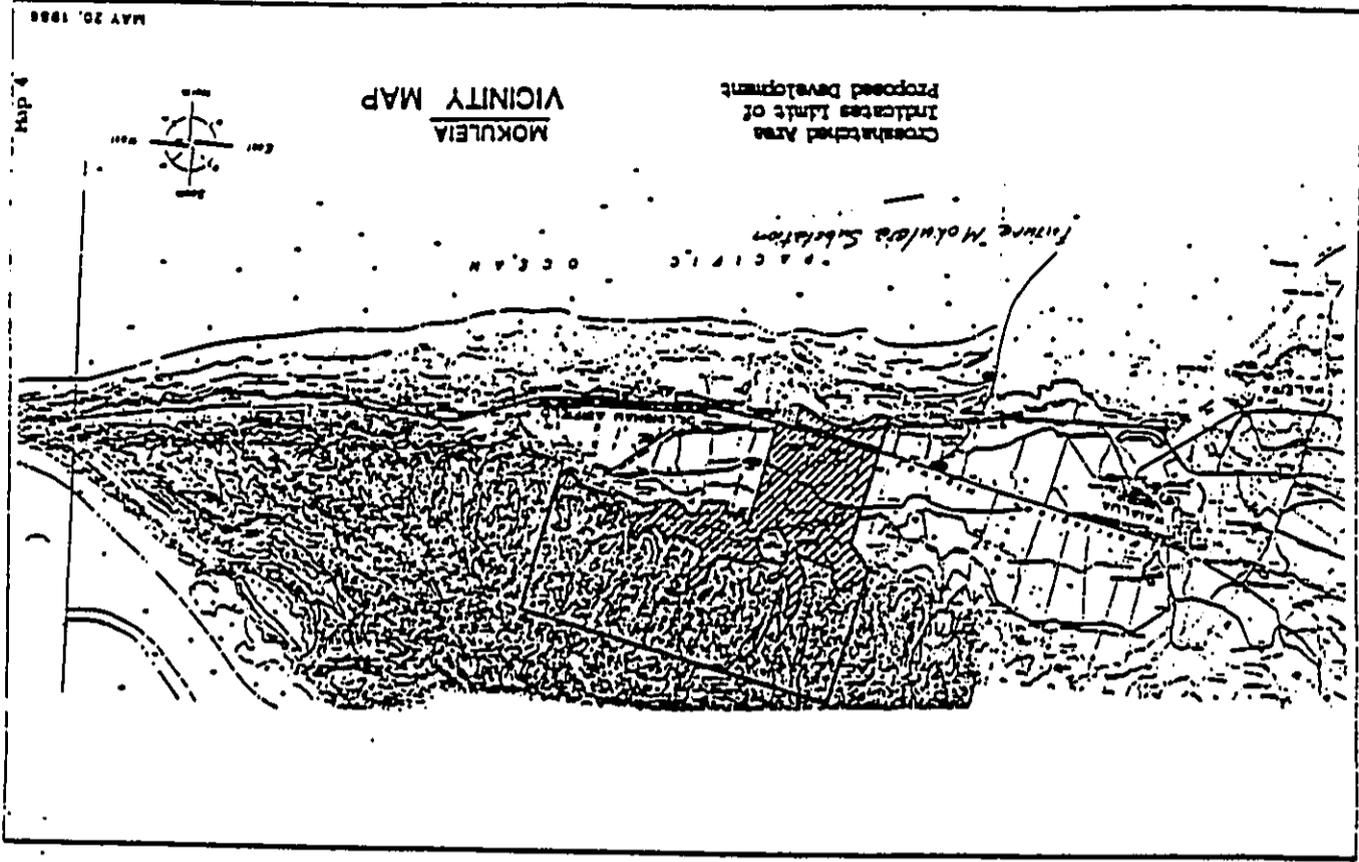
4. Ultimately, two 46 kv circuits from our Maialua Substation will be required to serve the new substation. These circuits will be overbuilt on existing pole lines on Farrington Highway to the new substation from opposite directions. This will require State Department of Transportation Highways Division approval. Refer to the attached Map 4 for the location of our future substation.
5. Close coordination will be required between the developer and HECO in order to provide timely service.

Sincerely,

Bernard Mung

Attachment

Rec 7-10-86



HEI

BARRY R. OKUDA, INC.

February 17, 1987

Mr. Brenner Manger, Ph.D., P.E.
Manager
Navalitan Electric Co.
P.O. Box 2750
Honolulu, Hawaii 96810

Re: Responses to Comments on the EIS Preparation Notice for
the Proposed Development at Mohuleia, Oahu

Dear Dr. Manger:

Thank you for your comments of July 9, 1986. The additional
information provided by your comments will be incorporated
into the Draft EIS for the project.

Again, thank you for your comments.

Sincerely,

Barry R. Okuda

Barry R. Okuda

MR01847

KAHALU COALITION
THE COMMUNITY THAT HELPS ITSELF

OFFICERS:
MULLA ACHAMUET
DANIEL BETHUNE
JIMMY BROWN
JACKIE BROWN
JACKIE BROWN
JACKIE BROWN
JACKIE BROWN
JACKIE BROWN

Barry R. Okuda
Barry R. Okuda, Inc.
Pauahi Tower Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96818

Dear Mr. Okuda:

Please consider the Kahaia's Coalition a corrected part
in the preparation of the Environmental Impact Statement
for the proposed development at Mohuleia, Oahu by
the Mohuleia Development Corporation a subsidiary of
the Northwestern Mutual Life Insurance Company.

Thank you,

Edwin Stevens, 1st Vice President
The Kahaia's Coalition

June 18, 1986

JUN 23 1986

47-232 WAIHEE ROAD, KAHALU, HAWAII 96744

1001 BISHOP STREET, PALAPA TOWER, SUITE 1800 • KAHALU, HAWAII 96813 • PHONE: 831-4754

BARRY R. OKUDA, INC.



MOKULEIA COMMUNITY ASSOCIATION
P.O. Box 644, Waihee, Hawaii 96791

June 27, 1986

August 13, 1986

Mr. Edwin Stevens
First Vice President
The Kahalu'u Coalition
47-232 Waihee Road
Kahalu'u, Hawaii 96744

Re: Request to be a Consulted Party to the Mokuleia Development
Proposal Environmental Impact Statement

Dear Mr. Stevens:

In response to your June 18, 1986 letter, enclosed please find a copy of the Preparation Notice for the Proposed Mokuleia Development. The Kahalu'u Coalition is considered a consulted party. If you wish to make comments at this time on the environmental effects of the proposed action we invite you to do so. We request your kokua in getting the comments as soon as possible but in any event, by September 12, 1986.

The Office of Environmental Quality Control has been notified of your interest in the project and has included the Kahalu'u Coalition on the distribution list for the Draft EIS. You will have an opportunity to comment on the project after distribution of the Draft EIS.

Thank you for your interest in the project.

Sincerely,

Barry R. Okuda
Barry R. Okuda

cc: Dept. of General Planning
Office of Environmental Quality Control

Mr. Barry R. Okuda
President
Barry R. Okuda, Inc.
Pauahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda:

Per your letter of June 16, 1986 regarding the EIS for the proposed development at Mokuleia, as a resident and property owner in the area, as well as President of the Mokuleia Community Association, I would like to make the following comments:

1. The proposed height and size of the hotel and condominium structures are out of place with the existing character of the area and the designation of the Mokuleia area per the North Shore Development Plan as a rural area - a green belt for Honolulu.

2. Altering the development plans and zoning for one landowner in the area without considering the other major landholders in the Mokuleia-Waiulua-Haleiwa area opens the door to "leap frog", piecemeal, poorly planned development of the entire North Shore area. It is the feeling of the community that before any changes to the North Shore Development Plan are granted to any single developer, that an area-wide planning forum be held to ensure the involvement of all parties concerned, i.e., Bishop Estate, Castle & Cooke, Northwestern Mutual, the various community association, the Department of Land Utilization, the Land Use Commission, etc. It would be wise, I think, to hold this planning forum under the auspices of the City Council.

Mr. Barry R. Okuda
June 27, 1986
Page Two

BARRY R. OKUDA, INC.

The area from Kahaluu to Kaena Point is the Green belt for urban Oahu and as such, its future development needs to be dealt with on a comprehensive, not piecemeal, basis.

3. The traffic congestion on Farrington Highway and in front of the Waihee High School that will result from the addition of several thousand units of hotel and housing in the Mokuleia area needs to be taken into consideration as the State Transportation Department's plans do not provide for this magnitude of traffic increase in the area.

Other considerations, such as view corridors, the airport, the proposed wilderness park at Kaena Point, etc. are also important. However, I think the above three items need be addressed first.

Sincerely,


Michael Dalley
President, Mokuleia
Community Association

MD:mle
cc:

Mr. Leigh Vai-Do
Ms. Marilyn Bornhorst
Rep. Joseph P. Leong
Mr. Randall Iwase
North Shore Neighborhood Board
Department of Land Utilization

February 17, 1987

Mr. Michael Dalley
President
Mokuleia Community Association
P.O. Box 686
Waihee, Hawaii 96791

Re: Response to Comments on the EIS Preparation Notice for the Proposed Development at Mokuleia, Oahu

Dear Mr. Dalley:

We are in receipt of your comments dated June 27, 1986 on the subject Prep Notice and respond as follows:

1. Building Heights

The applicant shares your concern that the proposed development at Mokuleia be suitable for the area. The Mokuleia architects and design consultants are looking at various aspects of the proposal including building siting, landscaping and setbacks to achieve the visual impacts compatible with the area.

2. Comprehensive vs. Piecemeal Planning

A comprehensive planning forum under the auspices of the City Council, as suggested by your comment, is currently under way. Council Chair Horgan has scheduled workshops while Planning Committee Chair Doo and Chief Planning Officer Clegg and their respective staffs have been working to coordinate efforts at reviewing General Plan and Development Plan issues. Issues raised will have an opportunity to be examined by land owners, community groups, planning professionals and government agencies. It is the applicant's hope that the Mokuleia Community Association, landowners and other interested parties will take an active role in the General Plan amendment process.

3. Traffic Impact

As part of the EIS process, the applicant commissioned a traffic study by the firm of Parsons, Brinckerhoff, Quade & Douglas to examine the adequacy of existing facilities in the area to handle the traffic

REC'D 4/30



NORTH SHORE CAREER TRAINING CORPORATION
 P.O. Box 465 • Kahuku, Hawaii 96731 • Telephone (808) 293-9204

Mr. Michael Deiley
 February 17, 1987
 Page 2

generated by the proposed development. The study found that traffic could be adequately handled from the proposed project at full development. A complete copy of that study will be included in the Draft EIS.

4. Other Considerations

a. View Corridors

The applicant agrees that the visual impacts, including the view corridors, are important.

b. Dillingham Field

A discussion of the potential noise impacts of Dillingham Field on the project is included in the Darby and Associates noise impact study for the proposed development. A copy of the study will be appended to the Draft EIS.

c. Proposed Kaena Point State Park

The EIS will discuss the various recreation amenities existing and proposed for the Mokulele area, including the Kaena Point State Park.

Thank you for your comments. We look forward to comments after you have had an opportunity to review the Draft EIS.

Sincerely,

Barry R. Okuda
 Barry R. Okuda

MO:evp

Board of Directors
 Thomas L. Richard, Jr.
 Clarence N. Matsuoka
 Harriet C. Hunsberg
 John P. Pines, Jr.
 Raymond "Suddy" Alo
 Carl A. Fujita

Executive Director
 Robert F. Comeau

June 26, 1986

Mr. Barry R. Okuda
 Barry R. Okuda, Inc.
 Pauahi Tower, Suite 1900
 1001 Bishop Street
 Honolulu, Hawaii 96813

Dear Mr. Okuda:

Thank you for transmitting a copy of the EIS Preparation Notice for the proposed development at Mokulele.

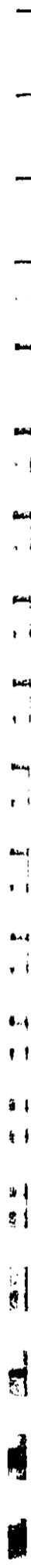
Our company is interested in the economic and social impact of the proposed project and we look forward to reviewing these issues as the EIS is prepared.

May I also suggest that you include the State Department of Labor & Industrial Relations, Office of Employment & Training, on your list of consulting agencies.

Aloha

Robert F. Comeau
 Robert F. Comeau
 Executive Director

rec'd 6/30



BARRY R. OKUDA, INC.

BARRY R. OKUDA, INC.

February 17, 1987

Mr. Robert F. Coeass
Executive Director
North Shore Career Training Corp.
P. O. Box 465
Kahuku, Hawaii 96731

Re: Response to Comments on the EIS Preparation Notice for
the Proposed Development at Mokuleia, Oahu

Dear Mr. Coeass:

We have received your comments dated June 26, 1986 on the
subject Prep Notice and respond as follows:

Comment 1

The economic and social impacts of the project will be
discussed in the Draft EIS. The Office of Environmental
Quality Control has been notified of your interest in the
project and has included the North Shore Career Training
Corp. in the distribution list for the Draft EIS.

Comment 2

The State Department of Labor and Industrial Relations,
Office of Employment and Training, has been contacted for
comments at your request. Their comments will be incor-
porated in the Draft EIS.

Thank you for your interest in our project. We look forward
to your comments on the Draft EIS.

Sincerely,

Barry R. Okuda
Barry R. Okuda

BR0:avp

1001 BEECH STREET, PALMUM TOWER SUITE 1000, HONOLULU, HAWAII 96813 • (808) 521-4754

August 13, 1986

Department of Labor and Industrial Relations
Office of Employment and Training
830 Punchbowl Street, Room 204
Honolulu, Hawaii 96813

Re: Information on the Mokuleia Development Proposal

Gentlemen:

Enclosed please find a copy of the Prep Notice for the Mokuleia
Development Project. We are forwarding the information to your
department at the request of the North Shore Career Training
Corporation, which is one of the consulted parties to the EIS
process.

If you wish to make comments at this time on the environmental
effects of the proposed action we invite you to do so. We
request your lokua in getting the comments as soon as possible
but in any event, by September 12, 1986. If you do not wish to
comment at this time you will have another opportunity to comment
on the Draft EIS.

Sincerely,

Barry R. Okuda

Barry R. Okuda

BR0:avp

cc: Dept. of General Planning
Office of Environmental Quality Control

1001 BEECH STREET, PALMUM TOWER SUITE 1000, HONOLULU, HAWAII 96813 • (808) 521-4754

THE SHORE NEIGHBORHOOD BOARD HQ
P.O. Box 547
HALLMARK, HONOLULU HI 96813



June 27, 1986

Barry R. Okuda, Inc.
Pauahi Tower, Suite 1900
1001 Bishop Street
Honolulu, HI 96813

Dear Mr. Okuda:

Subject: Mokuleia Development Co. EIS

At our last regular meeting which was held on June 24, 1986, the EIS for the Mokuleia Development Co. 1st preparation statement was discussed. Although the statement was incomplete, we did not have anything to add at this time. However, one question was raised, why was a private archaeological consultant used and not one from Bishop Museum? Also, we, the Neighborhood Board, would like to be kept informed as to when the final EIS preparation will be accomplished and we would appreciate being provided with a copy.

Thank you for the opportunity to submit our comments.

Sincerely,

Meryl M. Andersen
Meryl M. Andersen
Chairman

cc: Neighborhood Commission

BARRY R. OKUDA, INC.

February 17, 1987

Mr. Meryl M. Andersen, Chairman
North Shore Neighborhood Board #27
P. O. Box 607
Mailewa, Hawaii 96712

Re: Response to Comments on the EIS Preparation Notice for the Proposed Development at Mokuleia, Oahu

Dear Mr. Andersen:

Thank you for your comments on the subject Prep Notice. We respond as follows:

Comment 1: Use of Private Archaeological Consultant

Selection of consultants for preparation of environmental impact statements is usually based on a number of factors: availability of the consultant; time constraints of the research project; previous experience; and cost. Archaeological Consultants of Hawaii, Inc., headed by Mr. Joseph Kennedy, was selected to perform the study based on a number of criteria as discussed above. It should be noted that there are a number of archaeological consultants who normally provide services for EIS's and other research, the Bishop Museum being only one of the providers.

Comment 2: Keeping the Board Informed

The applicant intends to keep the Board informed during the EIS process. At the applicant's request, the Office of Environmental Quality Control has included the Board in the distribution list for the Draft EIS. The Board will have an opportunity to comment on the Draft EIS once it is distributed.

Subsequent Comments

After publishing of the Prep Notice on the proposed General Plan amendment, the applicant proceeded with the preparation of the EIS. Following the issuance of a Draft EIS, the North Shore Neighborhood Board responded with 15 comments in a letter dated November 18, 1986. The applicant answered 15 comments in a letter dated December 18, 1986. The applicant answered five of the comments and indicated that insufficient information was available at the General Plan level to answer the specific concerns raised in the other

Rec'd 6/30

1001 BISHOP STREET HALLMARK TOWER SUITE 1900 HONOLULU HAWAII 96813 PH: 531-5471 FAX: 531-5472

Ms. Meryl M. Anderson, Chairman
February 17, 1987
Page 2

ten comments. With the publishing shortly of the Draft EIS for the proposed Development Plan amendment (regarding the specific project at Mokuiaia), these remaining concerns will be covered. The following is a list of the concerns and the specific studies and their location in the Draft EIS:

Draft EIS Appendix

- | | |
|---------------------|-------|
| 1. Economic Study | A |
| 2. Archaeological | M |
| 3. Traffic | L |
| 4. Seawall | E |
| 5. Lifestyle | C |
| 6. Housing | B/C |
| 7. Investment | B/C/D |
| 8. Airfield | K |
| 9. Building Heights | A/B/C |
| 10. Employment | |

See Part IV.M of Draft EIS

Thank you for your comments. We look forward to your comments on the Draft EIS.

Sincerely,

Barry R. Okuda
Barry R. Okuda

BM01evp

J. A. Parnell
P.O. Box 27506
Honolulu, Hawaii 96827

June 18, 1986

Barry R. Okuda
c/o Barry R. Okuda, Inc.
Pauahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Re: EIS for Proposed Development at Mokuiaia, Oahu

I would like to be a consulted party on this project. Please put me on the list to receive a copy of the draft EIS.

Sincerely Yours,

J. A. Parnell
J. A. Parnell

JUN 23 1986



SIERRA CLUB, HAWAII CHAPTER

HONOLULU GROUP
P.O. BOX 11070, HONOLULU, HAWAII 96828
(808) 946-8494

10 July 1986

BARRY R. OKUDA, INC.

August 13, 1986

Ms. J. A. Parnell
P.O. Box 27506
Honolulu, Hawaii 96827

Re: Request to be a Consulted Party to the Mokuleia Development
Proposal Environmental Impact Statement

Dear Ms. Parnell:

In response to your June 18, 1986 letter, enclosed please find a copy of the Preparation Notice for the Proposed Mokuleia Development. J. A. Parnell is considered a consulted party. If you wish to make comments at this time on the environmental effects of the proposed action we invite you to do so. We request your kokua in getting the comments as soon as possible but in any event, by September 12, 1986.

The Office of Environmental Quality Control has been notified of your interest in the project and has included J. A. Parnell on the distribution list for the Draft EIS. You will have an opportunity to comment on the project after distribution of the Draft EIS.

Thank you for your interest in the project.

Sincerely,

Barry R. Okuda

Barry R. Okuda

cc: Dept. of General Planning
Office of Environmental Quality Control

Mr. Barry R. Okuda, REGARDING NORTHWEST/MOKULEIA PROJECT

c/o Barry R. Okuda Inc.
Paahii Tower Suite 1900
10001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda,

The Honolulu Group Conservation Committee did not have a chance to meet before the July 8, 1986 deadline. At our meeting this evening it was decided that we would most earnestly seek to be considered an interested party. Therefore I am asking that you send to our office the Environmental Impact Statement for the NorthWest/Mokuleia project.

With best wishes,

yours truly

Gary Andersen

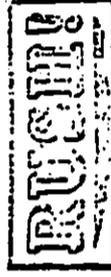
Gary Andersen, Conservation Chair
Honolulu Executive Committee

GA:jb

cc: Hawaii Chapter

Rec 7-11-86

SIERRA CLUB, HAWAII



GARY ANDERSEN, Conservation Chair
Honolulu Executive Committee

P.O. Box 11870
Honolulu, Hawaii 96828
(808) 946-8494

1001 BIRD-OP ST. PALM-BEACH, FL 33411 TEL: (407) 851-1111 FAX: (407) 851-1111

BARRY R. OKUDA, INC.



Wahiawa Community & Business Ass'n., Inc.

8301 Colburne Avenue
Wahiawa, Oahu, Hawaii 96784
Telephone Wahiawa 4808 471-4331

July 23, 1986

February 17, 1987

Mr. Gary Andersen
Conservation Chair
Sierra Club, Hawaii Chapter
Monelele Group
P. O. Box 11070
Honolulu, Hawaii 96828

Re: Response to Comments on the EIS Preparation Notice for
the Proposed Development at Mokuleia, Oahu

Dear Mr. Andersen:

Thank you for your letter of July 10, 1986 regarding the
subject Prep Notice. We respond as follows:

The Office of Environmental Quality Control has been notified
of your interest in the project and has included the Sierra
Club on the distribution list for the Draft EIS.

Thank you for your letter. We look forward to your comments
on the Draft EIS.

Sincerely,

Barry R. Okuda

Barry R. Okuda

BJO:avp

Mr. Barry R. Okuda
Puuahi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Okuda,

**SUBJECT: Environmental Impact Statement Preparation Notice
Development of Mokuleia, Oahu, Hawaii**

Thank you for your letter of June 16, 1986 regarding the
development of Mokuleia, Oahu, Hawaii preparation notice
of the environmental impact statement. We appreciate being
notified.

We have no comments at this time other than, we hope care
will be taken to preserve the rural character of Moleia.

Thank you for the opportunity to review the EIS preparation
notice.

Sincerely,

Libby Smith

Libby Smith
Master Plan Chairperson

Rec'd 7-28-86

BARRY R. OKUDA, INC.

February 17, 1987

Mr. Eric Yamauchi, President
Wahiana Community & Business Ass'n, Inc.
830 L California Avenue
Wahiana, Hawaii 96786

Re: Response to Comments on the EIS Preparation Notice
for the Proposed Development at Mokuleia, Oahu

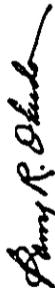
Dear Mr. Yamauchi:

Thank you for your letter of July 23, 1986 regarding the
subject Prep Notice.

The applicant shares your concern that the proposed
development at Mokuleia be suitable for the area. The
Mokuleia architects and design consultants are looking at
various aspects of the proposal including building siting,
landscaping and setbacks to achieve the visual impacts
compatible with the area.

Thank you for your letter. We look forward to your comments
in the future.

Sincerely,


Barry R. Okuda

MO:avp

PART XIII

AGENCIES, ORGANIZATIONS AND PERSONS
WHO WERE SENT A COPY OF THE DEIS:
WRITTEN COMMENTS RECEIVED DURING
THE PUBLIC REVIEW PERIOD; AND RESPONSES

The Draft EIS was officially received by the Office of Environmental Quality Control on February 20, 1987 and was published in the February 23, 1987 OEQC Bulletin. Sixty-seven (67) copies of the DEIS were provided to OEQC; distribution is shown in Exhibit 26. A total of 37 letters were received; 5 after the deadline for comments. Of this total, 27 responses were sent, 25 to comments received within the public review period and 2 to comments received after the public review period.

Summary of Letters Received and Responses Sent

Agency Organization

Federal

U.S. Department of Agriculture - Soil Conservation Service (*)
U.S. Department of Army - Corps of Engineers (**)
U.S. Department of The Army - Directorate of Facilities Engineering (1)
U.S. Department of Interior - Geological Survey (*)
U.S. Department of Interior - Fish & Wildlife (**)
U.S. Department of the Navy - Naval Base, Pearl Harbor (*)
U.S. Department of Transportation - Federal Aviation Administration (**)

State

Department of Accounting and General Services (*)
Department of Agriculture (**)
Department of Defense - Air National Guard (*)
Department of Education (**)
Department of Health (1)
Department of Land & Natural Resources (**)
Office of Hawaiian Affairs (**)
Department of Planning and Economic Development (**)
Department of Transportation (1)
University of Hawaii - Environmental Center (**)
University of Hawaii - Water Resources Center (**)

City & County

Board of Water Supply (*)
Building Department (**)
Fire Department (1)
Department of General Planning (**)
Department of Housing & Community Development (**)
Department of Land Utilization (**)
Department of Parks & Recreation (**)
Police Department (**)
Department of Public Works (**)
Department of Transportation Services (**)

Private Organizations and Individuals

Hawaiian Electric (*)
Life of the Land (**)
Mr. Jim Richardson (**)
The Salvation Army (**)
Mr. William Ramos Saunders (**)
Sierra Club (**)
Mr. Ed Stevens (**)
North Shore Career Training Center (1)
North Shore Neighborhood Board (**)

(1) DATED AFTER 3/25/87 DEADLINE FOR COMMENTS

NOTE: Comments dated after March 31, 1987 and corrections to responses are included at the end of Part XIII

DISTRIBUTION LIST

EXHIBIT 26

() E.A.
 () APPLICANT ACTION
 () AGENCY ACTION

(x) EIS
 (x) APPLICANT ACTION
 () AGENCY ACTION

Title: Mokuleia Development Proposal

Location: Mokuleia, Oahu

Proposing Agency/Applicant: Northwestern Mutual Life Insurance Co.

Accepting Authority/Approving Agency: City and County of Honolulu, Dept. of General Planning

Deadline for Comments: March 25, 1987

Date Sent/By: FEB 24 1987 *lbe*

<u>STATE AGENCIES</u>	<u>NO. COPIES</u>	<u>REMARKS</u>
OEQC		
Dept. of Agriculture	1	
Dept. of Accounting and General Services	1	
Dept. of Defense	1	
Dept. of Education (a)*	1	
Dept. of Hawaiian Home Lands (a)*		
Dept. of Health	1	
Dept. of Land and Natural Resources	3	
DLNR State Historic Preservation Officer	1	
Dept. of Planning and Economic Development	1	
DPED Library	1	
Dept. of Social Services and Housing	1	
Dept. of Transportation	3	
State Archives	1	
State Energy Office	1	
<u>UNIVERSITY OF HAWAII</u>		
Environmental Center	4	
Marine Programs (a)*	1	
Water Resources Research Center	1	
<u>FEDERAL</u>		
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)*	1	

Library Copy: 1

Total Received: 67

Total Distributed: 66

File Copy: 1

Copy of Distribution List Sent to: Barry R. Okuda, Inc.; DGP

Date: FEB 26 1987

(a)* Copy desired only if project involves the agency's responsibilities.

<u>NEWS MEDIA</u>	<u>NO. COPIES</u>	<u>REMARKS</u>
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)**		
Maul News (b)**		
Ka Molokai (b)**		
<u>CITY AND COUNTY OF HONOLULU (b)**</u>		
Board of Water Supply	1	
Building Dept.	1	
Dept. of Housing and Community Development	1	
Dept. of General Planning		
Dept. 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 and Records Center (Oahu only)	1	
Police Dept.	1	
<u>COUNTY OF HAWAII (b)**</u>		
Planning Dept.		
Dept. of Parks and Recreation		
Dept. of Public Works		
Dept. of Research and Development		
Dept. of Water Supply		
University of Hawaii - Hilo Campus Library		
<u>COUNTY OF MAUI (b)**</u>		
Planning Dept.		
Dept. of Parks and Recreation		
Dept. of Public Works		
Dept. of Water Supply		
Economic Development Agency		
Maui Community College Library		
<u>COUNTY OF KAUAI (b)**</u>		
Planning Dept.		
Dept. of Public Works		
Dept. of Water Supply		
Kauai Community College Library		
<u>NON-GOVERNMENTAL AGENCIES</u>		
American Lung Association	1	
Hawaiian Electric Company	1	
Office of Hawaiian Affairs	1	
<u>LIBRARIES</u>		
U.H. Hamilton Library, Hawaiian Collection	1	
Legislative Reference Bureau	1	

(b)** Copy desired only if project is in respective county.

	NO.	CL	ES	REMARKS
LIBRARIES			2	
State Main Library				
REGIONALS:			1	
Kaimuki Regional Library			1	
Kaneohe Regional Library			1	
Pearl City Regional Library			1	
Hilo Regional Library			1	
Wailuku Regional Library			1	
Mauihue Regional Library				
OAHU:				
Aliea Library				
Aiea Haina Library				
Ewa Beach Community-School Library				
Hawaii Kai Library				
Kahuku Community-School Library				
Kailua Library				
Kalihi-Palama Library				
Kalihi Library				
Manoa Library				
McCully-Moiliili Library				
Mililani Library				
Nahiwa Library			2	
Waialua Library				
Waianae Library				
Waikiki-Kapahulu Library				
Waimanalo Community-School Library				
Waipahu Library				
HAWAII				
Bond Memorial (Kohala) Library				
Holualoa Library				
Honokaa Library				
Kailua-Kona Library				
Keau 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				
MAUI				
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				

Mr. Henry A. Sumida
Airports District Office
Federal Aviation Administration
U.S. Dept. of Transportation
Box 50244
Honolulu, HI 96850-0001

Mr. Edwin Stevens, First Vice Pres.
The Kahalu'u Coalition
47-232 Waihee Road
Kahalu'u, HI 96744

Mr. Michael Dailey, President
Mokuleia Community Association
P.O. Box 686
Waialua, HI 96791

Mr. Robert F. Comeau,
Executive Director
North Shore Career Training Corp.
P.O. Box 465
Kahuku, HI 96731

Ms. Meryl M. Anderson, Chairperson
North Shore Neighborhood Board #27
P.O. Box 607
Haleiwa, HI 96712

Ms. J. A. Parnell
P.O. Box 27506
Honolulu, HI 96827

Mr. Gary Anderson
Conservation Chair
Sierra Club, Hawaii Chapter
Honolulu Group
P.O. Box 11070
Honolulu, HI 96828

County of Honolulu, the parcel is located in designated Zones A, M, and V22. Zone A are special flood hazard areas uninundated by the 100-year flood determined by approximate methods; no base flood elevations are shown or flood hazard factors determined. Zone M are special flood hazard areas inundated by the 100-year flood, determined by detailed methods; the base flood elevation for this parcel is 10 to 12 feet mean sea level. Zone V22 are special flood hazard areas along coasts inundated by the 100-year flood as determined by detailed methods and that have additional hazards due to wave action. The base flood elevation for this project is 10 to 12 feet mean sea level.

f. TMK 6-8-3:17,16,38,39. These parcels are designated Zones M and X (formerly Zone C). The zones have been described in the previous paragraphs.

g. TMK 6-8-3:11,15,31,34. The parcels are within Zones X and D which have been previously described.

h. TMK 6-8-3:5,6 & 6-8-2:1,6. The parcels are designated Zone D.

i. TMK 6-8-3:19. The parcels are designated Zones A and X and have been described in the previous paragraphs.

j. TMK 6-8-3:20,30,33,35,40. The parcels are within Zone X, area of minimal flooding.

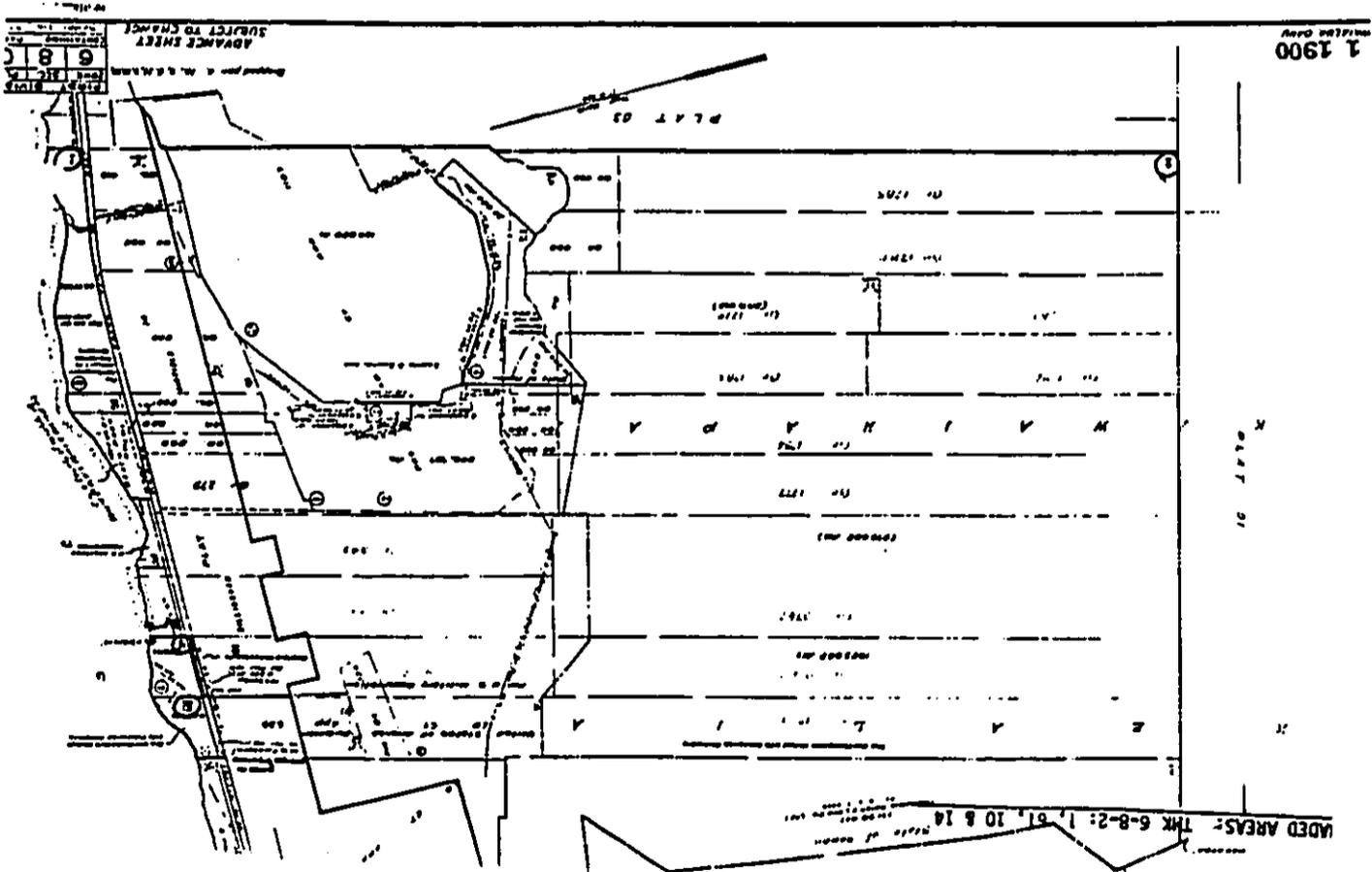
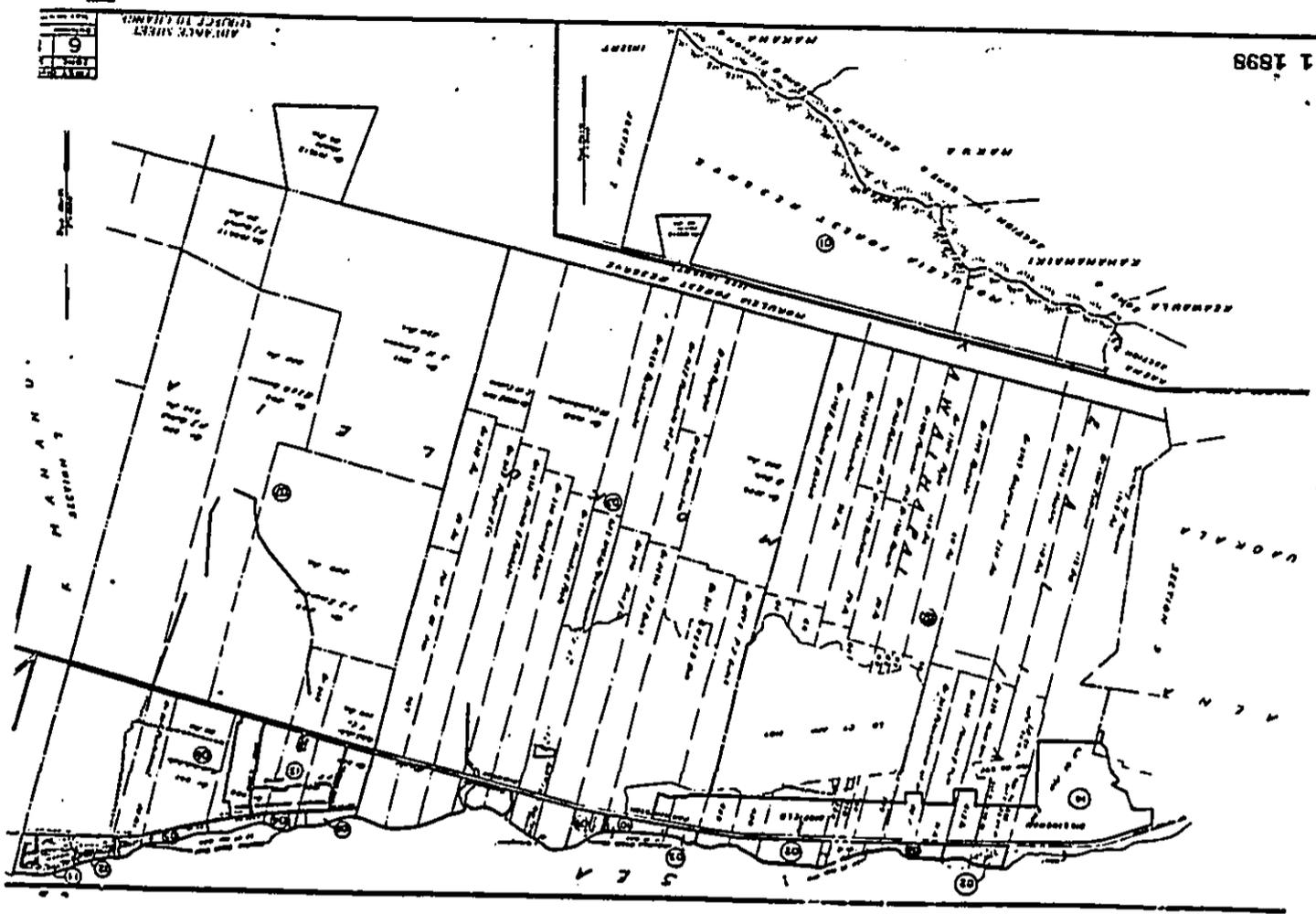
Sincerely,

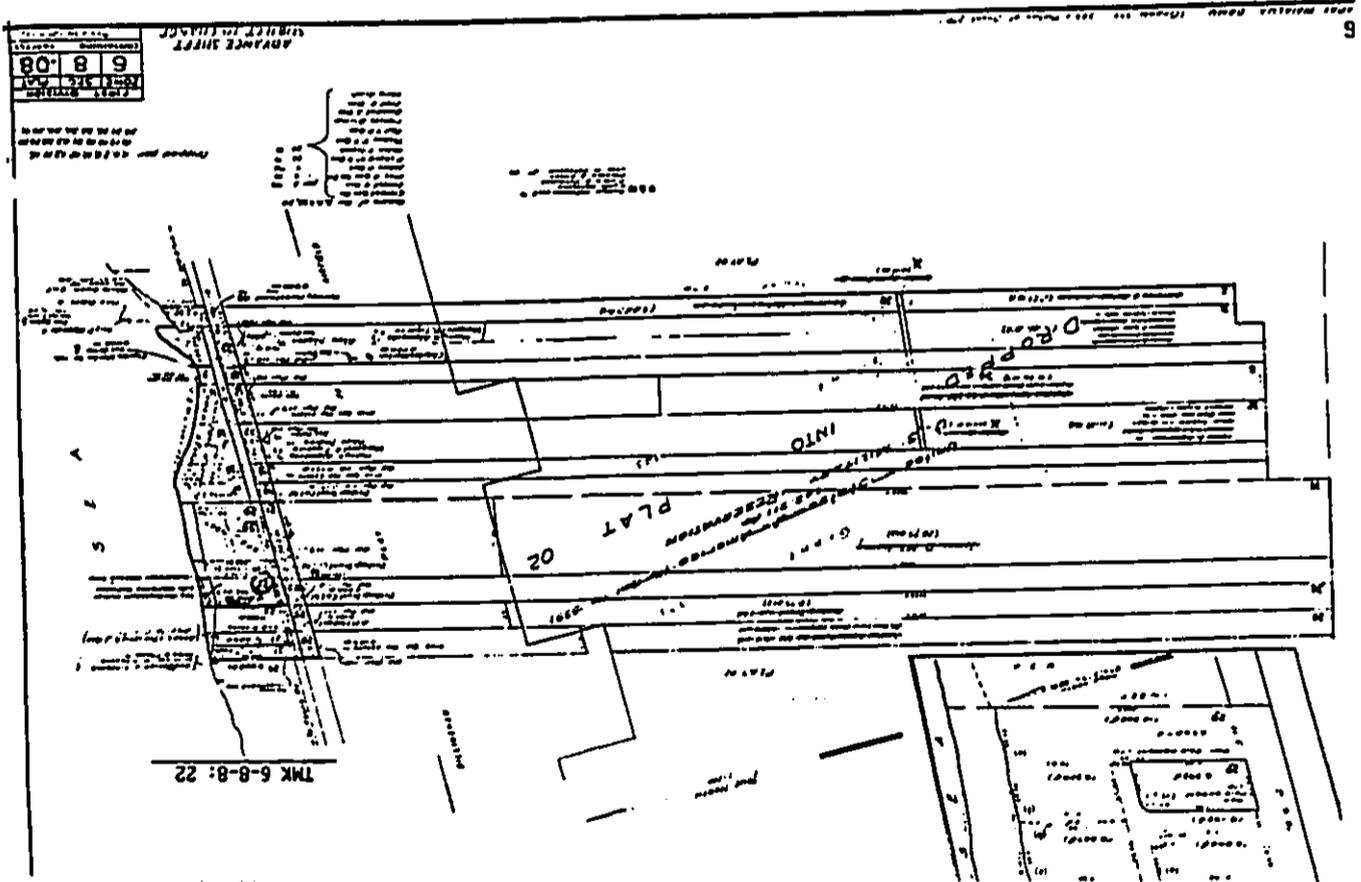
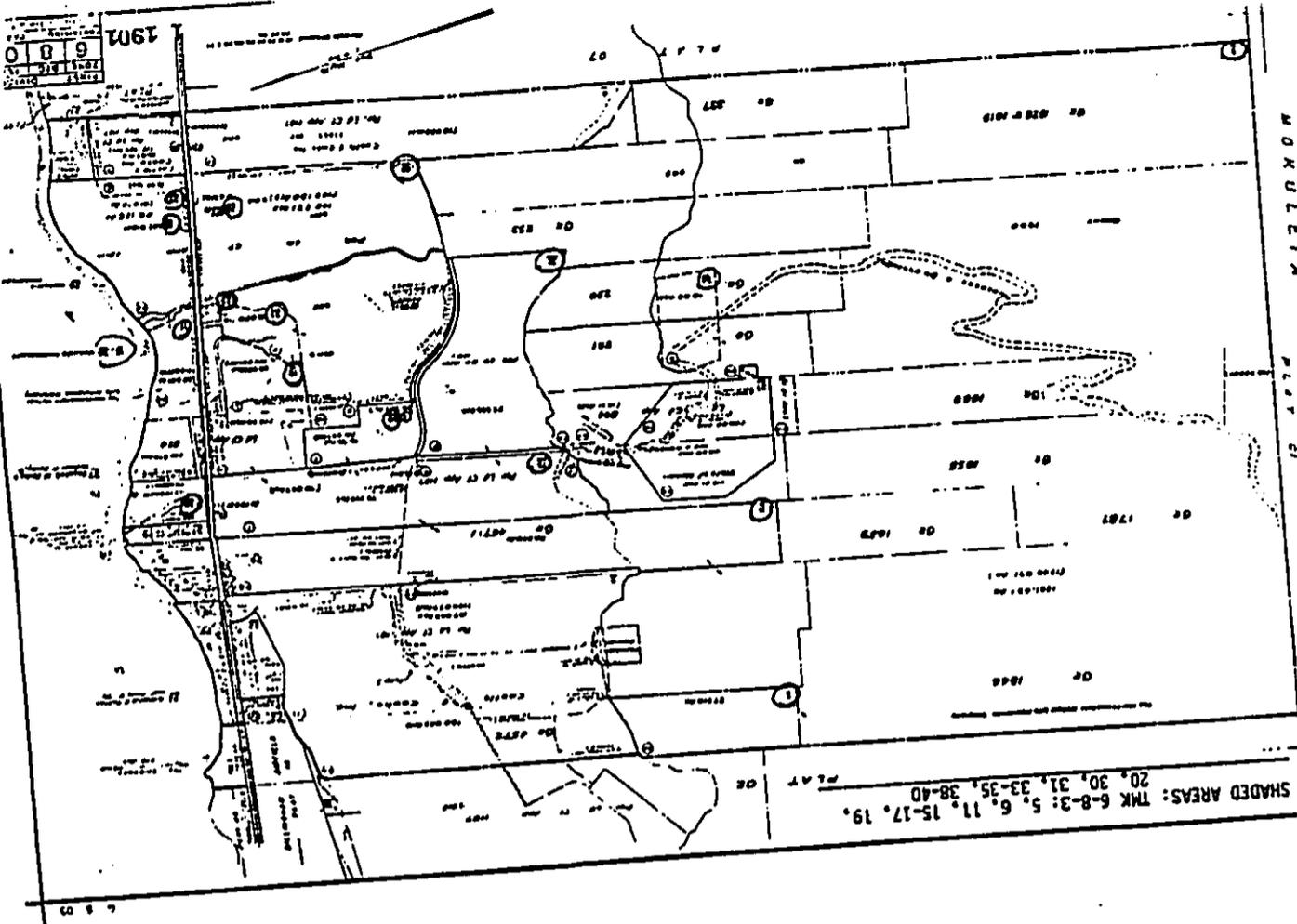


Kisuik Zheung
Chief, Engineering Division

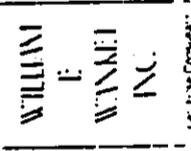
Enclosures

NATIONAL FLOOD INSURANCE PROGRAM	
FIRM FLOOD INSURANCE RATE MAP	
CITY AND COUNTY OF HONOLULU, HAWAII	
PANEL 35 OF 135 <small>(SEE MAP INDEX FOR PANELS NOT PRINTED)</small>	
COMMUNITY-PANEL NUMBER 150001 0035 A	EFFECTIVE DATE: SEPTEMBER 3, 1980
U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT FEDERAL INSURANCE ADMINISTRATION	





9

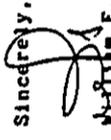


Mr. Kisuk Cheung, Chief
April 8, 1987
Page 2

d. through J. Flood zone information. Information provided in your comments will be incorporated into Exhibit 7 of the Final EIS. (SMA/FLOOD DESIGNATIONS)

Again, thank you for your comments.

Sincerely,


William E. Manket
WEM:awp

cc: Department of General Planning

April 8, 1987

Mr. Kisuk Cheung, Chief
Engineering Division
U.S. Army Engineer District, Honolulu
Building 230
Fort Shafter, Hawaii 96858-5440

Re: Responses to Comments on the DEIS for the Proposed Development at Mokuleia, Oahu

Dear Mr. Cheung:

Thank you for your comments of March 9, 1987 regarding the subject DEIS. We respond as follows:

- a. Conceptual Nature of Proposal. You are correct in your assessment of the design stage of the project. At this point the project is at the conceptual/schematic level and it is difficult to determine what permits may be required.
- b. Potential Permit Requirements. We concur with your assessment that permits may be required from the Corps for certain improvements and will contact the Corps Operations Branch when plans are available. Part XI of the EIS indicates that Corps of Engineers Permits may be necessary for the project.
- c. Erroneous Response. The applicant's response to the Corps comments on the Preparation Notice were in error when they indicated that contact with the Operations Branch had already been made.

Per 12, 1987
Sue 10/15
10/15/87
10/15/87
10/15/87



United States Department of the Interior

GEOLOGICAL SURVEY
Water Resources Division
P.O. Box 30166
Honolulu, Hawaii 96830

March 13, 1987



United States Department of the Interior

FISH AND WILDLIFE SERVICE
100 ALA MOANA BOULEVARD
P.O. BOX 50187
HONOLULU HAWAII 96850

BS
Room 6307

MAR 23 1987

Mr. Donald A. Clegg, Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Re: Draft Environmental Impact Statement, Mokuleia Development
Proposal, Mokuleia, O'ahu

Dear Mr. Clegg:

We have reviewed the Draft Environmental Impact Statement (DEIS) for the proposed Development Plan, Land Use, and Public Facilities amendments to the North Shore Development Plan and offer the following comments for your consideration.

General Comments

Our August 19, 1986 letter to Mr. K. Tim Yee; our September 18, 1986 letter to Mr. Barry Okuda; our December 22, 1986 and March 13, 1987 letters to your office; and our September 4, 1986 meeting with Mr. Barry Okuda, Mr. William Wanket, and Mr. Andy Yuen focused on the location of wetlands and their use by endangered Hawaiian waterbirds within the project area. We remain concerned about the long-term maintenance of wetlands and protection of endangered waterbirds from large-scale resort and commercial developments within the project site.

In addition to these wetland resources, we are concerned about potential secondary impacts to native dry land forest and candidate endangered plants in the Mokuleia, Makua Kea'au, and Kunokala Forest Reserves from proposed campground and hiking trail development. We are also concerned about potential impacts to nearshore water quality and fishery resources from changes in local stream drainages, increases in urban runoff, and construction of a large inland lagoon and shoreline protection structures.

Specific Comments

a. Exhibit 12, Mokuleia Conceptual Plan. The proposed conceptual plan includes a large inland lagoon directly connected to the ocean. This lagoon also encompasses the ponds at Crowbar

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 for the Mokuleia Development
Proposal, Mokuleia, Oahu

The Hawaii District office of the U.S. Geological Survey, Water Resources
Division has reviewed the subject DEIS and has no comments.

As requested, we are returning the Draft EIS to the State Office of
Environmental Quality Control; and thank you for the opportunity to review
it.

Sincerely,

William Meyer
District Chief

Rec'd 3-11-87

Copy to: Mr. Barry B. Okuda
Barry B. Okuda, Inc.
Puuhi Tower, Suite 1900
1001 Bishop Street
Honolulu, Hawaii 96813

NO RESPONSE REQUIRED



Save Energy and Yay Serve America!

beach and wetlands at the mouths of Makalea and Kapala'au streams. This lagoon design would eliminate endangered waterbird habitat and use of these ponds and wetlands. This design is not acceptable to the Service. We support the recommendation in the DEIS (pages IV-10, IV-14, and 41 of Appendix I) that design, planning, and modification of these wetlands be done in coordination with our office. We recommend the State Division of Forestry and Wildlife also be consulted on potential wetland modification.

b. Pages II-14, III-5, IV-61-62, IV-60-61, and IX-15. Camping and Hiking Trails. The DEIS states that additional trails and campgrounds may be developed in the dry upland areas to provide "nature/recreational" sites available to the general public. The location of potential campsites and trails within the arid upland areas should be specified in the final EIS.

We are concerned about potential secondary impacts to native dry land forest and candidate endangered plants found in the Mokule'ia, Makua Kea'au, and Kuaokala Forest Reserves from increased camping and hiking activities in the upland areas. Several candidate endangered plants including *Cyrtosperma*, *Schizaea*, *Mauiella*, *Naupaka*, *Phyllanthoides*, *Alpinodendron*, *Obolus*, *Metrosideros*, *Melastomifolia*, *Zabihopfia*, *Heulandiasia*, and *Isopogon* are found within the Mokule'ia Forest Reserve. Of these, *Cyrtosperma* is one of the rarest and is presently under review by our Washington office for listing as an endangered species. In 1981, this plant was restricted to two disjunct populations of 22 adults, 21 subadults, and 6 juveniles at Pahole Gulch and 3 adults and 15 juveniles at Kahanaiki Valley (enclosure 1).

Increased camping and hiking activities in the dry upland areas of the Mokule'ia project may substantially increase the potential for accidental wildfires spreading into the forest reserves and destroying these candidate endangered plants. Fires spreading into these forest reserves may be difficult to control because of the topography, isolation, and abundance of inflammable grasses and other vegetation. In addition to fire threat, camping activity may increase the potential for introduction of exotic plant competitors into the forest reserves and improved access roads and trails may encourage off-road-vehicle activity causing erosion and habitat degradation. The Final EIS should discuss potential secondary impacts to the native dry land forest and candidate endangered species and mitigation measures such as fire control.

c. Page IV-6. Nearshore Marine Environment. This section states the major impact to nearshore waters would be the rerouting of Kapala'au Stream to Makalea Stream. However, the

construction of a large inland lagoon directly connected to the ocean would be an additional major impact to water quality and nearshore fishery resources at Kai'ahulu Bay. The inland lagoon may intercept the groundwater table and concentrate the release of low salinity waters at the mouth of the lagoon. This may lower the salinity immediately within Kai'ahulu Bay. The lagoon waters may also be enriched with nutrients from groundwater inputs, and depending on the lagoon's flushing characteristics, may cause algal blooms within the lagoon. These nutrient levels and algal blooms may affect water quality within Kai'ahulu Bay. These impacts should be discussed in the final EIS.

In addition, potential impacts to threatened green sea turtles (*Chelonia mydas*), endangered humpback whales (*Megaptera novaeangliae*), and nearshore fishery resources should be discussed with the National Marine Fisheries Service and the State Division of Aquatic Resources, and addressed in the final EIS.

d. Page IV-8. Coastal Erosion. This section states that coastal erosion may be artificially stabilized by constructing seawalls or other barriers. These barriers should be discussed in the final EIS. If construction work in coastal waters is planned, we recommend the applicant contact the U.S. Army Corps of Engineers for permit requirements.

e. Page IV-13. The Federally listed endangered Hawaiian moorhen (*Gallinula chloropus sandvicensis*) has been observed in the wetland areas near Kapala'au and Makalea streams. The effect of rerouting Kapala'au Stream to Makalea Stream on endangered waterbirds and their wetland habitats should be discussed in the final EIS. It is not clear if the terrestrial fauna survey (Appendix I) included these wetlands.

f. Page IV-55-56. Sewage Disposal. The DEIS states that a sewage disposal system would be needed to accommodate the proposed development. The final EIS should discuss whether an ocean outfall would be used for effluent disposal.

g. Page IV-57-58. Drainage. This section states that runoff would be contained within a retention basin on the mountainside of Farrington Highway. The effectiveness of the proposed retention basin to contain runoff and limit sediment input into nearshore waters should be discussed in the DEIS. In addition, the discharge of stormwater runoff containing waste petroleum products from streets and parking areas may render the retention basin unsuitable as endangered waterbird habitat. We support the use of retention basins, and recommend parklands, open spaces, and dry wells be used to prevent stormwater runoff from entering coastal waters.

Summary Comments

Native dry land forest, candidate endangered plants, wetlands, endangered waterbirds, nearshore fishery resources, and water quality may be affected by proposed resort developments at Mokule'ia. We are available to work with the developer to further identify candidate endangered plant species within the Mokule'ia, Makua Kea'au, and Kuokala Forest Reserves and mitigation measures to protect these resources; on the design, protection, and management of wetlands and endangered waterbird habitats; and on protection of nearshore fishery resources and water quality affected by the proposed project. For further information, please contact Mr. John Ford (541-2757) or Mr. Andy Yuen (541-2761).

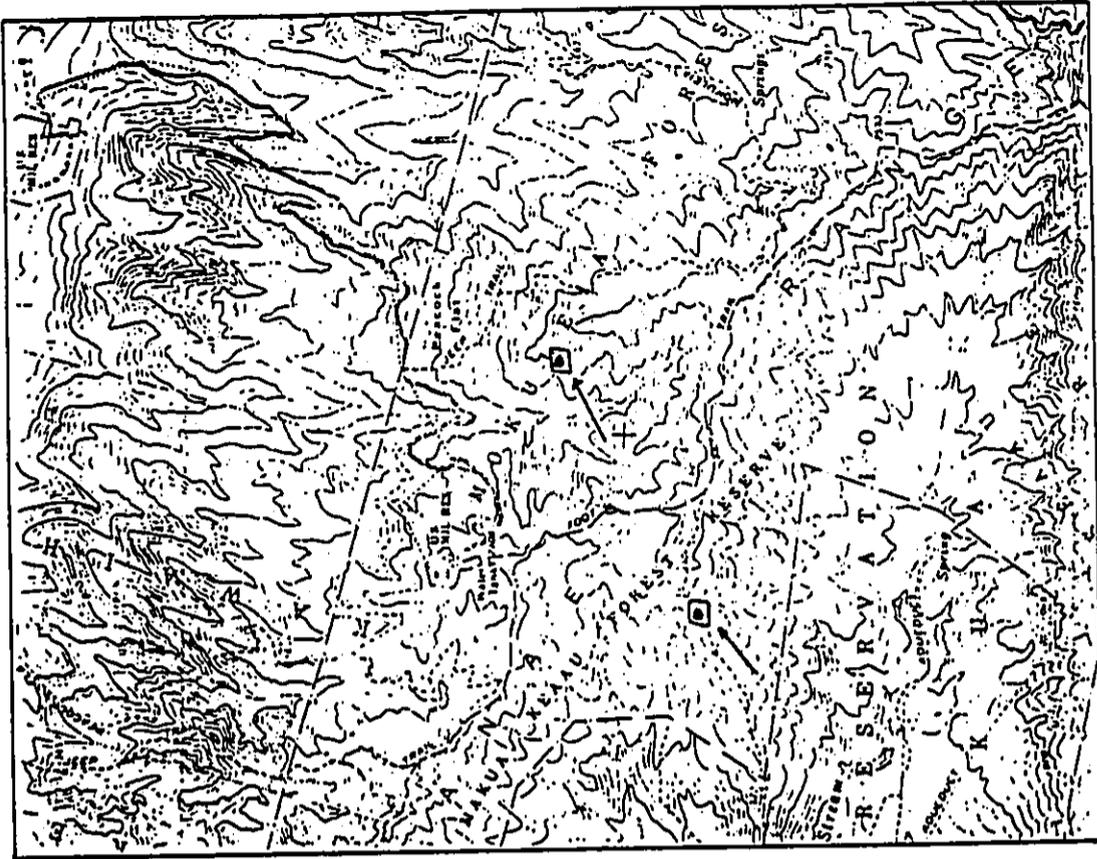
We appreciate the opportunity to comment.

Sincerely,


Ernest Kosaka
Project Leader
Office of Environmental Services

Enclosure

cc: DLNR - MPPO
NMFS - Hawaii
CZM, Hawaii
FWS, Portland
EPA, San Francisco
CE, Operations Branch
✓ Mr. William Wanket
OHA
OEGC



Enclosure 1. Populations of *Cyanea superba* at Pahole Gulch and Kahanaiki Valley, O'ahu. Base Map: Ka'ena quadrangle. Source: Status Survey for *Cyanea superba*, U.S. Fish and Wildlife Service.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

100 ALA MOANA BOULEVARD
P O BOX 50121
HONOLULU, HAWAII 96810

BS
Room 6307
MAR 13 1987

Mr. Donald A. Clegg
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, HI 96813

Re: 1987 Development Plans Annual Amendment Review, Oahu

Dear Mr. Clegg:

We have reviewed the 1987 Development Plans Annual Amendment Review for Oahu and offer the following comments for your consideration.

- a. Wetlands and buffer zones within the proposed development at Mokuia (DGP Reference No. 87/MS-1) should be zoned preservation to protect their habitat values for Federally listed endangered Hawaiian waterbirds (enclosure 1). The Hawaiian coot (*FULICA AEGIFIDA ALAI*), Hawaiian moorhen (*GALLINULA CHLOROPHYS SANDWICENSIS*), and the Hawaiian stilts (*HIMANTOPUS SPHINXUS HONGKONGI*) have been observed using the wetlands at Mokuia.
- b. Details of the proposed Mokuia Resort Water Wells (DGP Reference No. 87/MS-1007) should be reviewed by the appropriate natural resource agencies to insure that groundwater withdrawal will not adversely affect wetlands in the project area.
- c. Our office is working with Campbell Estate to eliminate runoff and drainage from the proposed industrial site (DGP Reference No. 87/MI-1) from affecting the Service's James Campbell National Wildlife Refuge, Kii Unit (enclosure 2). We request that this drainage problem be resolved prior to the proposed land use designation change from Agriculture to Industrial.
- d. The proposed development of 1,260 residential units (DGP Reference No. 87/E-2) adjacent to the Service's Pearl Harbor National Wildlife Refuge, Honolulu Unit, may be incompatible with Refuge goals and mandates (enclosure 3). A large residential development may create adverse secondary impacts to

our Refuge from increased predation of endangered waterbirds by pet and feral dogs and cats, increased disturbance to endangered waterbirds from trespassers and increased human activity near the Refuge, and changes in runoff patterns and water quality. At this time, we recommend further study and discussion of the potential impacts to our Refuge from the proposed housing development before amending the land use designation for this site.

We appreciate this opportunity to comment. If you have further questions, please contact Mr. John Ford (541-2757) for further coordination.

Sincerely

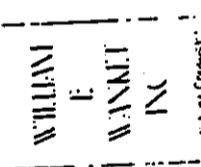
Ernest Kosaka
Ernest Kosaka
Project Leader
Office of Environmental Services

Enclosures

cc: RWR
DLHR



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Mr. Ernest Kosaka
April 8, 1987
Page 2

this scope and scale. We believe that the approach taken in the DEIS to identify and discuss areas of concern as well as to indicate potential mitigating measures is the intent of the EIS process. We intend to expand the discussion in the Final EIS on the issues raised in the comments to the DEIS by agencies and others commenting.

Responses to Specific Comments

a. Inland Lagoon: The conceptual plan and choice of the word "lagoon" as the impression of an inland body of water with some sort of connection to the ocean is unfortunate. Perhaps a better description would be water feature or open space/water feature. No ocean connection via stream is intended or planned. The large pond area could actually consist of a number of independent ponds separated by landscaped buffer zones.

The applicant notes that you support the DEIS recommendation that the applicant work with your office in the design, planning and modification of the wetlands areas. In addition, your suggestion of coordinating and consulting with State Division of Forestry and Wildlife on potential wetland modification will be incorporated into the Final EIS.

The fact that there have been communications on a number of occasions between your office and the applicant indicate a willingness to work together on both sides.

b. Mountain Access

The question of mountain access has been the subject of a number of comments on the DEIS and in discussions that the applicant has had with community groups and area residents. Comments from the Department of Land and Natural Resources and Department of Planning and Economic Development underscore a keen State interest. It should also be noted that State and County law and ordinances require that mountain access be provided in the case of developments such as the proposed Mokuleia development. It should also be pointed out that the information provided by Fish & Wildlife indicates that the area where the endangered plants are located are owned and under the control of the Board of Land and Natural Resources and its Forestry Department which currently maintains trails and camping areas in the Peacock Flats area. The

April 8, 1987

Mr. Ernest Kosaka
Project Leader
Office of Environmental Services
United States Department of the Interior
Fish & Wildlife Service
300 Ala Moana Boulevard
P.O. Box 50167
Honolulu, Hawaii 96850

Re: Responses to Comments on the DEIS for the Proposed Development at Mokuleia, Oahu

Dear Mr. Kosaka:

Thank you for your comments of March 23, 1987 regarding the subject EIS. We respond as follows:

General Comments

The general comments included concerns focused on the location of wetlands, their use by endangered Hawaiian Water Birds, and the long term maintenance and protection of these habitats. In addition, concerns include endangered plants in the dry land forest as well as impacts on near-shore water quality, fishery resources, urban runoff construction of an inland lagoon and shoreline protection structures.

Response

We share your concern for the general issues raised. The plan which has been developed is conceptual at this time and therefore cannot contain design details which demonstrate final solutions to numerous issues raised by a project of

Page 2
S.W.K.
W.E.W.
P.L.
4-8-87

applicant has proposed access via the existing Nike Road to the mountain areas.

The intent of the development proposal is to re-establish public access to the forest reserve and Peacock Flats area under a controlled management program. The program would include supervised use of this wilderness area for recreational/educational purposes, thereby minimizing the danger to endangered plant species and increasing the public's awareness of the unique flora to the area. A resource management program will be developed to control access and activity relative to the maintenance and management of this sensitive ecosystem.

Camping and Hiking

The DEIS states that additional trails and campgrounds may be developed in the upland areas which would be available to the general public. The U.S. Fish & Wildlife Service is concerned about the secondary impacts to the native dryland forest and candidate endangered plant species found on the adjacent Mokule'ia Forest Reserve and the Pahole Natural Area Reserve by the increased human activity.

A number of mitigating measures are available, including:

1. Keep upland areas in present use. These upland areas have been used for grazing cattle. Grazing cattle and, perhaps, horses could be continued. Guided activities such as horseback riding and nature walks could be allowed.
2. Limited use. The upland areas could be opened for day hikes only, no camping. Picnic shelters with appropriate facilities for open fires for cooking would be established.
3. Camping and hiking allowed. Increased activity in the upland areas will require an active management and control system. The following suggestions are offered.
Upland Resource Management Program. This program (manager and staff) would be involved in issuing camping permits, monitoring and policing visitors and campsites, trail maintenance, etc.

This office would be responsible for making sure Mokule'ia bikers and campers do not go onto State forest reserve lands without appropriate permits from DOFAW. The office would also work closely with DOFAW and the Division of Conservation and Resources Enforcement (DOCARE) as well as the U.S. Fish and Wildlife Service.

Fire Control System. Camping allowed only on designated areas with facilities for open fires--fire pits, barbecue grills, etc. Or open fires could be banned; gas stoves, sterno, etc. used for cooking. Water tanks should be located near each campground. A system of firebreak roads and a fire fighting plan should be set up in coordination with DOFAW.

In the options presented above, all vehicular traffic would be restricted to paved or gravel-lined roads (for service vehicles). NO off-road vehicle (ORV) activity, dirt-bikes, etc., would be allowed.

A Resource Management Program would be developed in consultation with the Fish and Wildlife Service, the Board of Land and Natural Resources Forestry Division, and other concerned and interested parties. The applicant believes that this would be the most appropriate forum for developing a mountain access program which addresses the many concerns.

- c. Lagoon/ocean connection. As discussed in our reply to Comment (a), no connection is planned or envisioned between the "lagoon" and the ocean. As indicated, the plan is conceptual and suggests an area set aside to provide for maintenance of wildlife as well as to provide for drainage improvements. Discharge into the ocean would be limited to intermittent drainage requirements caused by heavy rains which exist today and cause intermittent discharge into the bay. Through the construction of drainage improvements such as settling basins and holding ponds it is possible to maintain or discharge at current levels or less and to maintain or improve the quality of the water being discharged. Green sea turtles and humpback whales will be discussed in the Final EIS.

Mr. Ernest Kosaka
April 8, 1987
Page 5



DEPARTMENT OF THE NAVY
COMMANDER
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96822-5000

5090
Ser 002B/394
6 MAR 1987

d. Seawalls/artificial barriers. The EIS stated that construction of seawalls was a potential mitigating measure. It is not the applicant's intent to propose the use of seawalls or artificial barriers. The mention of seawalls in the EIS was simply to disclose that they are available as an option, although an undesirable one. The Final EIS will clarify this point. The applicant prefers the use of setbacks in order to mitigate against erosion potential.

e. Rerouting streams. As indicated in the responses to Comments (a) and (c), the concept plan showed a single stream. This would potentially reduce the stream-associated wetlands area. The fauna survey did consider this area, however, concentrated on the pond areas where higher concentrations of endangered birds were thought to be present. This point will be clarified in the Final EIS.

f. Sewage. The DEIS states that disposal of effluent would be in injection wells. The Final EIS will contain an expanded discussion of sewage.

g. Drainage. The Drainage section of the EIS will be modified to include the suggestions made in this comment.

Comments made by your Department on March 13, 1987 regarding the subject project on the 1987 Development Plan Annual Review will be included in the Final EIS.

Again, thank you for your comments.

Sincerely,

William E. Manket
WEM:awp

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:

DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
MOKULEIA DEVELOPMENT PROPOSAL

The Draft EIS for the Mokuleia Development Proposal 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,

T C CRANE
Captain, CEC, U.S. Navy
Marines Engineer
In direction of the Commander

Enclosure

Copy to:
Mr. Barry R. Okuda
Barry R. Okuda, Inc.
Faunahi Tower, Suite 1900
1001 Bishop Street
Honolulu, HI 96813



Rec'd 3-9-87

Office of Environmental Quality Control

NO RESPONSE REQUIRED

Mr. Henry A. Sumida
April 8, 1987
Page 2

Derby and Associates, our acoustical consultant, has been retained to review and assess the additional information received and their input will be included in an expanded noise section of the Final EIS.

Sincerely,


William E. Wanket

WEW:avp

cc: Department of General Planning

26P 3/27 1026



JOHN WAINES
GOVERNOR

SUZANNE D. PETERSON
CHAIRPERSON, BOARD OF AGRICULTURE
TADASHI TOJO
DEPUTY TO THE CHAIRPERSON

(P)1208.7

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So King Street
Honolulu, Hawaii 96814-2512
March 24, 1987

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

Mr. Donald A. Clegg
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street, 8th Floor
Honolulu, Hawaii 96813

MEMORANDUM

To: Mr. Donald A. Clegg
Chief Planning Officer
Department of General Planning
City and County of Honolulu

Subject: Draft Environmental Impact Statement (DEIS) for
Mokuleia Development Proposal (Secondary Resort Area)
Mokuleia, Oahu

THK: 6-8-02: 1, 6, 10, 14
6-8-03: 5, 6, 11, 15, 16, 17, 19, 20,
30, 31, 33, 34, 35, 38, 39, 40
6-8-08: 22
Area: 2,887.2

Dear Mr. Clegg:

Subject: Mokuleia Development Proposal

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

Very truly yours,

J. Tomioka
TEJUANE TOMIOKA
State Public Works Engineer

EH:jk
cc: Mr. Barry R. Okuda

The Department of Agriculture has reviewed the subject DEIS and offers the following comments.

The DEIS addresses many of the concerns we expressed in our July 8, 1986, comments on the Environmental Impact Statement Preparation Notice, as well as our December 22, 1986, comments on the earlier DEIS. However, there remain several issues that need further elaboration.

Exhibit 10 of the subject DEIS is a copy of the Land Study Bureau (LSB) Detailed Land Classification map for the area, including the proposed resort development. There should be a textual description of the LSB soil classification system similar to that done for the Soil Conservation Service (SCS) Soil Survey and the Agricultural Lands of Importance to the State of Hawaii (ALISH) maps.

We requested information on "(t)he effect of the proposed development on the ongoing cultivation of sugarcane in fields adjacent to the portion of the project on the mauka side of Farrington Highway" (memorandum to Mr. Barry R. Okuda, dated July 8, 1986). We note that the DEIS describes the potential noise from sugarcane operations (DEIS, page IV-25). There may also be adverse impacts associated with the burning of

NO RESPONSE REQUIRED

Mr. Donald A. Clegg
March 24, 1987
Page -2-

cane fields prior to harvesting. The Hawaii Right-to-Farm Act (Chapter 165, Hawaii Revised Statutes) limits the circumstances under which existing farming operations may be deemed a nuisance.

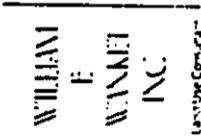
The DEIS contains a rather pessimistic view of agriculture in Hawaii (DEIS, page IV-16 to IV-21, and Appendix G). The Department of Agriculture takes a more optimistic and broader view of the future of agriculture in Hawaii. In the determination and protection of "important agricultural lands", it is the State's duty to assure the availability of agriculturally suitable lands. Therefore, it is appropriate that the State maintain what appears to be a surplus of productive lands as a resource in their own right. Incremental losses of a resource like prime arable land, if left uncontrolled, will have a devastating and irreversible cumulative effect on the viability of agriculture. Once agricultural lands are urbanized there is no return. This cannot be overemphasized.

There is no reference in the DEIS to Priority Guidelines 226-104(b)(2) and 226-106(1) which direct development into marginal or non-essential agricultural lands to meet housing needs, and "... (maintain) agricultural lands of importance in the agricultural district".

Thank you for the opportunity to comment.

SUZANNE D. PETERSON
Chairperson, Board of Agriculture

CC: Barry R. Okuda
OEOC
LJC
DRED
DLJ



April 8, 1987

Ms. Suzanne D. Peterson, Chairperson
Board of Agriculture
Department of Agriculture
P.O. Box 22159
Honolulu, Hawaii 96822-0159

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuleia, Oahu

Dear Ms. Peterson:

Thank you for your comments of March 24, 1987 on the subject
DEIS. We respond as follows:

Comment, page 1, paragraph 3: "There should be a textual
description of the LSB soil classification system similar to that
done for the Soil Conservation Service (SCS) Soil Survey and the
Agricultural Lands of Importance to the State of Hawaii (ALISH)
maps."

Response: A legend on the LSB map will be included in the Final
EIS. As noted in the LESA report, the LSB of the University of
Hawaii (UH) prepared an inventory and evaluation of the State's
land resources during the 1960s and 1970s. The Bureau grouped
all lands in the State, except those in the urban district, into
homogeneous units or land types; described their condition and
environments; rated the land on its overall quality in terms of
agricultural productivity; appraised its performance for selected
alternative crops; and delineated the various land types and
groupings on aerial photographs. Lands were segregated into
land types or groupings based on soil properties and productive
capabilities. These properties included: texture (sand, silt,
clay); structure (size, shape and amount of clumps); depth;

File No. _____
Site No. _____
Map Sheet No. _____
Scale: _____
Date: _____

drainage; parent (geological) material; stoniness; topology (slope and surface configuration); climate; and rain. A five-class productivity rating system was developed with "A" representing the class of highest productivity and "E" the lowest.

An evaluation of the subject lands based on the LSD soil classification would lead to the same conclusions as given in the DEIS based on the SCS and ALISH classifications regarding the suitability of the lands for agriculture.

Comment, page 1, paragraph 4: "We requested information on (the effect of the proposed development on the ongoing cultivation of sugarcane in fields adjacent to the portion of the project on the mauka side of Farrington Highway."

Response: Cane burning in preparation for harvesting may pose a nuisance to resort and residential development in the proposed project, however, as pointed out in your comment, the Hawaii Right to Farm Act (Chapter 165, H.R.S.) limits the circumstances under which existing farm operations may be deemed a nuisance. In essence, responsibility for taking mitigating measures would rest with the resort and residential development.

A number of mitigating measures could be undertaken to minimize the impact of the burning on the proposed development.

1. Setbacks. Setbacks from sugar growing areas could provide for some protection against the heaviest smoke, allowing the smoke to dissipate somewhat before reaching developed areas.
2. Landscape barriers. Landscape barriers could provide some measure of slowing the smoke, thus allowing it to disperse in other areas.
3. Notification. Notification of the potential smoke problem would allow especially sensitive residents or guests to take appropriate action such as staying indoors and keeping windows and doors shut while burning takes place.
4. Coordination. Establishing a close working relationship with the sugar company would allow for coordination of resort/residential activities to minimize conflicts with cane burning operations.

Within the State of Hawaii there are many examples of Resort and Agricultural enterprises which coexist in close proximity to each

other, i.e., Kaanapali and Kapalua resorts on Maui. We believe that these impacts can be minimized through planning and cooperation.

Comment, Page 2, Paragraph 1: "The DEIS contains a rather pessimistic view of agriculture in Hawaii. The Department of Agriculture takes a more optimistic and broader view of the future of agriculture in Hawaii. In the determination and protection of 'important agricultural lands,' it is the State's duty to assure the availability of agriculturally suitable lands. Therefore, it is appropriate that the State maintain what appears to be a surplus of productive lands as a resource in their own right. Incremental losses of a resource like prime arable land, if left uncontrolled, will have a devastating and irreversible cumulative effect on the visibility of agriculture. Once agriculture lands are urbanized there is no return. This cannot be overemphasized."

Response: The agricultural analysis contained in the DEIS is based on assumptions which are optimistic in terms of crops which can be grown profitably in Hawaii and at achievable levels of self-sufficiency. However, the projected demand and land requirements are more conservative than those contained in the State's analysis for LESA because the assumptions are more realistic. Nevertheless, a careful reading of the LESA report supports the conclusions contained in the DEIS: Comparatively little prime agricultural land will be required for diversified agriculture--less than 9,000 acres statewide, and about 2,240 acres for Oahu. This is a small fraction of the supply of land available to profitable diversified agriculture. This supply comprises (1) lands which have already been released from sugar and pineapple, (2) lands which are likely to be released from sugar in view of the marginal profitability of the industry, and (3) sugar lands which are in holding while awaiting the discovery of profitable crops. Even if extensive urbanization is assumed, the limiting factor for Hawaii's diversified agriculture industry is the market demand, and not the availability of land.

It is agreed that the State should assure the availability of agriculturally suitable land, and that a surplus of productive lands should be maintained. However, it is extremely unlikely that uncontrolled incremental losses of prime arable land would lead to a devastating cumulative effect on the viability of agriculture--the supply of land is too large compared to the combined demand of land for diversified agriculture and urbanization. This is true not only for Hawaii, but for nearly all of the world's developed countries; for the U.S., the excess

Ms. Suzanne D. Peterson, Chairperson
April 8, 1987
Page 4

capacity of agricultural land has been estimated at about 45 million acres (Michael T. Belongia, "The Farm Sector in the 1980s: Sudden collapse or Steady Downturn?", Review, Federal Reserve Bank of St. Louis, November 1986). From the viewpoint of feeding the world's population, this is a very optimistic situation which disproves Thomas Malthus; technology advances have resulted in yields increasing faster than population, with the result that ample food is produced while valuable land and other resources are freed for other uses within the economy. Aspartame alone has the potential of freeing sufficient prime agriculture land to cover all of Pennsylvania.

Finally, efforts to preserve prime agricultural land can indeed be overemphasized. Excessive preservation of prime agricultural land in the hope of future agriculture may be at the expense of normal and proper urban development, substantially higher housing prices, and the prevention of far more non-agricultural jobs than could ever be generated by agriculture.

Comment, page 2, paragraph 2: "There is no reference in the DEIS to Priority Guidelines 226-104(b)(2) and 226-104(i) which direct development into marginal or non-essential agricultural lands to meet housing needs, and (maintain) agricultural lands of importance in the agricultural district."

Response: The guidelines are as follows:

226-104(b)(2): "Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district."

226-101(i): "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."

The second of these guidelines concerns affordable housing, not a secondary resort.

Regarding Guideline 226-104(b)(2), it should be noted that it is a "guideline." As such, deviations from it should occur where warranted. If this were not the case, and all urban development were forced to locate only on lands which are already zoned urban or which are regarded as "marginal or non-essential agricultural lands," then the impact on Oahu's economy and housing market would be devastating. This is because the supply of lands that

Ms. Suzanne D. Peterson, Chairperson
April 8, 1987
Page 5

would be appropriate for urban development (based on location, slopes, access, etc.) would be insufficient to accommodate expected economic and population growth, and provide a reasonable amount of competition among landowners.

Furthermore, a secondary resort located at Mokuiaia would further other economic objectives, policies, and priority guidelines of the State (see DEIS, pp. IX-1 to 13).

Again, thank you for your comments.

Sincerely,



William F. Wanket

WEk:awp



STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2100
HONOLULU, HAWAII 96810

March 3, 1987

OFFICE OF THE SUPERINTENDENT

STATE OF HAWAII
DEPARTMENT OF DEFENSE
CHIEF OF THE ENGINEER CORPS
MILITARY ENGINEERING CENTER
HONOLULU, HAWAII 96810

HIENG

10: 3 887

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:

Mokuleia Development Proposal
Mokuleia, 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.

Yours truly,

[Signature]

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

cc: Barry R. Okuda, Inc. ✓

Rec'd 3-1-87

NO RESPONSE REQUIRED

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: Mokuleia Development Proposal

Our review of your proposed development indicates that it will have the following enrollment impact on our area schools:

School	Grade	Students
Matalua Elementary	K-6	50-100
Matalua High-Intermediate	7-12	40-80

Schools at all levels in this service area are operating at capacity. Additional classrooms will need to be budgeted to accommodate the projected enrollment increase.

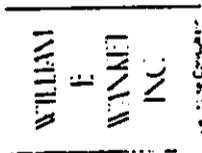
Please keep me informed of any changes to the project plans.

Sincerely,

[Signature]
Charles T. Toguchi
Superintendent

CTT:dk (MRI)
cc Mr. Barry R. Okuda
Mr. Chris Ito, OBS
Mr. Liberato Viduya, Central Dist.

Rec'd 3-4-87



JONI WAHEE
Director of Parks

WILLIAM M. PATY
Director of Land & Natural Resources
EVERETT A. LAMORELLO
Deputy Director
DIVISIONS:
REGULATORY DEVELOPMENT
PLANNING
RECREATION
CIVIL ENGINEERING
HAWAIIAN HISTORICAL SOCIETY
CONSERVATION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P O BOX 521
HONOLULU HAWAII 96809

April 8, 1987

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

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuleia, Oahu

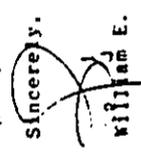
Dear Mr. Toguchi:

Thank you for your comments of March 3, 1987 regarding the
subject DEIS. We respond as follows:

The enrollment information contained in your comment was
included in the DEIS on page IV-64 under the heading
"11. Schools." The applicant will keep the Department
informed as to the progress of the approval process in
order to be included in the Department's planning and
budgeting process.

Again, thank you for your comments.

Sincerely,


William E. Kanket

WEK:awp

Page 10
5-10-87
Honolulu, Hawaii
10-10-87

MAR 20 1987

DOC. NO.: 27338
FILE NO.: 87-58

Honorable 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 (EIS), Mokuleia
Development Proposal, Mokuleia, Oahu

Thank you for the opportunity to review the Draft EIS. Our
concerns are as follows:

Aquatic Resources Concerns:

There is no convenient public access to any part of the beach west
of Kaiala Bay. Fishing activity along this section of coast is
moderate, limited mainly by lack of access. Pole fishing is most
popular, with ulua, papio, goatfish, moi, oio and other species
caught from shore. Throw netting is common. Spearfishing occurs
around the channels offshore of Mokuleia Army Beach and some net
fishing takes place in sand channels offshore.

The Final EIS should detail specific provisions for improving
public access to the shore. Detailed information should be
provided on access points, public beach facilities and parking to
accommodate the public.

Although some information has been provided by the applicant's
consultant on the proposed rerouting of drainage from Kapalaau to
Makaleha Stream, the Final EIS should define the measures planned
to prevent or mitigate impacts of silting and sedimentation, along
with the associated turbidity, on nearshore resources. Discussion
is also needed on the suggested no increase or decrease in runoff
after the development; the increase in impermeable areas (roads,
buildings, and so forth) to reduce natural seepage.



The projected sewage treatment facility should be designed to be "fail-safe" and approved by the Department of Health, to prevent effluent from contaminating coastal waters.

Precautions should be taken during construction so that eroded soils, petroleum products, fertilizers, pesticides and other potential contaminants associated with this development do not blow, leach or flow into the streams, wetland areas, or coastal waters.

Finally, any proposed shoreline modifications such as grading, sea walls, and so forth should be described fully and submitted to the Department for review.

Forestry and Wildlife Concerns:

This draft EIS is incomplete in addressing our concerns in the following areas:

1. Existing Wetland Areas (IV-14)

The impacts and mitigating measures are not yet defined. The EIS does, however, mention that an assessment of the flora and fauna which exist in the wetland areas will be available for use in more detailed planning and siting of structures. Design and planning of the areas will be done in consultation with the U.S. Fish and Wildlife Service. The Flora and Fauna Study (Appendix I) does not mention that the Hawaiian stilt and Hawaiian gallinule have been sighted within the proposed development area. At this stage it is not clear if another assessment of the flora and fauna will be conducted.

2. Public Access to the Forest Reserve (IV-51)

Under the heading "Anticipated Impacts and Mitigative Measures" it is mentioned that the current intent is to improve the jeep access road to Peacock Flat possible with general public access. This is the only section of the EIS where public access to the forest reserve is mentioned. A higher priority should be given to this anticipated improvement.

3. Wildfire Contingency Plan

No mention is made of a wildfire contingency plan that addresses fires starting from the development area and moving into the forest reserve (such as the need for fire suppression activity, access, firebreaks, etc.)

The final EIS should discuss these areas in more detail.

Historic Sites Concerns:

We concur with the conclusions of the consulting archaeologist, which state that intensive archaeological survey and testing needs to be conducted prior to development of these parcels.

We note that on page IV-14 of the EIS, that only the four known sites are noted as of potential significance, and deserving of additional study. This is not quite what the consulting archaeologist had in mind, as he points out that the 2,800 acres involved in this development have never had systematic archaeological surveys. The entire Mokuleia area almost certainly supported a fairly large precontact population, and almost nothing is known of archaeological remains there.

Under the heading of Mitigative Measures, the statement is made that the developer will work with the State Historic Preservation Officer, follow procedures compatible with State law, and follow the recommendations outlined in the archaeological report. If these intentions are carried out, our office's archaeological concerns will be met.

If there are any questions arising from this review, please call Dr. Joyce Bath, Historic Sites Section (548-7460).

Recreational Concerns:

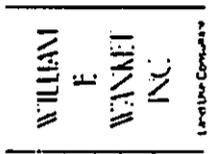
The subject draft EIS, has identified the Kaena Point area as being part of Kaena Point State Park. However, it has failed to identify Peacock Flats as being a part of the 1978 Kaena Point State Park Conceptual Plans, which discussed this park.

Water and Land Development Concerns:

Water Resources

The developer intends to install pumps and appurtenances on three existing wells and drill and develop a fourth well to supply 2.0 mgd of potable water and an additional 1.5 to 2.0 mgd for irrigation purposes.

The developer has clearly indicated that the project is located within the Mokuleia Sub-Area of the Waialua Ground Water Control Area and that permits from the Department of Land and Natural Resources are required for development of ground water under Chapter 177, HRS, and Chapter 166 of Title 13. Statements on page IV-4 indicating a sustainable yield for the Mokuleia Sub-Area of 20 mgd are correct.



Wastewater Treatment

We note the intention to dispose of treated wastewater effluent in injection wells. Serious consideration should be given to using the treated effluent for irrigation of the two golf courses and all landscaped areas.

Drainage Improvements

In addition to the on-site drainage improvements, the project includes a proposal to divert the flow of Kapala'au Stream to Makaleha (Makaleha) Stream (pg. III-6, IV-6/7, IV-58, and Appendix F). References to the proposed diversion are found throughout the DEIS; however, the actual reason for the rerouting of the stream has not been stated. The document should provide additional pertinent information on characteristics and flow of both streams, including instream and wetland habitat values. A map showing the proposed point of diversion and route to the Makaleha Stream outlet should also be included. Ultimately, a drainage master plan that includes the proposed stream diversion should be prepared.

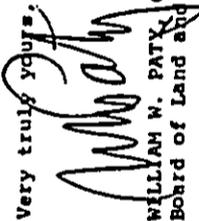
We note one inconsistency in the description of potential impacts to the nearshore marine environment (pg. IV-7) and project site drainage (pg. IV-58). In discussing the nearshore impacts, runoff is not expected to increase; however, in discussing the development of a drainage system on pg. IV-58, it appears an increase in runoff is anticipated.

Coastal Erosion

Adequate shoreline setback should be provided to ensure that all coastal development is protected from coastal erosion.

Thank you for your consideration of our concerns.

Very truly yours,


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

cc: Barry R. Okuda

Rec'd 3-20-87

April 8, 1986

Mr. William Paty, Chairman
Board of Land and Natural Resources
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuieia, Oahu

Dear Mr. Paty:

Aquatic Resources Concerns:

Although the project proposes the deletion of two proposed public parks, it also offers opportunities for increased recreational uses of the beach and mountain areas, perhaps equal to or greater than the potential of the two deleted parks, one of which is site undetermined and planned for seven years and beyond (since 1983). Although specific site locations and plans are not illustrated, it is the applicant's stated intent in the DEIS that beach accessways and parks are an integral component of the development and that they will be provided to meet recreational needs. These recreational needs will be developed and determined through discussions with the community, Departments of Land and Natural Resources and Parks and Recreation, as well as with the City Council, throughout the entire planning process. The exact location, scope and design, and the type and number of beach accessways and parks will reflect the results of these discussions.

The existence of public park sites on the development plans in no way ensure the implementation of these sites as park

Public Board
Staff Office
1900 Bishop Street
Honolulu, Hawaii 96813
Phone:
(808) 531-1911

Mr. William Paty, Chairman
April 8, 1987
Page 3

Historic Site Concern:

The applicant will carry out the mitigation measures recommended in the DEIS.

Recreational Concerns:

The inclusion of Peacock Flats in the conceptual plan for Kaena State Park will be discussed in the Final EIS.

Water Resources:

No response required.

Sewage:

Consideration will be given to use of effluent on golf course development.

Drainage:

The Final EIS will include an expanded discussion of the impacts of stream diversion.

We believe that the nearshore impacts and drainage impacts sections of the DEIS are consistent. Development of the property with roads, buildings and other impermeable surfaces will increase the potential for runoff. The construction of drainage improvements will mitigate the amount of discharge into the ocean under storm conditions to current or lower levels. Therefore statements in both sections are consistent.

Coastal Erosion:

Adequate shoreline setbacks will be provided.

Again, thank you for your comments.

Sincerely,


William E. Kanket

#EK:awp

Mr. William Paty, Chairman
April 8, 1987
Page 2

In the five years that the two sites have been designated on the North Shore Public Facilities Map neither site has been selected for funding, and therefore remain no closer to reality than they were in 1983 when the North Shore Public Facilities Map was first adopted. Recent experience (Kuilima and West Beach) suggests that the approval process generally provides the public and government agencies with ample opportunities to improve and enhance public recreational amenities as part of the overall political approval process, including accessways to beaches, beach promenades, parks, trails and other uses. Therefore, removal of park sites from the development plan exchanges a potential for government financed recreational opportunities for guaranteed developer financed recreational opportunities.

The Final EIS will include an expanded discussion on drainage impacts on the shoreline.

Any sewer treatment facility proposed for the project would require both State Department of Health and City Department of Public Works Approval. A broader discussion of the sewer impacts will be undertaken in the Final EIS.

Additional discussion of construction impacts will be included in the Final EIS.

Shoreline Modifications: No shoreline modifications are proposed at this time.

Forestry and Wildlife Concerns:

1. Wetlands Areas: This section will be expanded in the Final EIS; however, the applicant believes that specific impacts and mitigating measures require further design development and consultation with the Department of Interior, Fish and Wildlife Division and DLNR, Forestry Division. At this point it would appear that one of the mitigating measures would be a longer term systematic study of the endangered birds and their use of the ponds. The wetland section, Part IV-1, pages IV-13 and 14, will include mention of the Hawaiian Stilt and Hawaiian Gallinule.

2. Public Access to Forest Reserve: This section of the Final EIS will be expanded.

3. Wildfire Contingency Plan: This comment will be covered in the expanded section of the preceding comments.



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
1000 KUALOAN BLVD., SUITE 1000
HONOLULU, HAWAII 96813
TELEPHONE 534-2400

COPY

March 19, 1987

Mr. Donald A. Clegg,
Chief Planning Officer
Department of General Planning
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Subject: Draft Environmental Impact Statement, Proposed Development
at Mokuleia, Waialua, Oahu

Dear Mr. Clegg:

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement (EIS) for the proposed development at Mokuleia, Waialua, Oahu.

The Office of Hawaiian Affairs' Land and Culture Divisions have reviewed the EIS for the proposed project and wish to offer the following comments.

Waterbird Habitat

Two endangered endemic waterbirds, the Koloa and the Hawaiian Coot reside within ponds located in the project area. The EIS indicates that only limited information on the use of these wetlands by endangered waterbirds is available. It acknowledges however that construction or increased human activity in the area may impact upon the wetland habitat areas.

The EIS does not discuss what the nature of these impacts may be. Moreover, the EIS does not provide any basis from which others may ascertain the nature of these impacts.

Mr. Donald A. Clegg
Page 2
March 19, 1987

In order to facilitate an adequate assessment of the impact of the proposed action upon these unique environmental resources the following information should be added to this EIS:

1. A map which clearly indicates which ponds are located within the project area. This map should also indicate how the populations of the Koloa and Hawaiian Coot are distributed throughout this habitat area. Exhibit 14A does neither.
2. Indicate clearly what the developer plans to do within the affected habitat areas. Exhibit 12 clearly identifies neither the location of the affected ponds nor what construction or activities are planned for those areas.
3. State what the probable consequences of the proposed development would be upon these species.

Historic Sites

An adequate archaeological investigation of the Mokuleia area has never been conducted. However, as Mr. Kennedy notes, Mokuleia holds much promise for future archaeological study. Preliminary survey work within the project area has revealed the existence of a number of potentially significant sites. Clearly more archaeological research in this project area needs to be done.

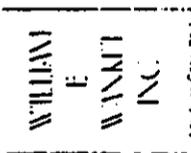
OHA supports Mr. Kennedy's recommendations that large-scale systematic archaeological testing of the entire project area, including subsurface testing, be conducted prior to any alterations to the site area. We also support his recommendation that a final report, which conforms to the standards as issued by the Society for Hawaiian Archaeology for intensive or Phase II surveys, be prepared. Please send us a copy of any such final report.

Based on these concerns, the Office of Hawaiian Affairs finds this Draft EIS to be deficient in significant areas of interest to our beneficiaries. Left unaddressed, this proposed project could be subject to OHA's opposition. Please feel free to contact Ms. Leslie Pym or Mr. Earl Neller at 946-2642 if you should have any questions.

Sincerely yours,

Kanaki A. Kanahelo
Kanaki A. Kanahelo, III
Administrator

cc: Barry Okuda
Ernest Kosaka (USFWS)
Office of Environmental Quality Control
E-11 2-2-87



Mr. Kawaki A. Kanahale, III
April 8, 1987
Page 2

bird population, the applicant has proposed working with the Federal Fish and Wildlife Division of the Department of the Interior and the State Department of Land and Natural Resources to develop a wildlife management plan for the development.

April 8, 1987

Mr. Kawaki A. Kanahale, III
Administrator
Office of Hawaiian Affairs
1600 Kapiolani Boulevard, Suite 1500
Honolulu, Hawaii 96814

Re: Responses to Comments on the DEIS for the Proposed Development at Mokualea, Oahu

Dear Mr. Kanahale:

Thank you for your comments of March 18, 1987 regarding the subject DEIS. We respond as follows:

Waterbird Habitat

Specific items requested in your comments and responses are:

1. Provide a better map of ponds and endangered bird distribution.
2. Specific plans.

The map shown on Exhibit 12 was only meant to illustrate a conceptual drawing of the proposed development; it was not meant to represent exactly the specific development. The actual design, location, improvement and construction details are specifics not called for in the development plan process, but more appropriately addressed in subsequent permit approval processes. To ensure that these details give proper consideration to the ponds and the

A map will be included in the Final EIS.

Project Name:
Subject:
Prepared By:
Date:
App. No.:

3. Probable Impacts

Increased human occupation in the areas surrounding the ponds is expected to have some impact on the waterbirds which utilize the ponds. Human disturbance and activity near the ponds will increase. This may affect breeding activity and the recovery of the endangered waterbirds. There may be increased predation of waterbirds by pet and feral cats and dogs; rodent populations may increase. In addition, there may be changes in drainage and runoff patterns as well as water quality due to construction in nearby areas.

The U.S. Fish and Wildlife Service has identified ponds around the Crowbar Ranch as important habitat for the recovery of endangered Hawaiian waterbirds. The U.S. Fish and Wildlife Service has recommended that the design, planning, and modification of the wetlands (ponds and streams) on the project site be done in coordination with their office and the State Division of Forestry and Wildlife.

The consultant has recommended that buffer zones be established around the pond areas. Existing trees and shrubs should remain intact; additional plantings should be made in those areas without shrub cover.

The developer, the U.S. Fish and Wildlife Service, and the State Division of Forestry and Wildlife should develop a long-term maintenance program for the wetlands and a protection plan for the endangered waterbirds. Fencing of the pond areas would reduce disturbance from humans and larger predators. In addition, an active trapping program for rodents and feral cats should be considered.

Historic Sites

This comment indicates that OHA supports the implementation of the recommendations of the Archaeological Report prepared for the applicant by Mr. Kennedy.

Mr. Kamaki A. Kanahahele, III
April 8, 1987
Page 3



DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT

KAHUNA KAUAHUA, 700 SOUTH KING STREET, HONOLULU, HAWAII 96813
PHONE: 535-2100 FAX: 535-2101

JOHN WAIKILI
ROBERT A. UELAND
MURRAY E. YOWELL
BARBARA ERM STANTON

DEVELOPMENT DIVISION
PLANNING DIVISION
ECONOMIC DEVELOPMENT DIVISION
COMMUNITY DEVELOPMENT DIVISION
HAWAIIAN CULTURE DIVISION
RESEARCH AND POLICY DIVISION
GENERAL ADMINISTRATION DIVISION
OFFICE OF THE ATTORNEY GENERAL
OFFICE OF THE COMPTROLLER OF ACCOUNTS
OFFICE OF THE DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF THE DEPARTMENT OF HEALTH
OFFICE OF THE DEPARTMENT OF TRANSPORTATION
OFFICE OF THE DEPARTMENT OF WATER RESOURCES
OFFICE OF THE DEPARTMENT OF ZONING AND PLANNING

Ref. No. P-6165

March 24, 1987

Section IV-J, page IV-14 of the DEIS states that the applicant will follow the recommendations of the archaeological report and work with the State Historic Preservation Officer in following procedures for development in compliance with State law.

We feel that the potential impacts and mitigating measures for both Waterbird and Historic Sites have been adequately addressed at this time in the development process. In both cases the applicant has identified a program of working with the responsible and concerned state and federal agencies to develop a program and plan over time and prior to development which will address the concerns outlined in your letter.

Again, thank you for your comments.

Sincerely,


William E. Manket
WEM:awp

The Honorable 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: DEIS for Mokuleia Development Proposal, Mokuleia, Oahu

We have reviewed the subject draft environmental impact statement (DEIS) and offer the following comments.

1. The discussion of the relationship of the proposed development to the County General Plan and Development Plan raises some questions which should be addressed further in the final EIS.

For example, page IX-11 of the DEIS indicates that the City Department of General Planning (DGP) projects a housing need in the year 2005 of 6,000 units for the North Shore area in support of a 15,600 population. Page 40 of Appendix C supports this contention, but further indicates that only 200 new dwelling units will be required to meet the year 2005 population target of 29,100 for the combined Koolauloa/North Shore Development Plan area. The estimated population within this area was already 26,088 persons in 1984. Even if the higher North Shore population target figure of 17,200 is considered, it seems obvious that the 1,200 condos, 700 residential units, and 2,100 hotel rooms will generate a population (See Exhibit 17) which dramatically exceeds this guideline.

2. The final EIS should clearly identify whether a percentage of dwelling units will be made available for low income and gap group housing. Page IX-7 states that the priority guidelines of the affordable housing section of the Hawaii State Plan do not appear to apply directly to the proposed Mokuleia development, yet the same paragraph does state that developers and hotel operators have "a vested interest in assuring that their employees will be suitably housed."

3. The final EIS should provide a specific site plan of the beach access facilities such as parking, restrooms, buffer landscaping adjacent to Mokuiea Beach Park, and location of walkways. The number and location of these facilities should be provided. Mitigating measures related to the provision of public access should be detailed.
4. It is a Coastal Zone Management (CZM) Program policy to protect areas uniquely suited for recreational activity. The proposed deletion of two public parks from the City and County Development Plan Public Facilities Map and the developer's proposal to charge "user fees" for mountain access will both reduce opportunities for public recreational access.
As stated in the DEIS, swimming conditions at the existing Mokuiea Beach Park are risky and hazardous. It should be noted that safer swimming may be found at Makaleha, one of the sites proposed for deletion as a public beach park.
A site plan illustrating the interrelationship and linkages between parcels "B," "C," "D," and "E" is especially important in light of the higher density six- or seven-story hotel(s) planned for the beach front areas in close proximity to Mokuiea Beach Park. A cross sectional view illustrating the height of the proposed hotel relative to the beach and mauka view corridors would also be helpful.
It is CZM policy to assure that new developments are designed and located to minimize alteration of natural landforms and views to and along the shoreline. The final EIS should discuss the impact of six- and seven-story beachfront hotels on coastal views from the North Shore toward Kaena Point, and on ocean views from Farrington Highway.
5. The final EIS should provide more information on easements or other arrangements relative to the existing hiking trails and jeep access trail referred to on pages IV-50 and IV-51. We are concerned that access to these recreation facilities and the Mokuiea Forest Reserve may be curtailed if liability concerns block access or if user fees are imposed. The Department of Land and Natural Resources currently maintains a trail and small camping area within the Reserve in the Peacock Flats area. The DEIS did not indicate that this area is within the Mokuiea Forest Reserve.
6. The final EIS should review the design of the Mokuiea Conceptual Plan (Exhibit 12) as it relates to the SMA/Flood Designations (Exhibit 7). A cursory review of the Conceptual

Plan provided in the DEIS, appears to indicate that most of the high density developments, (i.e., resort condos and hotels) are located in low-lying areas of greatest flooding potential (Zones A, A4, and V22), while the lower density golf courses and residential lots are located primarily in the higher elevations of Zone C. In light of the potential for flooding and tsunami damage, this aspect is of special concern and should be addressed in greater detail in the final EIS.

We note that page IV-8 of the DEIS states that "[t]he proposed development will have no impact on the sea levels." This statement should be either deleted or clarified since it is doubtful that any normal development would have an appreciable effect on the level of the surrounding ocean.

Exhibit 12 also illustrates a series of lakes or ponds near the mauka entrance of the project running parallel to Farrington Highway. These features are described on page III-6, as habitats for waterbirds. The final EIS should expand further on how the ponds will be integrated into the development proposal, whether construction or development activities will endanger the waterbird habitat, and if constituent discharge (sediment, fertilizers, etc.) resulting from development could impact shoreline water quality.

The final EIS should discuss in more detail plans for diversion of Kapala'au Stream discharge into "Makaleha Stream" and why, as stated on page IV-7, less runoff into the ocean is anticipated after project build-up. Impermeable surfaces established within urban areas are usually associated with an increase in surface runoff. We note at this point that "Makaleha Stream," as it is referred to in the DEIS, should be Makaleha Stream. According to historical records, this is the correct name, despite the engraving on the Farrington Highway bridge.

The purpose and necessity of the proposed diversion of Kapala'au Stream and construction of retention and siltation basins should be discussed in the final EIS. The importance of the proposed inland waterways to the project design is unclear. An assessment of the impacts of these modifications on water quality and circulation patterns should be provided, as well as detailed maps of the area, the depth, and an analysis of the flow patterns of these proposed modifications.

Hydrographic data and nutrient/suspended solid data, as well as information regarding storm duration, total volume of discharge, and the effective time of loading of the discharge stream should also be obtained for the proposed diversion. We note that the DEIS uses data from the West Beach and Kuliha areas, which may not be appropriate for estimating the impacts of this diversion at Kalahehu Bay.

7. The final EIS should give further consideration to plans for sewage treatment and disposal. More specifically, we note that a Development Plan Amendment is pending before the City and County of Honolulu which would provide for establishment of the sewage treatment plant (STP) near the western end of Dillingham Airfield. The elevation of this area is less than 20 feet above sea level and approximately 1,000 to 1,500 feet from the shoreline. Viable alternatives may be available to mitigate this potential STP flooding hazard and should be explored. Additional information on the quality and quantity of treated effluent discharge should be provided. Based on expected water usage, effluent discharge into the injection wells and/or the Pacific Ocean could approach two million gallons per day.

Another CZM policy is to promote water quantity and quality management practices and prohibit land and water uses which violate State water quality standards. Fecal coliform counts are reported in the marine study as being very low or undetectable. While the ocean waters in the project area are rated Class A by the State Department of Health, we note that waters within one-half mile of the proposed sewage treatment plant are rated as Class AA. The impacts on water quality of the proposed plant, its pumping stations, and sewer lines should be discussed in terms of their potential effects on the shoreline, near-shore, and marine environments in and near the project area. The potential effects of water withdrawal for the project on the hydrologic flux of the aquifer underlying the area, including its interaction with the proposed sewage treatment plant injection wells, should also be addressed.

Although the proposed sewage treatment plant is in an area of undetermined flood risk, it is in close proximity to the ocean, and is at similar elevation to nearby areas that have experienced tsunami and storm wave inundation up to five hundred feet inland in the recent past. The potential for inundation of and/or damage to the sewage treatment plant or its appurtenances should be discussed in the final EIS.

8. The final EIS should provide more information on the cumulative noise impacts for parcels 6, 7, and 8 as identified in Appendix K. We note from Figure 3 that the noise levels for these parcels generated by air traffic at Dillingham Airfield are between 55 and 60 Ldn. When considering cumulative noise levels of the surf, wind, increased traffic on Farrington Highway, harvesting operations in sugar cane fields, stationary equipment, the existing 55 Ldn levels from Dillingham Airfield, plus a potential increase in air traffic after project build-up, a cumulative noise level greater than the 60 Ldn recommended limit, referred to on page IV-24, may be generated.

9. The final EIS should explore additional mitigation measures to lessen impact from the anticipated increased traffic levels along Farrington Highway between the proposed project and Thomson Corner. We note with special concern that the Traffic Study predicts current levels of service along this portion of Highway (Table 5, page 16) will decline from a Weekday PM Peak Hour level of "A" to a "E" rating after the project is completed. In fact, only during weekday mornings can a level of service as high as "D" be expected during the peak hour. All other peak hour estimates are rated as "E" after project development.

The final EIS should identify other impacts associated with the proposed signalization of Thomson Corner and traffic flow leading into Haleiwa from Honolulu. The anticipated trips generated between the proposed project and Honolulu should also be included.

10. We concur with the findings of the Archaeological report which recommend that (1) a complete survey should be conducted on the subject parcel to locate and map all sites and intensively survey representative areas, (2) conduct a systematic sub-surface examination of representative areas to assess the extent of underground agricultural areas, (3) examine archival material, and (4) prepare a final report to present the results of the aforementioned activities. If available, the findings of the aforementioned study should be provided in the final EIS.

CZM policy supports State goals for protection, restoration, interpretation, and display of historic resources. The final EIS should provide a description and maps of archaeological sites to be retained or otherwise preserved or protected, in consultation with the State Historic Preservation Office.

The Honorable Donald A. Clegg
Page 6
March 24, 1987

11. The market study in the final EIS should provide an estimate of unit cost for the proposed residential units and condominiums. We note the market study in Appendix "A" considered absorption and sales history for other projects, but did not compare pricing of similar residential projects with the proposed development. Unit pricing is an obvious factor in creating a market acceptance. Pricing is also essential in evaluating the availability of units for low income and gap group residents. A comparison chart illustrating the pricing structure of similar products with the anticipated pricing of the proposed residential units would be especially helpful.

12. The final EIS should indicate whether the sugar cane haul road which traverses the project site will be closed after project build-up. If access from this road is removed, the viability of sugar production southeast of Dillingham Airfield may be jeopardized.

13. Appendix G states that the proposed Mokuleia development will require converting about 1,000 acres of land--now used primarily for grazing--to resort, housing, and recreational uses. About 400 acres are classified as Prime Agricultural Lands. The grazing operation and other historical agricultural activities, if any, should be discussed in more detail.

14. The EIS should fully discuss the impact of the proposed Mokuleia Resort on the four, already-designated Secondary Resort Areas: West Beach, Kahuku/Kuilima, Makaha, and Laie. West Beach has not started construction and the remaining three have not achieved full buildout.

15. An objective of the CZM Program is to protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems.

According to the National Marine Fisheries Service, the endangered green sea turtle, the endangered humpback whale, the melon-headed whale, porpoises, sharks, and the protected Laysan albatross have all been sighted in the project area. The final EIS should discuss potential impacts of the project on all of these fauna. The common and the Hawaiian names of all species of flora and fauna should be provided.

There should be a discussion of pesticide use on the proposed golf courses, its potential impacts on water quality and on the flora and fauna in the project area, and mitigation measures as may be appropriate.

The Honorable Donald A. Clegg
Page 7
March 24, 1987

16. The organization of the subject DEIS should be improved. Many of the page numbers in the Table of Contents should be rechecked, and several of the appendices are mislabeled, making cross-reference difficult. Several of the maps are not well reproduced, and the graphics in general do not facilitate analysis of the potential impacts of the project. Appendix D, "Development Plan Public Facilities Amendment," is also mislabeled as "Preliminary Engineering Study," and is not discussed in the text. In addition, we note that the document focuses on those aspects of the CZM objectives and policies which the proposed project complements. Since the purpose of the Hawaii CZM Program is to balance competing interests as they relate to coastal development, both the positive and negative consequences of development should be addressed.

17. Finally, a CZM objective is to improve the development review process, communication, and public participation in the management of coastal resources and hazards. Short- and long-term impacts of proposed significant developments should be communicated early in their lifecycle and in terms understandable to the general public, to facilitate public participation in the planning and review process.

Appendix D, "Development Plan Public Facilities Amendment," which details ten amendment applications for the proposed project, is dated June 1986. This is not consistent with the applicant's contention that no site-specific details for this project were available at the time that the EIS for the General Plan Secondary Resort Designation Amendment was prepared in January 1987.

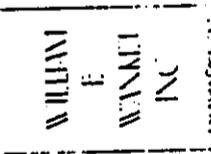
Thank you for the opportunity to review and comment on this document. We would appreciate receiving a copy of the final EIS.

Sincerely,

Murray E. Toward
Roger A. Ulveling

cc: Mr. Barry R. Okuda
Barry R. Okuda, Inc.
Office of Environmental Quality Control

A.C.A. 5-20-87



Mr. Roger A. Ulveling, Director
April 8, 1987
Page 2

are sometimes unrelated to EIS impact findings or mitigation recommendations.

At the City level, "unilateral conditions", or one-sided voluntary agreements by the project proponent, have normally been attached not to Development Plan approvals but to final zoning approvals. Presumably the latter stage is the point in time closest to project implementation and thus the best time or government decision makers to assess true needs. Also, zoning is a more detailed level of government control than Development Plan approvals--hence, the more appropriate level for imposing conditions.

Because there have been questions about the legality and equity of unilateral conditions, the City and County of Honolulu is now considering several new measures which would revise the present system:

1. "Development Agreements", a bilateral agreement process which would vest rights to develop at an early stage in return for firm detailed commitments by the developer to provide socio-economic and other mitigation measures; and
2. A "Community Benefit Assessment" (CBA) ordinance, which would set the total dollar amount for such mitigations according to formulas which consider such factors as location, extent of up-zoning, etc. The current CBA concept would rely on the EIS to recommend priorities for allocating assessed dollars (or other in-kind measures) among the various potential mitigation measures.

As of this writing (April 1, 1987), it is uncertain whether either of these measures will actually be adopted or, if so, in what exact form.

It is our contention that a number of the comments in your letter contain requests for a level of planning which is inappropriate at this time.

1. Population

The first point of the letter refers to the City Department of General Planning's year 2005 North Shore population guideline, then suggests the on-site resort structures "will generate a population (see Exhibit 17) which dramatically exceeds this guideline." However, Exhibit 17 actually projects the on-site resort resident

April 8, 1987

Mr. Roger A. Ulveling, Director
Department of Planning and
Economic Development
P.O. Box 2359
Honolulu, Hawaii 96804

Re: Responses to Comments on the DEIS for the Proposed
Development at Hokuileia, Oahu

Dear Mr. Ulveling:

Thank you for your comments of March 24, 1987 regarding the subject DEIS. We respond as follows:

Prior to responding to the specific comments contained in your letter we would like to discuss generally what we believe to be the process for determining mitigation measures within the EIS process.

Determination of Mitigation Measures

Environmental Impact Statements (EIS's) typically make preliminary suggestions for mitigations. Actual requirements, however, are imposed through the political and regulatory process, which may involve negotiations between government decision makers and private landowners or developers.

Public input during the EIS and/or subsequent hearing process can affect the outcome of these negotiations. In recent years, some requirements have been made on a standardized basis. For example, for projects containing residential units, an "inclusionary zoning" requirement of ten percent for low-to-moderate income units is often executed. These types of mitigation requirements

Public Input
Supplies
1987-1988
1989-1990
1991-1992
1993-1994
1995-1996

Mr. Roger A. Uiveling, Director
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Page 3

population as 1,200 in the year 2005, a figure which can easily be accommodated within the current guidelines. (DGP guidelines are based on resident population, not visitors.)

The initial paragraph also suggests a possible contradiction between page IX-11 of the Draft EIS and page 40 of Appendix C, in regard to number of additional housing units which can be accommodated under the DGP guidelines. However, we find that the two pages are totally consonant, in that both discuss the fact that only 100 additional housing units would be required for DGP's currently projected year 2005 North Shore population. As your letter acknowledges, this figure would be lower than the upper limit of the population guideline for 2005--i.e., the current projection falls below the maximum figure to be permitted. It is the guideline, not the projection, which represents City policy.

2. Housing (low income and gap group)

The section of housing will be expanded to identify more specifically the range of options available to meet the low and moderate income housing needs. The EIS will not identify a percentage of housing units to be made available for low, moderate or gap group housing. As discussed in our general comments and as indicated in communication that we have received from the City Department of Housing and Community Development, the policy on housing is under review.

3. Beach Access/Parks

Although the project proposes the deletion of two proposed public parks, it also offers opportunities for increased recreational uses of the beach and mountain areas, perhaps equal to or greater than the potential of the two deleted parks, one of which is site undetermined and planned for seven years and beyond (since 1983). Although specific site locations and plans are not illustrated, it is the applicant's stated intent in the DEIS that beach accessways and parks are an integral component of the development and that they will be provided to meet recreational needs. These recreational needs will be developed and determined through discussions with the community, Departments of Land and Natural Resources and Parks and Recreation, as well as with the City Council.

Mr. Roger A. Uiveling, Director
April 8, 1987
Page 4

throughout the entire planning process. The exact location, scope and design, and the type and number of beach accessways and parks will reflect the results of these discussions.

The existence of public park sites on the development plans in no way ensure the implementation of these sites as park areas. In the five years that the two sites have been designated on the North Shore Public Facilities Map neither site has been selected for funding, and therefore remain no closer to reality than they were in 1983 when the North Shore Public Facilities Map was first adopted. Recent experience (Kuilima and West Beach) suggests that the approval process generally provides the public and government agencies with ample opportunities to improve and enhance public recreational amenities as part of the overall political approval process, including accessways to beaches, beach promenades, parks, trails and other uses. Therefore, removal of park sites from the development plan exchanges a potential for government financed recreational opportunities for guaranteed developer financed recreational opportunities.

4. CZM

Regarding Specific Site Plans: The Mokuleia development proposal does not contain a request for a zone change, nor is it a request for a shoreline management area permit where site plan details, to the extent being suggested, are normally available. However, in the Final EIS we will include a visual analysis prepared by Michael S. Chu.

Regarding User Fees and Mountain Access: While access to the mauka portions of the site is contained within the recreational aspects of the project, concerns over liability, possible impacts on endangered plant species, capacity of the ecosystem, and human safety must be considered. Controlled access, supervision and a resource management plan should be considered over unrestricted access. User fees are but one method of controlling/managing access.

5. Mountain Access

The applicant is proposing to develop an upland resource management plan in consultation with the Department of Interior, Division of Fish and Wildlife, and the State

Department of Land and Natural Resources as well as with input from other interested agencies and community groups and individuals. The information that the DLNR maintains trails and camping areas in the Peacock Flats area of the Mokuleia Forest Reserve will be included in the Final EIS.

6. Various Comments

SMA/Flood: DPED notes that more intense development is located in flood and tsunami areas than in areas of higher elevations. The rationale for location of resort facilities is the applicant's belief that as a general rule, the economic value of resort property is higher the closer it is to the ocean. The applicant believes that the cost of mitigating measures is exceeded by the increase in value.

Impact of Development on Sea Level: Statement will be deleted from Final EIS.

Waterbird Habitat, Waterways, etc.: The applicant has proposed to develop a plan for the wetland areas and the proposed drainage system in consultation with the Department of Interior, Division of Fish & Wildlife, and the State DLNR. The concept plan basically presents an opportunity to accommodate both uses in this area.

Drainage/Wakalea Stream: As the proposed plan is only conceptual, the inland waterway is most likely the product of artistic license. The area shown on the plan as inland waterway is an area which is to accommodate the existing pond ecosystems as well as the necessity to accommodate the drainage requirements of the project. While it is true that buildings and pavement prevent the absorption of water in the soil, drainage improvements such as settling ponds and holding areas increase an area's capacity to absorb water over time and thus can result in smaller flows into the ocean under storm conditions. During design development, large open spaces such as the golf course can be graded to mitigate drainage impacts. As indicated in our earlier General comments, we believe that the purpose of the EIS is to identify general mitigating measures rather than specific engineering solutions.

7. Sewage

The DEIS described two sewage treatment alternatives, participation in a regional sewer system now under consideration by the City and County of Honolulu or development of treatment plant to City standards for dedication to the City and County of Honolulu for operation and maintenance. No location for the developer built sewer treatment plant has been discussed. If the project participates in the regional system, its sewer treatment facility will be subject to an EIS process. Environmental impacts of sewage disposal will be discussed in the EIS.

The site shown in the proposal located west of Dillingham Airfield was a location under consideration by the City for location of its regional plant. Based on information provided by the Department of Public Works, the City is now considering a site located approximately a mile east of the project site and mauka of Farrington Highway. Impacts of such a plan would be considered when the City prepares the EIS for its regional system.

If a developer built plant were to be developed, the following scenario could be expected.

Although the location of the plant has not been identified specifically, it would most likely be located on the applicant's property mauka of Farrington Highway. It would be developed to City standards for dedication to the City and County of Honolulu for operation and maintenance. Estimated capacity of the plant would be 1.5 million gallons per day. Location of the plant would consider the locations of flood zones on the property.

Concerning the question of water quality, it is our understanding that treated effluent (to City standards) contains low to undetectable levels of fecal coliform counts. The selection of the effluent disposal method would be subject to the review of the State Department of Health and the Board of Water Supply which are charged with the protection of water quality throughout the State and which, through administrative rules, ordinances and laws, have strict rules and regulatory powers in matters. These procedures are designed to protect both the purity of the aquifer and the downstream impacts of disposal.

An expanded discussion of the impacts of the proposed sewer system will be included in the Final EIS.

8. Cumulative Noise Impacts

Cumulative noise impacts for Parcels 6, 7 and 8 is of concern, but the following considerations should be taken into account.

Figure 3 in Appendix K presents aircraft noise contours predicted for the year 1995, not for the existing condition as inferred in the comment. The potential increase in air traffic after project buildup was taken into account by assuming that the number of civilian power aircraft operations would approximately double in 1995 as compared to 1983 to 1985. Thus the contours in Figure 3 are based upon 120,000 civilian power operations in 1995 compared to 60,494 operations in 1985.

On page IV-24, the reference to "Ldn 60 not being exceeded for residential and resort areas" applies only to aircraft noise and to cumulative noise impact. For example, in the "Summary Report, HIA and Environs Master Plan Study" of June 1981, the aircraft noise exposure category of Ldn 60 to 65 is described thusly:

Areas of noise effects where the noise may be disturbing to some activities because of the outdoor Hawaii lifestyle. In some locations, the ambient noise level (background noise from vehicular traffic and other sources) may be equal to or greater than the contribution of aircraft noise.

Motor vehicular traffic noise is usually treated separately from aircraft noise because (a) noise barriers or other buildings can often provide effective shielding from traffic noise, but are not effective in mitigating aircraft fly-over noise; and (b) many people accept higher levels of traffic noise as compared to aircraft noise. In the islands, traffic noise is normally evaluated using mainland criteria of 67 dB for FHWA or 65 dB for HUD.

If the Ldn's from aircraft and traffic noise are combined, it should be understood that logarithmic summation of the dB levels would be used. For example, if a worst-case condition existed at Parcel 7 where the aircraft

noise caused 59 Ldn (from Figure 3) and traffic noise caused 61.7 Ldn (from Table 2), the combined total would be 63.6 Ldn. This level would still be considered acceptable by HUD for residential housing. If stationary equipment caused an additional 55 Ldn, then 64.2 dB would be reached.

As mentioned on page 7 of Appendix K, the structures on the shore parcels should be designed to provide shielding from aircraft from the runway. Such designs would also mitigate traffic noise from Farrington Highway so the worst-case situation considered above would not exist.

Sounds from surf and wind in the trees are usually considered beneficial masking sounds that tend to cover up less desirable noise from aircraft, highway traffic, and stationary equipment. Such natural sounds should not be combined with other noises for comparisons to a standard criterion.

9. Traffic

The Traffic section of the Final EIS will be expanded to include a discussion of your comments, including additional mitigating measures.

10. Archaeological

The applicant has proposed to follow the recommendations in the Archaeological Report. These recommendations would be undertaken during the design development stage of the project. These studies are not available at this time.

11. Market Study

Estimate Unit Pricing

The Mokuieia Development Plan is currently in a schematic phase. The physical characteristics of the residential and condominium units are not available. However, the pricing would be expected to be competitive with comparable properties in the State.

Mr. Roger A. Ulveling, Director
April 8, 1987
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12. Cane Haul Road

The cane haul road would remain after completion of the project and therefore there should be no impact on the viability of the existing sugar operation on lands southwest of the project. The DEIS includes ways of mitigating noise impacts from the sugar operation on the resort development through use of buffers, setbacks, etc. at no cost to the sugar operation.

13. Previous Agricultural Operations on the Property

The grazing operation was terminated in February 1987. The operation had been subsidized by the landowner for a number of years due to low cattle prices and high expenses. Over the years, a number of agricultural enterprises had been conducted on the land, including alfalfa, truck farming and macadamia nuts. Grazing of horses continues on portions of the property.

14. Impact of Mokualeia on Existing Secondary Resort Areas

A secondary resort at Mokualeia would be complementary to the four secondary resort areas already designated on Oahu, and would provide a wider variety of accommodations and recreational activities to be enjoyed by local residents and visitors.

In addition, sufficient demand is projected to support continued development of resort facilities on Oahu. Based on our projections, the visitor industry on Oahu could be expected to require about 18,900 to 22,700 additional rooms by 2005. Because only 9,300 to 9,400 rooms are currently planned for development, an additional 9,500 to 13,300 rooms are needed on Oahu.

15. Endangered Marine Life

The national marine fisheries will be contacted and a discussion of this issue will be contained in the Final EIS.

Flora and Fauna Names

Common and Hawaiian names of flora and fauna are contained on pages 18-26 of Appendix I, the flora and fauna study.
Note: Not all plants have Hawaiian names.

Mr. Roger A. Ulveling, Director
April 8, 1987
Page 10

Golf Course/Pesticide Usage

Golf course pesticide use will be discussed in the Final EIS.

16. Organization and Labeling

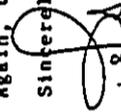
The errors pointed out in this comment will be corrected in the Final EIS. In addition, the applicant will review the entire EIS document to check for other organization and labeling problems.

17. Improved Communication

The applicant concurs with the first comment. The second comment is the subject of an Environmental Council hearing scheduled for April 8, 1987.

Again, thank you for your comments.

Sincerely,


William E. Manket
WEM:asp

Mr. Donald A. Clegg
Page 2

STP 8.1932

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STP 8.1932

demarcation. We also recommend that within the 55-60Ldn noise impact area, a disclosure requirement be mandatory to advise developer/tenant that they may be subjected to aircraft noise.

We appreciate this opportunity to provide comments.

Very truly yours,


Edward Y. Hirata
Director of Transportation

DT:ko

cc: HWY, AIR, STP(dt)

Barry Okuda, Barry R. Okuda, Inc.
William Hanket

March 30, 1987

Mr. Donald Clegg
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Draft EIS - Mokuleia Development Proposal
Mokuleia, Oahu

The following comments are offered for your consideration on the subject proposal.

Traffic

Traffic conditions along Farrington Highway (Exhibit 24) are projected to increase anywhere from 3 to 10 times over current levels thereby causing a deterioration of traffic service from level of service A to level of service E. This represents a significant change in operating conditions and is considered an unacceptable level of service for rural highways. Therefore, we find that the proposed mitigation measures address only localized impacts and do not fully address the impact of the development on Farrington Highway.

The developer should bear all cost of improvements necessitated by his proposal.

Aircraft Noise

A composite military and civilian noise contour map should be generated for Billingham Field based on existing and projected operations. Using this map, we recommend that resort/residential developments not be allowed within the 60Ldn and greater

WILLIAM
E
WANNEI
INC

Mr. Edward Y. Hirata, Director
April 8, 1987
Page 2

April 8, 1987

Mr. Edward Y. Hirata, Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuiaia, Oahu

Dear Mr. Hirata:

Thank you for your comments of March 30, 1987 regarding the
subject EIS. We respond as follows:

Traffic

The traffic impacts identified could be mitigated by reducing the travel demand or by increasing roadway capacities. Travel demands can be reduced in various ways, ranging from a decrease in project scale to the implementation of a ride sharing program. Reductions in travel demands, however, were not considered in the EIS because the traffic analyses were prepared to identify and disclose potential impacts.

Widening of the existing highway would be necessary to increase capacities. Improvements to the two-lane highway such as removing roadside obstructions and widening travel lanes to 12 feet could increase capacity by about 30 percent; the condition during the weekend peak hour, however, would remain at Level of Service E (LSE). Since LSE on two-lane highways describe probable delays due to the inability to pass slow moving vehicles, a passing lane or pull-off areas could be provided to minimize delays. Widening to a multi-lane facility would increase capacity to approximately four

William E. Wannei
Director
104-111-191

times the peak traffic demand, which does not appear to be appropriate in light of existing conditions elsewhere.

The low level of service may not translate to unacceptable operational conditions. The procedure to calculate capacity and determine the levels of service on a two-lane highway from the Highway Capacity Manual also estimates that the average speed on the highway, if not otherwise regulated, would exceed the posted 35 mile per hour speed limit. The calculation also assumes extended (longer than the four miles of Farrington Highway involved here) segments of the highway, whereby delays due to speed differences would be significant.

Note: Traffic will be more fully discussed in the Final EIS.

Aircraft Noise

Cumulative noise impacts for Parcels 6, 7 and 8 is of concern, but the following considerations should be taken into account.

Figure 3 in Appendix K presents aircraft noise contours predicted for the year 1995, not for the existing condition as inferred in the comment. The potential increase in air traffic after project buildup was taken into account by assuming that the number of civilian power aircraft operations would approximately double in 1995 as compared to 1983 to 1985. Thus the contours in Figure 3 are based upon 120,000 civilian power operations in 1995 compared to 60,494 operations in 1985.

On page IV-24, the reference to "Ldn 60 not being exceeded for residential and resort areas" applies only to aircraft noise and to cumulative noise impact. For example, in the "Summary Report, HIA and Environs Master Plan Study" of June 1981, the aircraft noise exposure category of Ldn 60 to 65 is described thusly:

Areas of noise effects where the noise may be disturbing to some activities because of the outdoor Hawaii lifestyle. In some locations, the ambient noise level (background noise from vehicular traffic and other sources) may be equal to or greater than the contribution of aircraft noise.

Mr. Edward V. Hirata, Director
April 8, 1987
Page 3



University of Hawaii at Manoa

Environmental Center
Crawford 317 - 2530 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

March 25, 1987
RE:0460

Motor vehicular traffic noise is usually treated separately from aircraft noise because (a) noise barriers or other buildings can often provide effective shielding from traffic noise, but are not effective in mitigating aircraft fly-over noise; and (b) many people accept higher levels of traffic noise as compared to aircraft noise. In the islands, traffic noise is normally evaluated using mainland criteria of 67 dB for FHWA or 65 dB for HUD.

If the L_{dn}'s from aircraft and traffic noise are combined, it should be understood that logarithmic summation of the dB levels would be used. For example, if a worst-case condition existed at Parcel 7 where the aircraft noise caused 59 L_{dn} (from Figure 3) and traffic noise caused 61.7 L_{dn} (from Table 2), the combined total would be 63.6 L_{dn}. This level would still be considered acceptable by HUD for residential housing. If stationary equipment caused an additional 55 L_{dn}, then 64.2 dB would be reached.

As mentioned on page 7 of Appendix K, the structures on the shore parcels should be designed to provide shielding from aircraft from the runway. Such designs would also mitigate traffic noise from Farrington Highway so the worst-case situation considered above would not exist.

Sounds from surf and wind in the trees are usually considered beneficial masking sounds that tend to cover up less desirable noise from aircraft, highway traffic, and stationary equipment. Such natural sounds should not be combined with other noises for comparisons to a standard or criterion.

Note: New information provided by the military is being analyzed by our acoustical consultant. The results of this analysis will be included in the Final EIS. Mitigation measures will also be reviewed.

Again, thank you for your comments.

Sincerely,

William E. Nanket

WEN:awp

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:

Draft Environmental Impact Statement
Mokuleia Development Proposal
Mokuleia, Oahu

The above cited Draft Environmental Impact Statement (DEIS) proposes the development of 1,019 acres on a 2,900 acre parcel of land in the Mokuleia area on the North Shore of Oahu. The projected development on this land includes 2,100 hotel rooms, 1,200 condominium units, 700 residential units, 100,000 sq. ft. of commercial space, two golf courses and other recreational amenities. One of the issues addressed in this document is the change of currently zoned agricultural/preservation land to be designated resort, residential and commercial land.

The Environmental Center has reviewed this document with the assistance of Kevin Bobery, Fredrick Collison, Chuck Gee, Juanita Liu, and Pauline Sheldon, Travel Industry Management; Doak Cox, Joint Institute of Marine and Atmospheric Research; Paul Ekam, Agonomy and Soils; Peter Flachsbart and Ken Lovry, Urban Regional Planning; Michael Graves, Anthropology; Reginald Young, Engineering; Pamela Bahnsen and Sonya Myers, Environmental Center.

Archaeology

The Archaeological reconnaissance of the project area is seriously lacking in substantive information and does not meet the minimum requirements of a such a survey as established by the Society of Hawaiian Archaeology. The area examined, at least 2,000 acres, was briefly surveyed (one day) by an archaeologist and preliminary archival research was conducted. Neither of these activities, however, is sufficient to permit an objective assessment of the number or quality of archaeological resources in the area. In order to assess the archaeological significance of the project area a more complete survey must be done, as noted by the surveyor,

A Unit of Water Resources Research Center
AN EQUAL OPPORTUNITY EMPLOYER

and should be done in accordance with the minimum guidelines as set forth by the Society for Hawaiian Archaeology.

Marketability

There are many concerns that should be answered regarding the financial viability of the project:

The proposed development is on a very large scale (3,300 units). However, the unique attractions of this development do not seem to include features which differentiate Mokuleia from Turtle Bay, which has had a history of low occupancy. Furthermore, the proposed development is quite a distance from mainstream tourism on Oahu and from the airport. Projected market share estimates anticipate that this area of Oahu will receive 12.5% of Oahu visitors by the year 2005. The basis for this estimate is not explicit in the report. Oahu is capturing a smaller and smaller percentage of visitors as neighbor islands have become increasingly competitive and this fact is reflected in the significant increase in visitor counts of the neighbor islands. The question arises as to whether there will be sufficient market demand to match the supply generated by this project and the proposed development in the Turtle Bay area and if not there will be little justification for the 'loss of ruralness' that will occur as a result of development. This DEIS does not appear to suggest any substantive remedies for this loss.

The convention center hotel discussed in the report may be in conflict with the proposed convention center in Waikiki. Smaller convention facilities such as those proposed are already available at a number of properties both on Oahu and the Neighbor Islands. An additional observation regarding the convention center is that discussion on infrastructure requirements do not mention requirements for the proposed telecommunication facilities outlined in the section on convention center.

Traffic/ Environmental Considerations

As noted in Appendix 1, traffic volumes will increase significantly as a result of development. Is a center lane for Farrington Highway going to be sufficient, particularly for vehicles entering the highway from driveways, etc., and making left turns? Also, it appears that major changes will have to be made to Weed Circle to accommodate the increased traffic however, specific actions still need to be determined. The statement found on p. IV-49, second paragraph of the summary does not accurately reflect the need for signalization, expressed in the text of Appendix 1, p. 20. We suggest that the paragraph should be stated word for word.

Traffic noise is expected to peak at 63 dBA, whereas the current weekday peak is at 56 dBA. While this increase in noise level is not particularly large in absolute terms, it is nonetheless a consideration. Moreover, these noise levels will be maintained only as long as drivers observe the speed limit.

Traffic pollutants attributable to development are "well within allowable standards". While this is true, pollution will still be at more than the current, negligible levels. Considering that the area will inevitably be put to some use, however, the proposed resort will have less harmful effects in terms of air quality, than other, alternative uses.

The DEIS does not seem to include consideration of the visual impacts of the development on the environment.

Socio-economic Considerations

The lifestyle of the few residents living on the proposed site will obviously be altered. There is no mention as to what will happen to these residents. There is no mention as to whether or not amenities and facilities such as the sports center would be open to the public. It is important to ensure that the local community will not be excluded from any of the amenities included in the development.

Beach access for the general public needs to be better established. The 'reasonable user fee' for camping or hiking in the mountains also needs clarification. While additional camping sites are needed for this area, their compatibility with other proposed uses is not evident.

Residential development as an alternative to this project is rejected, in part, because it would require residents to travel long distances to their place of employment. However, employees who work at the proposed resort would likewise have to travel long distances, as would tourists.

We find that housing problems in the Draft EIS have been addressed thoroughly, housing prices would be expected to increase as a result of the project, especially if people are hired from the area. The report suggests that part of this problem would be mitigated if workers are drawn and commute from Central Oahu. In this instance, we believe the problem of housing will simply be replaced with a commuting problem.

Employment issues may prove rather large. If workers are drawn from the North Shore, long run impacts are difficult to assess. As mentioned in the reports, this population is not highly educated and has a low female participation rate. The major question is whether the population will actively seek employment at the resort and whether the population base is large enough to provide workers for both this project and the proposed Turtle Bay expansion.

No mention is made of any training programs which would give potential workers from the area the necessary skills to qualify for employment. Do the developers plan to work with the community to develop competitive job skills? The report points out that labor can always be 'imported' from Central Oahu. If all proposed projects are developed, a number of these will be drawing labor from the Central Oahu district whose population is limited. The State has already recognized a labor shortage in the service trades, particularly at the skill level required for the proposed resort.

Crime rates in the area are currently low, with the major problems stemming from isolation of the parcels people using the area for illegal target practice and growing marijuana. Although it may be true that this type of crime will decrease, other types of crimes will most assuredly follow tourism development, a point not acknowledged in the report.

Schools in the North Shore are currently at capacity. Adding a population of 4,680 will strain these (and other) facilities. The Social Impact report points out that the residents of the resort will have few children in the public schools. Does this imply that resort residents' children will mostly attend private schools? If so the effects on private school facilities should be considered.

Fire protection upgrading should be a priority in the development of the project, but this is not apparent in the proposal.

A major error is made when applying the multiplier methodology to estimated visitor expenditures generated by the resort. The multiplier analysis deals with income or employment multiplier effects. In this regard, the \$106,000,000 estimated visitor expenditures in 2005 will result in \$78,440,000 of income (using the DPED multiplier figure of .74 which includes direct, indirect and induced income effects). The report makes a false assumption that expenditures are the same as direct income and consequently projects the \$106,000,000 will result in over \$200,000,000 in expenditures (p. IV-33).

Climate

The climatic setting of the area is an important factor that will effect the proposed development and has not been thoroughly addressed in this document. We suggest the Final EIS look into these factors:
1. Windfactor: Will there be problems with loose sand and dust blowing in the area? Therefore, could there be a need for shelter belts in building designs? It is also likely that the on-shore blowing winds will carry salt spray from the ocean which will affect the type of building materials used as well as the vegetation grown in the area. A source of reference for this information can be found in Wind_Energy_Resource_Atlas:Volume_11

Hawaii and Pacific Islands Region Feb. 1981 pages 48-49, and in Journal of Ecology Noguchi 1979, 67:611-628, figure 3.

2. If the area is lacking in sufficient rainfall, the resulting dry land will be more susceptible to soil loss through wind erosion. The preparers of the EIS might refer to Predicting Rainfall Erosion Losses: A Guide to Conservation Planning, USDA Dec. 1978 and to Rainfall Atlas of Hawaii Report R76, Dept. of Land and Natural Resources, June 1986, for further information. Likewise, we suggest that information on evaporation and its effect on the development site be included, the report by Paul C. Ekern and Jer-Ru Chang entitled Pan Evaporation: State of Hawaii, 1984-1983 Report R74, Dept. of Land and Natural Resources, Aug. 1985, might be useful.

More mention should be given to the Makalena Stream regarding flood flow. It may be helpful to look through Water Resources Data Hawaii Water Year 1981 vol.1, U.S. Geological Survey Water-Data Report HI-81-1.

We suggest that information on currents in the area and their effect on coastal erosion as well as on beach activities should be fully addressed. There are several reference sources that can be looked into such as Hawaii's Shoreline 1962, Shoreline Plan, Oahu, and a report by Ralph Heberly, Jr. and Theodore Chamberlain entitled Hawaiian Beach Systems May 1964, HIG-64-2 also, Coastal Currents and Sediment Disposal in the Hawaiian Islands June 1964, HIG-64-1 a report done by Taivo Laevatu, Don E. Avery, and Don C. Cox and Beach Changes on Oahu as Revealed by Aerial Photographs by Dennis Hwang, July 1981, Tech. Suppl. No. 22 Hawaii Coastal Zone Management Program

Water Supply

To make a more thorough assessment of the effects the development will have on the water supply we feel that a comparison made between the existing amount of water used and what will be used when the development is finished will be helpful. In addition, a discussion should be included about ground water recharge.

Wastewater

There is no definite decision as to whether the development will be using their own treatment plant or the City's. The Final EIS should elaborate on plans for both systems as well as give the overall impact both systems will have on the environment such as any effects they may have on coastal waters. Information should also be given on the volume and quality of wastewater that will be discharged from the development.

Solid Waste

More information should be provided regarding solid waste disposal. Where are the disposal sites? What are the capacities of these sites and what is the forecasted volume and quality of the waste that will be generated from the development? This data would be very helpful in the Final EIS.

Mr. Donald A. Clegg

-6-

March 25, 1987

TSUNAMI HEARDS

The section regarding tsunamis (IV-5) seems to be rather complete. However, it might be noted that the 100-year tsunami inundation zones and even the 156-year zone proposed by Breckwelder (Appendix E) probably are not broad enough for adequate protection to persons, and, on tsunami-warning occasions, evacuation of the broader Civil Defense evacuation zone will be required.

We appreciate the opportunity to comment on this Draft EIS and hope you will find our comments useful in the preparation of the final document.

Sincerely,

Jacquelin N. Miller
Jacquelin N. Miller
Acting Associate
Environmental Coordinator

- cc: OEQC
- Stephan Lau
- Kevin Boberg
- Fredrick Collison
- Doak Cox
- Paul Ekern
- Peter Flachsbart
- Chuck Gee
- Michael Graves
- Juanita Liu
- Ken Lowry
- Pauline Sheldon
- Reginald Young
- Pamela Bahnsen
- Sonya Myers

ENC 3-22-87

WILLIAM
E.
WANKER
INC.

April 8, 1987

Ms. Jacquelin N. Miller
Acting Associate Environmental Coordinator
University of Hawaii at Manoa
Environmental Center
2550 Campus Road, Crawford 317
Honolulu, Hawaii 96822

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuleia, Oahu

Dear Ms. Miller:

Thank you for your comments of March 25, 1987 on the subject
DEIS. We respond as follows:

General Comments

Environmental Impact Statements (EIS's) typically make preliminary suggestions for mitigations. Actual requirements, however, are imposed through the political and regulatory process, which may involve negotiations between government decision makers and private landowners or developers.

Public input during the EIS and/or subsequent hearing process can affect the outcome of these negotiations. In recent years, some requirements have been made on a standardized basis. For example, for projects containing residential units, an "inclusionary zoning" requirement of ten percent for low-to-moderate income units is often executed. These types of mitigation requirements are sometimes unrelated to EIS impact findings or mitigation recommendations.

File to Room
5-2-1000
1000 Bishop Court
Honolulu, HI 96813
Phone
(808) 533-3333

At the City level, "unilateral conditions", or one-sided voluntary agreements by the project proponent, have normally been attached not to Development Plan approvals but to final zoning approvals. Presumably the latter stage is the point in time closest to project implementation and thus the best time or Government decision makers to assess true needs. Also, zoning is a more detailed level of government control than Development Plan approvals--hence, the more appropriate level for imposing conditions.

Because there have been questions about the legality and equity of unilateral conditions, the City and County of Honolulu is now considering several new measures which would revise the present system:

- (1) "Development Agreements", a bilateral agreement process which would vest rights to develop at an early stage in return for firm detailed commitments by the developer to provide socio-economic and other mitigation measures; and
- (2) A "Community Benefit Assessment" (CBA) ordinance, which would set the total dollar amount for such mitigations according to formulas which consider such factors as location, extent of up-zoning, etc. The current CBA concept would rely on the EIS to recommend priorities for allocating assessed dollars (or other in-kind measures) among the various potential mitigation measures.

As of this writing (April 1, 1987), it is uncertain whether either of these measures will actually be adopted or, if so, in what exact form.

Specific Comments

Archaeology

The applicant has agreed to the recommendations of the archaeological report and will conduct the studies in conformance with the guidelines as set forth by the Society for Hawaiian Archaeology. In addition, the applicant will work with the State Historic Preservation Officer in order to comply with state law and policy in these matters. Further design development is necessary in determining sites which would merit more intensive study.

Marketability

Demand would not be created by building a resort. The market study found that a demand does exist for rooms throughout Oahu.

Waikiki will continue to dominate the Oahu visitor unit market; however, its market share is expected to decline from its current level of 93% to about 75% by 2005. Reasons for this decline in market share are a result of:

- Limited amount and availability of suitable development sites in Waikiki.
- Anticipated development and maturation of resort destinations outside Waikiki.
- Trend in visitor preference for recreation-oriented vacations in integrated resort communities.

Alternative destination areas are expected to occur on lands elsewhere on Oahu which are:

- suitable for development
- close to the ocean
- in unique environmental settings.

Lands which meet these criteria are typically outside the primary urban center of Oahu along the coastline and include:

- West Beach
- Makaha
- Laie/Kahuku
- Nokualea.

Considering the market orientation and development plans of the destination areas on Oahu which are presently planned or proposed, the market share distribution of Oahu visitor units by 2005 is projected as follows:

Waikiki/Kahala	75.0%
West Beach/Leeward	10.0
North Shore/Koolauloa	12.5
Other (airport, downtown, etc.)	<u>2.5</u>
	<u>100.0%</u>

Socio-Economic Considerations

- (1) What will happen to the few current on-site residents? As stated in Draft EIS Appendix C, pages 47-48, they will probably be displaced (although the timing of this displacement is uncertain and some current residents may have already left before this time). Also as stated there, all tenants have been notified of the intent to develop the property and of the likelihood that month-to-month leases will be terminated.
- (2) Will employment of Central Oahu residents create a "commuting problem"? Table 2.7(a) of the Draft EIS Appendix C shows the average 1980 commuting time of Waihawa residents was 17 minutes; for Mililani/Waipahu residents, 27 minutes. Commutes from these locations to Mokuleia would not dramatically exceed these figures and would relieve potential congestion of morning Honolulu-bound lanes.
- (3) Will the population actively seek employment at the resort? While this remains to be seen (and perhaps depends to some extent on the fate of North Shore sugar operations), no Oahu resort has yet encountered significant labor shortages for entry-level workers.
- (4) Is the population base large enough to provide workers for both this project and the proposed Turtle Bay expansion? This question was extensively addressed in Draft EIS Appendix C pages 68-78, and summarized in pages IV-38 and 39 of the Draft EIS text.
- (5) Why has the EIS not "acknowledged" crime impacts which "most assuredly" will follow tourism development? In actuality, the relationship between tourism and crime rates is far from clear-cut, as discussed at length in Draft EIS Appendix C, pages 99-101, and summarized on page IV-43 of the text.
- (6) Part IV-11, Schools, of the Draft EIS indicates that the Department of Education expects an impact of less than 200 students due to the small residential component.
- (7) Should fire protection be a priority in development of this proposal? Proposed impacts and mitigating measures were addressed in Part IV.9, Fire Protection.

Based on these factors, visitors would probably want to stay on the North Shore and as a result, a resort could be developed.

Conference Center Hotel

The conference center hotel is not intended to replace a convention center in Honolulu. Rather, it would complement our convention market by catering to small to medium sized post- or pre-convention meetings and corporate incentive groups. The facilities provide different alternatives to our visitors.

"Loss of Ruralness"

There is no question that the development of the resort proposed would result in the reduction of "ruralness". The loss of ruralness was identified as an adverse impact in Part V.F of the DEIS under the heading "Lifestyle Changes".

Traffic/Environmental Concerns

The proposed improvements recommended at the mauka project access road would accommodate the higher volumes expected there. Observations at an existing, similar highway where mid-afternoon (non-peak) volumes are 1600 to 1800 vehicles per hour (Kaneohe Bay Drive between Mokulele and Mikiola Drives) indicate that traffic conditions on Farrington Highway would allow sufficient gaps for low volumes of traffic to enter the highway from driveways or cross streets.

Traffic volumes between Honolulu and Haleiwa are expected to be affected more by factors other than the proposed project, such as increases in island-wide population, tourism activity, and development elsewhere. Construction of the proposed Haleiwa bypass highway would ease the expected increases in traffic at Weed Circle.

Visual Impacts

The applicant has contracted Michael Chu, Land Architect, to perform a visual analysis for the proposed project. The results of his study will be included in the Final EIS.

Ms. Jacquelin N. Miller
April 8, 1987
Page 6

- (8) The multiplier relating visitor expenditures to total visitor-related expenditures in the State has declined from about 2.10 in 1974 to about 1.91 in 1984, as shown in Exhibit A.

Based on the data, each dollar of direct visitor expenditure resulting from development at Mokualeia is projected to result in \$1.93 of total direct, indirect and induced visitor-related expenditures in the State.

Therefore, expenditures in the State attributable to Mokualeia's visitors are projected to increase from \$35.3 million in 1990 to \$206.1 million by 2005, in 1986 dollars, as shown in Exhibit IV-B of the study.

Climate

The Mokualeia area is not noted for unusual climatic conditions; however, the Final EIS will include a discussion of the conditions at the site.

Water Supply

Existing water usage at the site is unknown due to the lack of metering facilities on the well currently operating on the site. In recent years water usage for agricultural operations have fluctuated due to weather conditions and the size and component mix of the grazing operation. Note: The grazing operation consisted of a cow-calf operation and a pasturing operation raising dairy heifers with supplemental feed. Economic returns from the heifer operation allowed for irrigation of portions of the property while returns from the cow-calf operation did not permit irrigation. Changes in the mix of the operation therefore impacted irrigation over time.

Wastewater

An expanded discussion of Wastewater alternatives will be included in the Final EIS.

Solid Waste

At the present level of planning, data on the forecasted volume and quality of the waste that will be generated from the proposed development was determined. This information will become available and analyzed in more detailed levels of

Ms. Jacquelin N. Miller
April 8, 1987
Page 7

planning, such as in the application for a Shoreline Management Area permit under City and County Ordinance 84-4, which Review Guidelines require provisions to be made for solid waste, disposition, and management that minimize adverse effects upon special management area resources. We also note by the time the project is operational, it is anticipated that the City's Garbage to Energy Facility in Ewa will be completed.

Tsunami Hazards

As indicated in our general comments at the beginning of this response, we believe that specific details and programs should be developed at a later date in the approval process. This appears to be one of those areas.

Again, thank you for your comments.

Sincerely,


William F. Manket
WEM:ajp



University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 283 • 2540 Dole Street
Honolulu, Hawaii 96822

Relationship Between Direct Visitor Expenditures
and Total Visitor-Related Expenditures
1974 - 1984
(in millions)

	Direct visitor spending 1/	Total sales or output 2/	Multi- plier
1974	\$1,225.0	\$2,582.7	2.11
1975	1,360.0	2,815.2	2.07
1976	1,640.0	3,332.9	2.03
1977	1,845.0	3,699.7	2.01
1978	2,146.0	4,322.3	2.01
1979	2,537.0	5,145.8	2.03
1980	2,875.0	5,868.4	2.04
1981	3,200.0	6,458.6	2.02
1982	3,700.0	7,298.2	1.97
1983	3,974.0	7,720.5	1.94
1984	4,582.0	8,767.8	1.91

24 March 1987

Mr. Donald A. Clegg
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 S. King St.
Honolulu, Hawaii 96813

Dear Sir:

We have reviewed the Environmental Impact Statement, "Mokulele Development Proposal, Mokulele, Oahu," and have the following comment: Figure 1 showing the project boundary map should include a small scale map of Oahu and indicate the relative location of Mokulele.

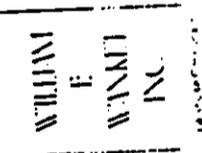
Thank you for the opportunity to review and comment on this EIS.
Sincerely,

Henry K. Gee for
Edwin T. Murabayashi
EIS Coordinator, WRRC

HKG:jmn

- 1/ Excludes direct expenditures by airline and ship crews and overseas airlines.
- 2/ Total direct, indirect and induced sales or output generated by visitor-related expenditures.

Source: Hawaii State Department of Planning and Economic Development, The Economic Impact of Tourism in Hawaii: 1970 to 1980, Research Report 1983-2 (April 1983), and unpublished 1981-1984 estimates based on the DPED Input-Output Model.



April 8, 1987

Mr. Edwin T. Murabayashi, EIS Coordinator
Water Resources Research Center
University of Hawaii
Holmes Hall 283
2540 Dole Street
Honolulu, Hawaii 96822

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuieia, Oahu

Dear Mr. Murabayashi:

Thank you for your comment dated March 24, 1987 regarding the
subject EIS.

The requested change in Figure 1 will be made in the Final
EIS.

Again, thank you for your comment.
Sincerely,


William E. Wanket
WEW:awp

EDWIN T. MURABAYASHI
EIS COORDINATOR
UNIVERSITY OF HAWAII
HONOLULU, HAWAII 96822
TEL: 533-3331

PS 87-226

March 12, 1987

MEMO TO: MR. DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
MOKULEIA DEVELOPMENT PROPOSAL

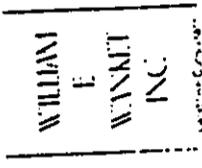
We would like to repeat our previous comment made on the proposed Mokuleia Development project that an adequate access road to the State's Mokuleia Radio Site, where City's radio equipment are located, be provided.

Thank you for the opportunity to review the draft EIS for the subject project.

Herbert K. Muraoka
HERBERT K. MURAOKA
Director and Building Superintendent

TR:jg
cc: Barry Okada, Inc ✓

Rec'd
3-16-87



April 8, 1987

Mr. Herbert K. Muraoka
Building Department
650 South King Street
Honolulu, Hawaii 96813

Re: Responses to Comments on the DEIS for the Proposed Development at Mokuleia, Oahu

Dear Mr. Muraoka:

Thank you for your comments dated March 12, 1987 regarding the subject EIS. We respond as follows:

As indicated in our February 17, 1987 response to your earlier comments, the applicant will be working with the State Department of Land and Natural Resources to provide access to the mountains. As indicated in our earlier response, the existing access road has experienced some stability problems. The applicant will work with the State to provide an acceptable access.

Again, thank you for your comments.

Sincerely,

William E. Wanket
William E. Wanket
WEN:awp

SEARCHED
SERIALIZED
INDEXED
FILED



DONALD A. CLEGG
CHIEF PLANNING OFFICER
GENE CONNELL
DEPARTMENT OF GENERAL PLANNING

RH/DGP 3/87-569

March 4, 1987

March 25, 1987

TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

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

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR MOKULEIA
DEVELOPMENT PROPOSAL, THK: 6-8-02: 1, 6, 10 AND 14;
THK: 6-8-03: 5, 6, 11, 15, 16, 17, 19, 20, 30, 31,
33, 34, 35, 38, 39 AND 40; THK: 6-8-08: 22

We have no additional comments. All of our concerns are already incorporated in the environmental document.

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


KAZU HAYASHIDA
Manager and Chief Engineer

cc: Mr. Barry R. Okuda

Revised 3-6-87

NO RESPONSE REQUIRED

Mr. William E. Wanket
William E. Wanket, Inc.
Pacific Tower, Suite 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Wanket:
Draft Environmental Impact Statement on the Mokuleia Development Proposal

We have the following comments on the subject Draft Environmental Impact Statement.

The draft EIS should include a discussion of the relationship of this project and Section 4.8. Rural Areas, of the DP Common Provisions.

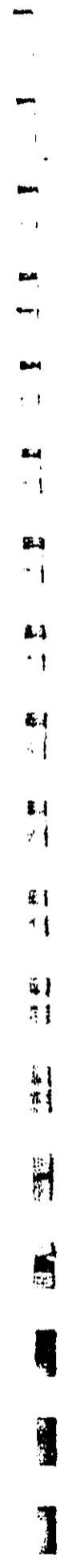
The draft EIS should include a discussion of the environmental impacts of developing inland lagoons.

The discussion on water resources should address the hydrology of the Mokuleia aquifer including how the project will affect groundwater recharge.

What are the urbanizing effects of this resort development? What other services and facilities will be needed to serve this project, such as housing, industrial and commercial services?

The EIS should address the potential loss of nearby sugar cane lands which may affect the operations of the Waialua Sugar Company. Conversely, how will current sugar cane operations, including the planting, growing, and harvesting of cane, affect this project?

Discussion involving the Dillingham Airfield should include the potential for aircraft accidents, the designation of accident potential zones, and the land use compatibility of the project.



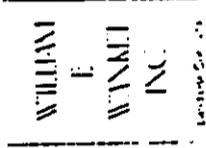
Mr. William E. Manket
William E. Manket, Inc.
Page 2
March 25, 1987

The draft EIS should contain a summary of unresolved issues and either a discussion of how such issues will be resolved prior to commencement of the action or what overriding reasons there are for proceeding without resolving the problem.

Thank you for giving us an opportunity to comment on this project. Should you have any questions, please contact Randy Hara of my staff at 523-4483.

Sincerely,

Donald A. Clegg
DONALD A. CLEGG
Chief Planning Officer



April 8, 1987

Mr. Donald Clegg, Director
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokujele, Oahu

Dear Mr. Clegg:

Thank you for your comments on the subject DEIS. We respond as follows:

General Comments

Environmental Impact Statements (EIS's) typically make preliminary suggestions for mitigations. Actual requirements, however, are imposed through the political and regulatory process, which may involve negotiations between government decision makers and private landowners or developers.

Public input during the EIS and/or subsequent hearing process can affect the outcome of these negotiations. In recent years, some requirements have been made on a standardized basis. For example, for projects containing residential units, an "inclusionary zoning" requirement of ten percent for low-to-moderate income units is often executed. These types of mitigation requirements are sometimes unrelated to EIS impact findings or mitigation recommendations.

William E. Manket, Inc.
1000 Kalia Road
Honolulu, Hawaii 96813
Tel: 523-4483

At the City level, "unilateral conditions", or one-sided voluntary agreements by the project proponent, have normally been attached not to Development Plan approvals but to final zoning approvals. Presumably the latter stage is the point in time closest to project implementation and thus the best time or government decision makers to assess true needs. Also, zoning is a more detailed level of government control than Development Plan approvals--hence, the more appropriate level for imposing conditions.

Because there have been questions about the legality and equity of unilateral conditions, the City and County of Honolulu is now considering several new measures which would revise the present system:

1. "Development Agreements", a bilateral agreement process which would vest rights to develop at an early stage in return for firm detailed commitments by the developer to provide socio-economic and other mitigation measures; and
2. A "Community Benefit Assessment" (CBA) ordinance, which would set the total dollar amount for such mitigations according to formulas which consider such factors as location, extent of up-zoning, etc. The current CBA concept would rely on the EIS to recommend priorities for allocating assessed dollars (or other in-kind measures) among the various potential mitigation measures.

As of this writing (April 1, 1987), it is uncertain whether either of these measures will actually be adopted or, if so, in what exact form.

Specific Comments

1. DP Common Provisions

Section IX of the Final EIS will be expanded to include a discussion of the relationship of this project and Section 4.9, Rural Areas, of the Development Plan Common Provisions.

2. Inland Lagoons

At the present time there are no specific plans to develop inland lagoons. The water features shown on the concept Plan are the product of artistic license of the individual preparing the conceptual drawing of the project. The area

shown on the concept plan as inland water amenity is an area which has been identified for providing a habitat for endangered birds and for controlling drainage within the project site. Specific drainage solutions for the development have not been adopted but are currently in the range of alternative status. As indicated in the conceptual plan, there are large areas of the property immediately mauka of Farrington Highway that are available for recreation use such as polo fields and golf course areas which could be incorporated into the drainage improvements for the project, i.e., designed to flood under storm conditions.

The impression created by the concept plan that there is an ocean connection to the inland water feature is also unfortunate. The streams which currently exist on the property flow seasonally and only intermittently flow into the ocean under storm conditions. Wave and wind action currently provide a sand berm at the mouths of the streams and this situation is altered only when flood waters overtop the berm under storm conditions. Currently this is intermittently and it is expected to remain that way after development of the project. Increases in runoff caused by impermeable surfaces necessitated by the development will be mitigated by the development of drainage improvements.

3. Impact on Aquifer

The development of the project should have little impact on the hydrology of the Mokuleia Aquifer for the following reasons. As indicated on the Concept Plan, Exhibit 12, only a small portion of the site would have buildings and roadways. Intensive development would be concentrated on the shoreline. As indicated on Exhibit 10, shoreline parcels and property close to Farrington Highway are below the Board of Water Supply No-Pass Line, indicating no connection between surface water and the aquifer. Beyond the No-Pass Line development proposed by the concept Plan indicates a predominance of low-density house lots, golf course and recreational amenities which should have little or no impact on soil permeability.

Other mitigating factors include that the subject area proposed for development makes up only a minor portion of the Mokuleia aquifer. In addition, rainfall gradients

indicate that annual rainfall is greater in mountain areas than in the area proposed for development, thus making the area's contribution to recharge even smaller.

4. Other Impacts (Services)

Part IV of the DEIS and Appendix C (Social Impact Assessment) identify impacts on other services in detail. Housing impacts are discussed and based on assumptions contained in the Department of General Planning's "Residential Implications of the Development Plans" August 1985. Residential population can be accommodated within the North Shore Population Guidelines.

Appendix A, the Market Assessment, describes in detail the estimated commercial demand generated by the project and provided a recommended square footage for inclusion within the project area. In addition, based on information provided by the Planning Information Branch of the Department of General Planning, the North Shore Development Plan Area included 14.7 acres of Commercially Designated land which was available for development.

While no study has been made of the industrial demand generated by the development, the project site is within easy driving distance of Mililani High Tech Park, Gentry Business Park and Campbell Industrial Park. In addition, according to information provided by the Planning and Information Branch of the Department of General Planning, the North Shore Development Plan Area contains 19.7 acres of industrial land which is currently underdeveloped. Resort activities are expected to contribute only minimally to the demand for industrial development.

5. Loss of Sugar Lands/Impact of Cultivation of Resort Use

No loss of sugar land will be caused by resort development.

Appendix K (Noise Study) describes impact of agricultural noise on resort development and mitigating measures.

Our response to the Department of Agriculture concerns about impact of cane burning on the resort and residential development cites potential mitigating measures. Resort and agricultural enterprises have coexisted successfully in Hawaii over the past years. Note: Kaanapali/Pioneer Will and Kapalua/Maui Pineapple experience.

6. Dillingham Airfield Impacts

Information received from Directorate of Facilities Engineering indicates that Dillingham Field is under civilian control and that they should be contacted for safety zones. Telephone interviews with FAA and DOT personnel indicated that there were no such zones established for Dillingham Field. The Final EIS will contain additional discussion of airport noise and safety considerations.

7. Unresolved Issues

The Final EIS will contain a section on discussing unresolved issues and how they will be resolved prior to commencement of the action or what overriding reasons there are for proceeding without resolving the issue.

Again, thank you for your comments.

Sincerely,



William E. Wanket

MEW:asp

DGP 3/87 968

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813-1001 521-4122



JOHN P. WHALEN
DIRECTOR

LU2/87-930(AC)

March 24, 1987

MEMORANDUM

TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: JOHN P. WHALEN, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)
FOR MOKULEIA DEVELOPMENT PROPOSAL, MOKULEIA, OAHU
TAX MAP KEYS 6-8-02, -03, -08; VARIOUS

The Department of Land Utilization has reviewed the Draft EIS and offers the following comments:

1. Coastal Erosion

Our response to the EIS Preparation Notice dated July 11, 1986 noted that the EIS should examine the history of beach changes at specific segments proposed for development. The Draft EIS, in analyzing the existing conditions, demonstrates that the various segments have had net losses of land due to erosion. As mitigation for these losses, the Draft EIS suggests three alternatives to minimize erosion:

- a. Construction of seawalls or other barriers;
- b. Using adequate setbacks for shoreline structures; and
- c. Beach replenishment by hauling in material.

The EIS should examine these and other alternatives in greater detail in order to determine their feasibility. Please be advised that the placement of seawalls and other erosion control structures require a shoreline setback variance from this Department.

DONALD A. CLEGG, CHIEF PLANNING OFFICER
Page 2

In general -- and especially in cases of undeveloped property, the DLU recommends establishing ample shoreline setbacks, so that facilities will not be threatened by erosion, and the need to harden the shoreline will not arise.

2. Wetlands

Exhibit 14A, which shows the existing wetlands on the subject property, is difficult to read at the current scale. The EIS should provide a revised wetland map which more accurately depicts the wetland locations as well as the size of each area.

The biological survey prepared by Char and Associates states that the pond areas around the Crowbar Ranch provide habitat for and are utilized by two endangered waterbird species, the koloa (Anas wyvilliana) and the Hawaiian coot (Fulica americana alai). The EIS should discuss in greater detail how these pond areas will be incorporated into the design of the development and managed to preserve existing habitat.

3. Parks and Public Beach Access

The Draft EIS states that public access to the shoreline will be increased as a result of the project, but does not provide specifics as to how or where this will be accomplished. The EIS should at least provide alternative plans and sites for parks and public access to beaches.

4. Traffic

The proposed project will increase traffic volumes on Farrington Highway from the existing peak hour Levels of Service (LOS) B and C to LOS E at weekday and weekend P.M. peak hours with completion of the project. The EIS should describe possible mitigation alternatives to reduce adverse traffic impacts related to the project.

5. Drainage

Two streams flow through the site, Makalena and Kapala'au Streams, with the latter providing discharge into Kai'ahulu Bay. Proposed plans call for rerouting the discharge outlet to Makalena Stream.

The EIS should more fully discuss why moving the discharge outlet to Makalena Stream is expected to have no significant impact on the nearshore marine water quality or environment. The Draft EIS, through a study prepared by Oceanit Laboratories

Inc., cites the existing drainage and flushing conditions within Kai'ahulu Bay as the primary factors for the minimal expected impacts. The study comprehensively describes existing conditions but does not project the future level of discharge loading at project buildout. Please be advised that any drainage construction work performed within the Shoreline Setback will require a Shoreline Setback Variance.

6. Housing

The EIS should specifically address how the project will provide at least ten percent of the proposed housing units for low- and moderate-income families. Such a discussion should include alternative methods for housing provision, feasibility of each alternative, recommended housing types and associated impacts.

7. Sewage Disposal

The Draft EIS states that the applicant intends to provide sewage disposal through two optional methods:

- a. Independent development of a sewer treatment plant; or
- b. Participation in the City's plan to develop a regional North Shore system.

The EIS should include a more detailed discussion of these two options, particularly addressing the feasibility of creating a regional system.

8. Tsunami/Flood Hazards

Exhibit 7, SMA/Flood Designations, is difficult to read because of the small scale and the difficulty of distinguishing SMA and flood district lines. This information should be mapped in a more readable format.

The makai portion of this project is located within areas subject to tsunami and storm flooding. The EIS should provide a more detailed study of flood hazard impacts and methods for mitigation. Because of the historical frequency of tsunami events at Mokuiaia, the EIS should focus on site specific mitigation alternatives.

9. Urban Design/Coastal Views

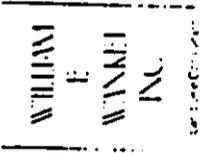
The project is described as a low-density project, with structures not exceeding six to seven stories in height. It is questionable if six- to seven-story structures will be compatible with the land forms and rural character of the area. The EIS should include visual analyses which depict the potential height and bulk of the proposed structures in relation to landforms and existing structures. These analyses should also contain a study of coastal views looking mauka and makai from Farrington Highway.

We hope these comments will be helpful to you in the preparation of the Final EIS. If you have any questions, please contact Art Chatacombe of our staff at 523-4648.

Very truly yours,

John P. Whalen
JOHN P. WHALEN
Director of Land Utilization

JPM:sl
08448



Mr. John Whalen, Director
April 8, 1987
Page 2

At the City level, "unilateral conditions", or one-sided voluntary agreements by the project proponent, have been normally attached not to Development Plan approvals but to final zoning approvals. Presumably the latter stage is the point in time closest to project implementation and thus the best time or government decision makers to assess true needs. Also, zoning is a more detailed level of government control than Development Plan approvals--hence, the more appropriate level for imposing conditions.

Because there have been questions about the legality and equity of unilateral conditions, the City and County of Honolulu is now considering several new measures which would revise the present system:

1. "Development Agreements", a bilateral agreement process which would vest rights to develop at an early stage in return for firm detailed commitments by the developer to provide socio-economic and other mitigation measures; and
2. A "Community Benefit Assessment" (CBA) ordinance, which would set the total dollar amount for such mitigations according to formulas which consider such factors as location, extent of up-zoning, etc. The current CBA concept would rely on the EIS to recommend priorities for allocating assessed dollars (or other in-kind measures) among the various potential mitigation measures.

As of this writing (April 1, 1987), it is uncertain whether either of these measures will actually be adopted or, if so, in what exact form.

Specific Comments

1. Coastal Erosion

The applicant will expand the Coastal Erosion section of the Final EIS to include a more detailed analysis of the mitigation alternatives. The applicant agrees with the DLU comment that the most preferable alternative would be the establishment of adequate setbacks.

2. Wetlands

A revised Wetlands Map will be provided in the Final EIS.

April 8, 1987

Mr. John Whalen, Director
Department of Land Utilization
650 South King Street
Honolulu, Hawaii 96813

Re: Responses to Comments on the DEIS for the Proposed Development at Mokuleia, Oahu

Dear Mr. Whalen:

Thank you for your comments of March 24, 1987 on the subject EIS. We respond as follows:

General Comments

Environmental Impact Statements (EIS's) typically make preliminary suggestions for mitigations. Actual requirements, however, are imposed through the political and regulatory process, which may involve negotiations between Government decision makers and private landowners or developers.

Public input during the EIS and/or subsequent hearing process can affect the outcome of these negotiations. In recent years, some requirements have been made on a standardized basis. For example, for projects containing residential units, an "inclusionary zoning" requirement of ten percent for low-to-moderate income units is often executed. These types of mitigation requirements are sometimes unrelated to EIS impact findings or mitigation recommendations.

Page 10 of 10
Sent 10:00
10/10/87
10/10/87

The discussion of the Wetlands Areas will be expanded to provide additional detail on potential impacts and mitigating measures. Specific details on incorporation of the pond areas and long term management programs for those areas remain to be worked out with the Department of Interior, Fish and Wildlife Division and the State Department of Land and Natural Resources.

3. Parks and Public Beach Access

Although the project proposes the deletion of two proposed public parks, it also offers opportunities for increased recreational uses of the beach and mountain areas, perhaps equal to or greater than the potential of the two deleted parks, one of which is site undetermined and planned for seven years and beyond (since 1983). Although specific site locations and plans are not illustrated, it is the applicant's stated intent in the DEIS that beach accessways and parks are an integral component of the development and that they will be provided to meet recreational needs. These recreational needs will be developed and determined through discussions with the community. Departments of Land and Natural Resources and Parks and Recreation, as well as with the City Council, throughout the entire planning process. The exact location, scope and design, and the type and number of beach accessways and parks will reflect the results of these discussions.

The existence of public park sites on the development plans in no way ensure the implementation of these sites as park areas. In the five years that the two sites have been designated on the North Shore Public Facilities Map neither site has been selected for funding, and therefore remain no closer to reality than they were in 1983 when the North Shore Public Facilities Map was first adopted. Recent experience (Kuulima and West Beach) suggests that the approval process generally provides the public and Government agencies with ample opportunities to improve and enhance public recreational amenities as part of the overall political approval process, including accessways to beaches, beach promenades, parks, trails and other uses. Therefore, removal of park sites from the development plan exchanges a potential for Government financed recreational opportunities for guaranteed developer financed recreational opportunities.

4. Traffic

The traffic impacts identified could be mitigated by reducing the travel demand or by increasing roadway capacities. Travel demands can be reduced in various ways, ranging from a decrease in project scale to the implementation of a ridesharing program. Reductions in travel demands, however, were not considered in the EIS because the traffic analyses were prepared to identify and disclose potential impacts.

Widening of the existing highway would be necessary to increase capacities. Improvements to the two-lane highway such as removing roadside obstructions and widening travel lanes to 12 feet could increase capacity by about 30 percent; the condition during the weekend peak hour, however, would remain at Level of Service E (LSE). Since LSE on two-lane highways describe probable delays due to the inability to pass slow moving vehicles, a passing lane or pull-off areas could be provided to minimize delays. Widening to a multilane facility would increase capacity to approximately four times the peak traffic demand, which does not appear to be appropriate in light of existing conditions elsewhere.

The low level of service may not translate to unacceptable operational conditions. The procedure to calculate capacity and determine the levels of service on a two-lane highway from the Highway Capacity Manual also estimates that the average speed on the highway, if not otherwise regulated, would exceed the posted 35 mile per hour speed limit. The calculation also assumes extended (longer than the four miles of Farrington Highway involved here) segments of the highway, whereby delays due to speed differences would be significant.

5. Drainage

As the proposed plan is only conceptual, the inland waterway is most likely the product of artistic license. The area shown on the plan as inland waterway is an area which is to accommodate the existing pond ecosystems as well as the necessity to accommodate the drainage requirements of the project. While it is true that buildings and pavement prevent the absorption of water in the soil, drainage improvements such as settling ponds and holding areas increase an area's capacity to absorb water over

Mr. John Whalen, Director
April 8, 1987
Page 3

time and thus can result in smaller flows into the ocean under storm conditions. During design development, large open spaces such as the golf course can be graded to mitigate drainage impacts. As indicated in our earlier general comments, we believe that the purpose of the EIS is to identify general mitigating measures rather than specific engineering solutions.

6. Housing

The Final EIS will provide an expanded discussion on the potential mitigating measures which are available for the issue of Low/Moderate Housing. Provision for providing 10% of the units for low/moderate housing is but one alternative mitigating measure. We believe this is an area where our initial comments on the purpose of the EIS are applicable to comments from DLU.

7. Sewage Disposal

The EIS will be expanded to include a more thorough discussion of the sewage issue. The Feasibility of Creating a Regional North Shore System is beyond the scope of this EIS and is the subject of a City Funded Study being undertaken by Beit, Collins and Associates for the City's Department of Public Works. If a regional facility is feasible it would be the applicant's preference to participate in that system.

8. Tsunami/Flood Designations

Exhibit 7 will be redrawn to improve readability.

We believe that this is another area where our general comments apply. The DEIS identified a number of alternatives for mitigating against Tsunami/Flooding Conditions. Details of relating to the most appropriate design are more appropriately addressed at the time of the SMA Permit or the Zoning level where specific information about building locations, building design and actual development are normally addressed in detail.

9. Urban Design and Coastal Views

The applicant has commissioned Michael Chu - Land Architect to conduct a view analysis of the proposed

Mr. John Whalen, Director
April 8, 1987
Page 6

development. The results of his study will be included in the Final EIS.

Again, thank you for your comments.
Sincerely,


William E. Manket
WEW:amp

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

505 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 533-6181



FRANK P. ZASU
DIRECTOR

MIKE MOON
DIRECTOR
ROBERT METCALFE
DEPUTY DIRECTOR

March 16, 1987

MEMORANDUM

TO: Donald A. Clegg, Chief Planning Officer
Department of General Planning

FROM: Mike Moon

SUBJECT: Environmental Impact Statement - Mokuieia Development Proposal

We have no objections to the proposed development but would like to reiterate the following concerns:

1. The creation of additional jobs will stimulate job opportunities for Oahu residents. In this regard, the potential employees will require housing and the EIS should address this need; and
2. 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 Mokuieia Development Proposal 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.

We would welcome the opportunity to assist the applicant in formulating a program to provide these units.

We will retain the report for our files.


MIKE MOON
Director

cc: Barry R. Okuda, Inc.

4-2-87 3:20:17

April 8, 1987

Mr. Michael Moon, Director
Dept. of Housing & Community Development
650 South King Street
Honolulu, Hawaii 96813

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuieia, Oahu

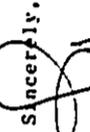
Dear Mr. Moon:

Thank you for your comments of March 16, 1987 regarding the subject DEIS. We respond as follows:

1. Employee Housing: The Final EIS will contain an expanded section dealing with housing needs including a more detailed look at possible mitigation alternatives.
2. Proposed Policy Changes relating to affordable housing: Thank you for informing us of the review of policy in these areas. While we have been aware of potential changes, we appreciate your department's courtesy in providing this information. It is the applicant's intention to work with the Department of Housing and Community Development in developing the optimum program for meeting these needs during the approval process.

Again, thank you for your comments.

Sincerely,


William F. Banket

WEN:exp

6-11-87
5:10 PM
MAY 12 1987
HONOLULU, HAWAII

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



WILLIAM E. WANKET, INC.
 1215 KALANIANA'OLA DRIVE
 HONOLULU, HAWAII 96813

March 25, 1987

TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER
 DEPARTMENT OF GENERAL PLANNING

FROM: HIRAM K. KAMAKA, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)
 MOKULEIA DEVELOPMENT - WAIALUA
 TAX MAP KEY 6-8-02, 6-8-03 AND 6-8-08

We have reviewed the Draft EIS for the Mokuleia Development and make the following comments and recommendations.

Proposed Beach Parks

Two parcels, TMK 6-8-02:1 and 6-8-03:16, are identified on the City Development Plan Public Facility Map for planned acquisition for beach park expansion. The proposed amendments to delete these designations have been submitted by the developer and will require City Council action.

Park Dedication and Public Access

Guidelines of our department's park and facility standards are attached for the applicant's information and use in the development of any recreational plan. Compliance to these standards and also the Park Dedication and Public Access Ordinances will facilitate the applicant in obtaining City approvals required in the planning process of land developments.

We would like to apprise the applicant that under the Park Dedication Ordinance, all lands to be dedicated to the City for park purposes will be graded, grassed, provided with all off-site improvements and an irrigation system at no cost to the City.

Thank you for the opportunity to review and comment on the Draft EIS.

Hiram K. Kamaka
 HIRAM K. KAMAKA, Director

HKK:el
 Attach.
 cc: Barry R. Otuda, Inc.

3-30-87

April 8, 1987

Mr. Hiram Kamaka, Director
 Department of Parks and Recreation
 650 South King Street
 Honolulu, Hawaii 96813

Re: Responses to Comments on the DEIS for the Proposed Development at Mokuieia, Oahu

Dear Mr. Kamaka:

Thank you for your comments of March 25, 1987 regarding the subject EIS. We respond as follows:

Deletion of Proposed Beach Parks from Public Facilities Map: We are aware that City Council action will be necessary in order to remove the park designations from the Development Plan Public Facilities Map.

Park Dedication and Public Access: The applicant understands the requirements for parks and access within the development approval process. The applicant also understands the requirements necessary to comply with park dedication requirements.

The applicant will work with the Department of Parks and Recreation to develop a park program for the development which best meets the City's, community's and developer's needs.

The applicant has commissioned Michael Chu, Land Architect, to review relevant material to assess park needs in the area. The results of his study will be included in the Final EIS.

Again, thank you for your comments.

Sincerely,

Hiram E. Wanket
 HIRAM E. WANKET

HEW:app

WILLIAM E. WANKET, INC.
 1215 KALANIANA'OLA DRIVE
 HONOLULU, HAWAII 96813

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1435 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96814



DOUGLAS G. GIBB
CHIEF
WILLIAM E. MANKET
DEPUTY CHIEF

FRANK P. PAIK
SAFEGUARD

OUR REFERENCE: CS-LX

March 5, 1987

TO: DONALD CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: DOUGLAS G. GIBB, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT FOR THE MOKULEIA
DEVELOPMENT PROPOSAL AT MOKULEIA, OAHU

With the development of 1,000 acres of land for 2,100 hotel rooms, 1,200 condominium units, 700 residential units with additional commercial and recreational areas by the year 2005, we anticipate a large increase in demands for police services in the area. The additional increase of another 800-900 residents by the year 2015, will further affect police services. Our present budget does not contain provisions for the necessary increase in manpower and equipment.

We are concerned that the present two lane roadway will not be adequate to accommodate the projected visitor and resident population needing access to and from the area. This in itself may affect the provision of police services because of excessive traffic congestion and possible accidents. We concur with the recommendations of the Traffic Impact Report.

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

Douglas G. Gibb
DOUGLAS G. GIBB
Chief of Police

cc: Mr. Barry R. Okuda

WILLIAM
E
MANKET
INC

April 8, 1987

Chief Douglas G. Gibb
Honolulu Police Department
1455 South Beretania Street
Honolulu, Hawaii 96814

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuleia, Oahu

Dear Chief Gibb:

Thank you for your comments of March 5, 1987 regarding the subject EIS. We respond as follows:

Increased Manpower Requirements

The DEIS indicates that (Part IV, page IV-62) increased manpower requirements due to population and economic growth in the area are unfunded at present. The budgeting process generally requires that actual development is imminent or underway before funding is provided.

Traffic

The applicant concurs with your recommendation that traffic report recommendations be followed. The Traffic section of the Final EIS will be expanded to include some additional mitigation measures.

Again, thank you for your comments.

Sincerely,

William E. Manket
William E. Manket
WEM:avp

Part 100
Sub 100
100-100-100
100-100-100
100-100-100

44- 701 011

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



ALFRED J. THIEDE

ENV 87-32

March 9, 1987

-2-

Mr. Donald A. Clegg

The disadvantage of a two-plant system is the higher cost of operation and maintenance to the City of two wastewater treatment plants instead of one plant. If the developer built plant was constructed at the proposed City WTP site, this disadvantage would not materialize and the function design could be coordinated. The use of joint site could be considered another option.

March 9, 1987

MEMORANDUM

TO: MR. DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: ALFRED J. THIEDE, DIRECTOR AND CHIEF ENGINEER

SUBJECT: DRAFT EIS FOR MOKULEIA DEVELOPMENT PROPOSAL
(TRK: 6-8-01, 6-8-03, 6-8-08, VARIOUS PARCELS)


ALFRED J. THIEDE
Director and Chief Engineer

cc: Barry R. Okuda, Inc.

We have reviewed the Draft EIS for the proposed development and have the following comments.

1. A drainage report should be prepared and submitted to the Drainage Section, Division of Engineering for review and approval.
 2. Two treatment and disposal systems are being considered. One treatment and disposal option suggested is a single City built and operated wastewater treatment plant (WTP) that will serve the Waialua-Haleiwa sewage district as well as the proposed development. The developer will share in the cost of the WTP and disposal system. The tentative date when the City's WTP will be completed is 1992.
- The other treatment and disposal option suggested is a two-plant system; a City built plant and a separate treatment plant constructed by the developers according to City standards and dedicated to the City for operation and maintenance. A developers' built plant would have the flexibility of scheduling, e.g., the plant would be built in time to serve the 500 hotel units, whereas a City built plant would not be ready.

WILLIAM
E.
WANKET
INC.
1015 Kalia Road, Suite 200
Honolulu, Hawaii 96813

DP 3/87-928

DEPARTMENT OF TRANSPORTATION SERVICE
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
150 SOUTH KING STREET
HONOLULU, HAWAII 96813



April 8, 1987

Mr. Alfred J. Thiede
Director and Chief Engineer
Department of Public Works
650 South King Street
Honolulu, Hawaii 96813

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuleia, Oahu

Dear Mr. Thiede:

Thank you for your comments of March 9, 1987 regarding the
subject EIS. We respond as follows:

1. Drainage

The level of planning for the proposed development is not
adequate to allow for the preparation and submittal of a com-
plete drainage report. A drainage report will be submitted
as plans for the development advance to an appropriate level.

2. Sewage Treatment

The section in the Final EIS relating to sewage will be
expanded to discuss more fully the ramifications of partici-
pation in the regional plant versus development of a separate
plant for dedication to the City. Included in the discussion
will be the issues of timing and cost of operation included
in your comments. Included in the mitigation measures will
be a discussion of your suggestion to locate the developer
built plant at the proposed site for a City plant and coordi-
nation of design.

Again, thank you for your comments.

Sincerely,

William E. Wanket
WEN:awp

Copy to:
City Engineer
650 South King Street
Honolulu, Hawaii 96813
4/10/87
WEN:awp

FRANK S. PEARSON
DIRECTOR

March 17, 1987

MEMORANDUM

TO: DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM: JOHN E. HIRTEN, DIRECTOR

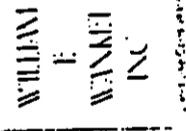
SUBJECT: MOKULEIA DEVELOPMENT PROPOSAL
ENVIRONMENTAL IMPACT STATEMENT REVIEW
TMK: 6-8-02: 1, 6, 10 and 14
6-8-03: 5, 6, 11, 15, 16, 17, 19, 20, 30,
31, 33, 34, 35, 38, 39 and 40
6-8-08: 22

This is in response to the Office of Environmental Quality
Control's letter dated February 24, 1987.

We have reviewed the subject document and recommend that all
internal roadways conform to the City's design and standards.
If there are any questions, please contact Kenneth Hirata of my
staff at local 5009.

cc: Mr. Barry R. Okuda

JOHN E. HIRTEN



April 8, 1987

Mr. John E. Hirten, Director
Department of Transportation Services
650 South King Street
Honolulu, Hawaii 96813

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuleia, Oahu

Dear Mr. Hirten:

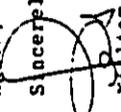
Thank you for your comments of March 17, 1987 regarding the
subject EIS. We respond as follows:

Conformance with City Design Standards - Internal Roadways

The applicant will comply with applicable design and stand-
ards for internal roadways.

Again, thank you for your comments.

Sincerely,


William E. Manket
WEM:awp

Facility Name:
Site No:
City/State/Street:
Map Reference:
Date:
1987 03 10 10:07

HAWAIIAN ELECTRIC COMPANY, INC. P.O. BOX 2750 - HONOLULU HI 96840-0001

DNW 2-1
J/M/G



March 9, 1987



Brenner Munger Ph.D. PE
Member
Professional Department
AC08 518 648C

Mr. Donald A. Clegg, Chief Planning Officer
Department of General Planning
City and County of Honolulu
630 South King Street
Honolulu, HI 96813

Dear Mr. Clegg:

Subject: Draft Environmental Impact Statement (EIS) for Mokuleia Development Proposal

We have previously responded on July 8, 1986 to an Environmental Impact Statement Preparation Notice (EISP/N) on the Mokuleia Development Proposal. Our comments on that EISP/N have been adequately addressed in the subject draft EIS.

Sincerely,

Brenner Munger

NO RESPONSE REQUIRED

A Hawaiian Electric Industries Company

March 20, 1987

Donald A. Clegg, Chief Planning Officer
Department of General Planning
City & County of Honolulu
650 South King Street, 8th Floor
Honolulu, Hawaii 96813

Mokuleia Development Proposal
Draft Environmental Impact Statement

Dear Mr. Clegg,

We are responding herewith to the Mokuleia Development Proposal Draft EIS. We have addressed the issue of this development in our letters dated 22 December and 28 December 1986. (re. Draft EIS for GF resort area and GF amendment application.)

We are somewhat surprised that the present EIS is being processed prior to a GF change. We are also amazed to see that the site of the proposed resort development is now known precisely whereas the EIS for the GF could not be site specific.

We must reiterate that if the Oahu GI and DF have any meaning whatsoever the proposed resort violates their intent. Even though the present city administrator and council aren't all that smitten with the notion of democracy, the GF and DP are the will of the people whether they like it or not and should command a certain modicum of respect. The Mokuleia area was designated rural for good reason. Simply put the island of Oahu has exceeded a reasonable carrying capacity. Any further development can only lead to more crime, more traffic, more pollution, lower paying jobs, and fewer facilities for the residents. We must have rural areas on Oahu where one can experience truly open spaces, free of infrastructure and surcharges.

Particularly disturbing is the aspect of recreational facilities and public access. In actuality the hotels in

Hawaii have systematically excluded local residents, all the while claiming to provide greater facilities and access. The Ka'anapali hotels have all sorts of right-of-ways yet only a handful of parking spaces along that entire coast. Turtle Bay now charges for parking. The Mauna Kea Hotel allows only ten parking places for the public beach at any one time for the local residents. Until recently the Kahala Hilton wouldn't allow local residents or state beach front property. The pattern is all too clear: sure the beach belongs to the people - just try to get there. Interestingly enough the section in this EIS entitled "Public Access & Parking" (page IV-59) contains no mention of, you guessed it, parking.

In summary, the country must remain country for all our sakes. Otherwise we all lose, visitors and residents alike.

Yours truly,



Arthur L. Mori, President
Life of the Land

Copy: Barry F. Okuda Inc., Consultant

4/13/87 3-30-87



April 8, 1987

Mr. Arthur L. Mori, President
Life of the Land
250 S. Hotel Street, Room 211
Honolulu, Hawaii 96813

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuleia, Oahu

Dear Mr. Mori:

Thank you for your comments of March 20, 1987 regarding the
subject EIS. We respond as follows:

Change in General Plan/Development Plan, paragraph 3, page 1

Your comments indicate that the proposed development violates the intent of the existing General Plan and Development Plan. We agree with you on this point and therefore are seeking an amendment to the General Plan/Development Plan in order to permit the proposed development. The purpose of the EIS is to disclose alternate viewpoints, impacts and mitigating measures. We believe that the EIS very clearly indicates that development of a resort in the Mokuleia area will have impacts and that while some can be mitigated, others involve a trade-off. It is our belief that the EIS has fulfilled its purpose and that officials elected through the democratic process should now decide if the benefits of the proposed projects outweigh the negatives. Through your letter you have expressed your opinion on the matter. It will be included in the Final EIS.

Pacific Tower
Suite 1014
1001 Bishop Street
Honolulu, Hawaii 96813
Phone
(808) 537-4937

Mr. Arthur L. Mori, President
April 8, 1987
Page 2

Recreational Activities/Public Access

Recreational activities and public access were discussed in the DEIS (Parts IV-P.2 and IV-P.8).

All of the waterfront resort developments discussed in your comments--Kaanapali, Kuliima, Mauna Kea and the Kahala Hilton--were developed prior to the enactment of the Development Plans and the subsequent requirement of the EIS at the development Plan level of planning. Situations similar to those described are unlikely in the future due to the General Plan/Development Plan process. Ordinances requiring adequate public access and parking, SMA and CZM procedures and the existence of groups like Life of the Land, which, though their comments and participation in the approval process, keep issues such as recreational resources and public access before the politicians, press and public.

Again, thank you for your comments.

Sincerely,


William E. Wanket

WEM:awp

Jim Richardson
68-533 Crozier Dr.
Waiialua, HI 96791

March 24, 1987

William Wanket
Pacific Tower Suite 1010
1001 Bishop St.
Honolulu, HI 96813

Dear Mr. Wanket,

The following are my comments on the Draft Environmental Impact Statement for the Mokuleia Development Proposal dated February 20, 1987.

General Comments

The Mokuleia Development Corporation has proposed that the General Plan for the City and County of Honolulu and the Development Plan for the North Shore of Oahu be changed to allow them to construct hotels, condominiums, and residential units on what is presently designated as Preservation and Agriculture land in Mokuleia. Their argument for changing the designated land use from Preservation or Agriculture to Resort is a forecasted shortage of visitor rooms on Oahu to occur over the next seventeen years. The question I would like to raise is whether this is sufficient justification for converting Preservation land to Resort land. As the Development Corporation states many times in its EIS, Mokuleia is a special area, unlike any other on Oahu. Indeed, the many people who participated in putting together the General Plan for Oahu and the Development Plan for the North Shore feel that the area is unique and special enough to be designated Preservation land. It seems extremely premature and unreasonable to allow this area to be developed as a resort solely on the basis of a speculative market study (see comments below) indicating that the owner and developer may be able to make a profit.

Even if we take the developer's market study as an accurate forecast of demand for visitor rooms on Oahu, we still must ask whether the North Shore, in particular Mokuleia, is the appropriate place to develop further visitor room capacity. The developer has not argued that the North Shore is the only place on Oahu where additional resort development can occur. Nor has the developer presented any argument or evidence that the North Shore should be the preferred location of additional resort development on Oahu. Perhaps the Ewa area, or the West Shore would be preferable to both visitors and residents of Oahu. The developer makes no such arguments in favor of further resort development on the North Shore, much less in favor of resort development on Preservation land in Mokuleia. If visitors were clamoring for additional room capacity on Oahu and if no other locations were available, then we might want to consider whether converting Preservation land to resort land is justified and acceptable. But to do so at

the present time would be completely unjustified and counter to public interest as it is expressed in the City and County Government's planning documents. Indicative of this public interest, the City and County has proposed funding for a park on the ocean front parcel adjacent to the present Mokuleia Beach Park (Parcel C in the EIS) upon which the developer would like to construct a hotel and resort condominiums. Park development is consistent with the land use designation of Preservation and should be pursued.

Comments on the Market Study

The developer's sole rationale for resort development at Mokuleia is that additional visitor rooms will be required on Oahu to meet the forecasted increase in demand over the next seventeen years. The forecasted demand for visitor rooms is based on forecasts of visitor arrivals from the State Department of Planning and Economic Development. These may be the best forecasts available, but there are many factors which affect tourist arrivals, some of which cannot be forecasted with much confidence. There are no confidence intervals given for these visitor arrival forecasts. These arrival forecasts are converted into forecasts of demand for visitor rooms by assuming that the percentage of visitors using commercial accommodations, the average length of stay, the average number of persons per room, and average occupancy levels will all stay roughly at current values or follow current trends. Such factors may be less prone to forecast errors in each arrival, but some error is inevitable. The effects of forecast errors in each of these factors are compounded when they are multiplied to compute the forecast of visitor room demand on Oahu. It would be useful to have some information on confidence in these arrival forecasts to judge the merits of the developers argument.

The most speculative and the most critical part of the developer's market study is their forecasted increase in the portion of Oahu visitors who will stay on the North Shore. Presently, around 2% of visitor room nights on Oahu are spent on the North Shore. The developer forecasts that this will increase to 12.5% by the year 2005. Little explanation is given for this large forecasted shift in visitor demand away from Waikiki to the North Shore. The developer simply suggests that if a resort exists on the North Shore such as the one proposed, visitors will probably want to stay there. This is highly speculative and the accuracy greatly affects the economic rationale for the development. Based on the forecasted demand for visitor rooms on Oahu and the 12.5% share for the North Shore, the supportable number of hotel rooms at Mokuleia is calculated in the market study to be on the order of 2000 by the year 2005. The developer has proposed to build approximately that much room capacity among 4 or 5 hotels. If the forecasts are, say, 25% too high, will these hotels be profitable? If I were the developer, I would consider this a highly speculative investment. And the City and County of Honolulu should certainly consider this as too speculative an argument to justify resort development on Preservation land.

Perth March 1987



April 8, 1987

Mr. Jim Richardson
68-533 Crozier Drive
Waiakua, Hawaii 96791

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuleia, Oahu

Dear Mr. Richardson:

Thank you for your comments of March 24, 1987 regarding the
subject EIS. We respond as follows:

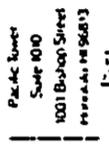
General Comments

Paragraph 1. Is Potential Economic Growth Sufficient Justifica- tion for Permitting the Development?

The purpose of the EIS process is to provide a forum for review-
ing the positive and adverse impacts of a proposed development.
Naturally, different individuals and groups place a different
value on the various impacts. Actual decision making is the
result of a political process in which various proponents and
opponents of a project decide on the overall benefit or negative
benefit of a given decision through the votes of their elected
officials. We believe that the DEIS has discussed both the posi-
tive and adverse impacts of the proposed project.

Paragraph 2. Alternate Location for Resort Development and Funded Park Sites.

The proposed Mokuleia resort development would accommodate only
a portion of the demand for tourist accommodations shown in the
market study. Assuming that the projections are correct,
additional locations will have to be found on Oahu for facilities



Mr. Jim Richardson
April 8, 1987
Page 3

- Anticipated development and maturation of resort destinations outside Waikiki.
- Trend in visitor preference for recreation-oriented vacations in integrated resort communities.

Alternative destination areas are expected to occur on lands elsewhere on Oahu which are:

- suitable for development
- close to the ocean
- in unique environmental settings.

Lands which meet these criteria are typically outside the primary urban center of Oahu along the coastline and include:

- West Beach
- Makaha
- Laie/Sahuku
- Mokuiaia.

Considering the market orientation and development plans of the destination areas on Oahu which are presently planned or proposed, the market share distribution of Oahu visitor units by 2005 is projected as follows:

Waikiki/Kahala	75.0%
West Beach/Leeward	10.0
North Shore/Koolauloa	12.5
Other (airport, downtown, etc.)	2.5
	<u>100.0%</u>

Based on these factors, visitors would probably want to stay on the North Shore and as a result, a resort could be developed.

Again, thank you for your comments.

Sincerely,


William E. Manket

WEM:awp

Mr. Jim Richardson
April 8, 1987
Page 2

to accommodate this growth. Perhaps a portion of these accommodations should be placed at one or more of the existing resort areas, however, this would require the amendment of a Development Plan in the respective area. Presumably the size of the resort designations in those areas already existing was based on impacts and issues raised during the EIS and public review processes that each resort development underwent. Rationally, to compare alternatives, an EIS for each location would have to be undertaken. Such a task is outside the scope of the EIS for any individual resort proposal.

We are not aware of any proposed funding for the acquisition of Mokuiaia lands for park sites. The park sites suggested for deletion are on the North Shore Development Plan Public Facilities Map for funding in future time frames. It should be noted that their position for funding, i.e. one to six-year timeframe and seven-plus-year timeframe has remained unchanged since the North Shore Development Plan was adopted in 1983. Hindsight has shown that when the projects were first placed on the DPPF Map, a more appropriate funding projection would be five to eleven and twelve years and beyond. It could well be that an individual looking back from the year 2005 could report that funding should actually have been projected as years 20 to 25 and 26 years and beyond.

Comments on the Market Study

Reliability of Visitor Arrival Projections

The Department of Planning and Economic Development develops its forecasts as a basis for developing State plans and policies. As a result, the confidence interval is judged to be highly reliable for private planning purposes. We believe the visitor arrival projections to be reasonable for estimating hotel room demand.

Market Share of Visitor Units

Demand would not be created by building a resort. The market study found that a demand does exist for rooms throughout Oahu.

Waikiki will continue to dominate the Oahu visitor unit market; however, its market share is expected to decline from its current level of 93% to about 75% by 2005. Reasons for this decline in market share are a result of:

- Limited amount and availability of suitable development sites in Waikiki.

625 2187 549

WILLIAM
E
WANNET
INC
L.P.O. COMPANY

THE SALVATION ARMY

HONOLULU BRANCH, HONOLULU, HAWAII, P.O. BOX 620, HONOLULU, HAWAII 96809



WILLIAM E. WANNET
1001 BROAD STREET
HONOLULU, HAWAII 96813

February 13, 1987

RECEIVED
FEB 18 PM 1:40

DEPT. OF
GENERAL PLANNING
C & C HONOLULU

Dept. of General Planning
City & County of Honolulu
650 S. King St., 8th Floor
Honolulu, HI 96813

RE: North Shore Development Plan

Dear Friend:

We have received information relating to the proposed amendments to the change of this lovely area on the north shore from agricultural to resort. As a long-time resident of this area, we must express our great concern regarding this change.

You would want to know that the Salvation Army conducts a year-round camping program on Crozier Drive in the city of Waialua. During the summer months, nearly 1,000 children and adults attend the camp and take part in this residential camping program. Many of these individuals are from low income, inner city settings, and this is a very unique and special opportunity for them to experience the wonderful natural setting found on the north shore. You would know that very few untouched areas remain on the island of Oahu.

We can't help but feel that the high-rise buildings, increased traffic, and growing population could do anything but harm this lovely area and detract from the camping program. We would appreciate very much your careful review and consideration of this change and its impact on the future of Hawaii.

Sincerely,

Bill D. Luttrell

Bill D. Luttrell, Major
Divisional Commander

BDL/PBS:pb
cc: Mokuleia Community Association



April 8, 1987

Bill D. Luttrell, Major
Division Commander
The Salvation Army
P.O. Box 620
Honolulu, Hawaii 96809

Re: Responses to Comments on the DEIS for the Proposed Development at Mokuleia, Oahu

Dear Major Luttrell:

Although your comments of February 13, 1987 were not directed at the Draft EIS for the proposed project, the Department of General Planning asked that they be included in the Final EIS. We respond as follows:

The Draft EIS discussed that the North Shore area is the host to a number of recreational and camping programs sponsored by religious and non-profit groups. Loss of ruralness due to development is an adverse impact which has been identified. This adverse impact and others has to be weighed against the positive impacts which include increased economic activity and the creation of jobs to provide an alternate employment base for the Waialua community. The importance of these positive impacts have been highlighted by the recent dis-closure of a planned shutdown of Waialua Sugar by Castle & Cooke.

Again, thank you for your comments.

Sincerely,

William E. Wanket

William E. Wanket

WEX:awp

Pack 1000
Suite 1010
1001 Broadway Street
Honolulu, HI 96813

William Wankett
Page 2

unsure whether they depict the animal on the beach or in the near-shore waters.

At any rate, this is certainly a revelation which should be discussed in your final Impact Statement. The Hawaiian Monk Seal is one of the most endangered animals on earth and the significance of its sighting in the project area is monumental. Every effort should be made to assess the potential impact this planned project would have on this and other seals which may be using the area.

What sort of water sports and beach activities are envisioned for the hotel projects? Will there be motorboats, jet skis or other craft which may endanger not only the Monk Seals but also the other marine life? What will be the impact of increased human population and beach activity?

I believe these and other issues relating to the project's impact on the rare and unique marine life in the area should be fully addressed in the final Impact Statement. Thank you once again for this opportunity to comment.

Very truly yours,

William W. Ramos-Saunders
William W. Ramos-Saunders

WWR-S:ico

cc: Donald Clegg

REC'D 4/1

William W. Ramos-Saunders
59-383 Alepio Road
Haleiwa, Hawaii 96712

March 25, 1987

HAND DELIVERED

William Wankett
Pacific Tower, Suite 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Re: Development Plan Environmental
Impact Statement on Proposed Resort
At Mokuleia

Dear Mr. Wankett:

This letter will supplement my longer letter dated March 24, 1987 commenting on the Development Plan Environmental Impact Statement relating to the proposed resort at Mokuleia. I learned late yesterday afternoon that there have been two sightings of a Hawaiian Monk Seal in the Mokuleia area within the last two weeks. Both sightings have been reported to the National Marine Fisheries Services.

The first sighting occurred on Friday, March 13 in the area directly on or adjacent to the Kealia parcel of the proposed development, west of Mokuleia Beach Park. I understand photographs were taken at that time but I am

William Wankett
Page 2

William W. Ramos-Saunders
59-383 Alapio Road
Haleiwa, Hawaii 96712

offer and would appreciate a response on the points covered.

I. General Comments

The following are observations on the general approach taken with respect to the Impact Statement. More specific comments are included later in Section II below.

1. Procedure Followed, Failure to Address Specific Impacts.

As I understand it, the City and County of Honolulu's Department of General Planning determined that an Environmental Impact Statement was required for the proposed development. Since the development required a number of governmental approval actions, that Department and the developer agreed that they would treat each application phase with a separate Impact Statement. The General Plan Impact Statement, which has already been accepted, was extremely vague and failed to address the specific impacts of the various components of the proposed resort. A number of commentators wrote challenging this. The developer's answer was that this was not a "site specific" Impact Statement and it did not intend to address the details until later statements.

Now the draft Development Plan Environmental Impact Statement has been submitted and it suffers from the same flaws. Despite the fact that the specific plans for the development are known (i.e. location of sewage

HAND DELIVERED

March 24, 1987

William Wankett
Pacific Tower, Suite 1010
1001 Bishop Street
Honolulu, Hawaii 96813

Re: Development Plan Environmental
Impact Statement on Proposed Resort
At Mokuleia

Dear Mr. Wankett:

I am a resident of the North Shore of Oahu and a frequent and long-time user of the mountain, coastal and ocean resources of the Mokuleia area. My hobbies and interests include fishing, bird watching, surfing, endangered species, natural history and Hawaiian history.

I have reviewed the Environmental Impact Statement prepared in connection with Mokuleia Development Corporation's requested Development Plan amendments concerning the proposed resort at Mokuleia. I understand that Barry Okuda is no longer working for the developer/applicant and that comments on the Statement should be sent to you. I have the following comments to

William Wankett
Page 4

In Declaratory Ruling 86-1, the Environmental Council held that:

If all the specific details of a project are not available at the general plan or development plan amendment stage, then the Environmental Impact Statement, if required, need not be voluminous.

In this case, however, the specific details have long been available. The facilities of the proposed development were mapped out in 1986, yet the Development Plan Impact Statement fails to address specific impacts of each facility.

Since the Statement is so broad and vague it also seems to violate Sections 11-200-16 and 11-200-17 of the Environmental Council's Rules which set forth the content requirements for draft impact statements.

Specifically, the Development Plan Environmental Impact Statement fails to comply with the following requirements:

The contents shall fully declare the environmental implications of the proposed action and shall discuss all relevant and feasible consequences of the action. In order that the public can be fully informed and that the agency can make a sound decision based upon the full range of responsible opinion on environmental effects, this statement must include responsible opposing views, if any, on significant environmental issues raised by the proposal.

William Wankett
Page 3

treatment plant and pumping stations, stream diversions, golf course location, etc.) the Statement continues to treat the resort in a very general way. I believe this is in violation of Administrative Rule 11-200-7 and/or the Environmental Council's Declaratory Ruling 86-1.

Section 11-200-7 of the Environmental Council's Rules states as follows:

Multiple or Phased Applicant or Agency Actions. A group of actions proposed by an agency or an applicant shall be treated as a single action when:

(1) The component actions are phases or increments of a larger total undertaking;

(2) An individual project is a necessary precedent for a larger project;

(3) An individual project represents a commitment to a larger project; or

(4) The actions and questions are essentially identical and a single statement will adequately address the impacts of each individual action and those of the group of actions as a whole.

Based on this rule, I believe the developer/applicant is required to submit just one statement which addresses all known details of the proposed development.

Shore. The "secondary effects" of a domino trend this project may stimulate should be addressed, as should the cumulative impact of loss of Oahu's remaining rural beach areas.

4. Failure to Present Responsible Opposing Views.
Under Environmental Council Rule § 11-200-17, the Impact Statement must include a serious discussion of responsible opposing views. The Statement fails to do this on almost every substantive point.

For example, there is no serious discussion of park needs or of the consequences of deleting park sites from the existing development plan. Neither is there any discussion of the need for retaining coastal lands in preservation zoning.

There is little mention of the desirability of retaining a vestige of "country" on this island for those of us who do not relish the overcrowding in Honolulu and who need some room to breathe.

These omissions are just examples of the Statement's failure to present "responsible opposing views", more instances of which are discussed below.

5. Failure to Discuss Reasonable Alternatives.
The Statement does not discuss with any depth or credibility the possibilities of alternative uses of the

2. Failure To Adequately Assess Impacts Beyond The Project Area.

The environment of the Mokuleia area is not an isolated or enclosed capsule. It affects and is affected by activities in adjacent areas and even distant areas. To the extent the Impact Statement even mentions environmental impacts, it confines them to the boundaries of the project area. There is almost no discussion of the project's impact on the Kaena Point State Park. The discussion on traffic is limited almost entirely to roads in and out of the area. It does not discuss traffic going beyond the project toward Kaena Point and neither does it discuss traffic problems in Haleiwa and the North Shore in general.

This failure to address impacts beyond the project area pervades all aspects of the Impact Statement. I believe this is significant and violates the rules concerning EIS content requirements.

3. Failure to Discuss Cumulative and Secondary Impacts.

The Statement fails in almost every aspect to meet the requirement that it discuss the cumulative impact this and other similar projects will have. There is little discussion of the new Kavele Bay resort development or of other existing or potential resorts which may be inspired should the Mokuleia project proceed. Impacts on the lifestyle of rural Oahu are mentioned only briefly, notwithstanding the fact that resort development will entirely change living conditions on the whole North

project lands for profitable activities which are more consistent with existing land use designations and the rural atmosphere. What about an agricultural park or subdivision? What about aquaculture? These and other alternatives should be fully evaluated in the final Statement.

6. Organization and Format

The Statement's Table of Contents is full of errors which makes cross-reference very difficult. The maps are poorly rendered and do not adequately or comprehensibly depict the project area. Some of the appendices are mislabeled. These deficiencies should all be corrected in the final Statement.

II. Specific Comments

1. Biological Studies

(a) Flora

The Impact Statement does a fairly complete inventory of plants species found on the project site but it fails to discuss the number of rare and endangered species at nearby Kaena Point. Kaena Point has one or more species which exist nowhere else in the world. These are primarily coastal species which are especially susceptible to impact from human activities. The Nature Conservancy has recently done a complete inventory of endangered plants in the area and that list is being made

available to the public through a data bank system. However, your biological consultants have failed to even mention this study of the project's potential impact on those plants.

There is no question that increasing the population of the Mokuleia area from roughly 500 to over 5,000 will significantly increase traffic in and out of the area, including traffic beyond the resort. No mention is made of how that increased traffic and human presence will impact on these rare and endangered species. This failure is a direct violation of Environmental Council Rule § 11-200-17(g) which states in relevant part that:

The draft EIS shall contain a description of environmental setting, including a description of the environment in the vicinity of the action; as it exists before commencement of the action, from both a local and regional perspective. Special emphasis shall be placed on environmental resources that are rare or unique to the region and the project site

The terrestrial botanical survey conducted by Char & Associates (and the Impact Statement discussion based on it) was inadequate to accurately access the project's impacts on the sensitive botanical areas nearby which contain very rare and unique specimens of endemic Hawaiian flora. This should be corrected prior to submission of the Final Statement.

(b) Fauna

As with the botanical survey, the terrestrial faunal survey done by Char & Associates was inadequate with respect to identifying native species in the area as well as discussing the project's impact on them. The survey was conducted on May 24 and 25, 1986, a time of year when many of the migratory bird species are not present. In addition, the study was conducted from 8:30 a.m. to 5:00 p.m., omitting the critical hours around sunrise and sunset when feeding occurs.

Significantly missing from the study was any mention of the colony of Laysan Albatross, a protected native Hawaiian bird, which has been frequenting the project area for at least the last two winters. This winter there were over 15 adult individuals exhibiting breeding behavior on the Kealia parcel of the proposed development.

Also missing from the bird life discussion was mention of the probability that the rare and endangered Hawaiian Stilt uses the wetland areas around Crowbar Ranch. Your statement concludes that the officially "endangered" native Hawaiian coot and Hawaiian ducks found in the area were probably captive-bred birds. However, that is a conclusion unsupported by the Char & Associates study or other observation.

It is also notable that your report fails to disclose the existence of another large pond at the west

end of Dillingham Air Field where other rare birds including the Koloa and Hawaiian Coot have been sighted. This is right where the proposed sewage treatment plant is expected to be built but there is no assessment of its impact on those native birds.

While the report briefly mentions that the pond habitat should be incorporated into the design of the development, there is no discussion of the probable impact of increased activity in the area upon the endangered bird species. Just because the ponds are retained does not mean the birds will remain there if there is dense development nearby. The actual impact of increased human occupation of the area has not been analyzed in your study and should be addressed.

Missing from the discussion of reptiles and amphibians was the Hawaiian Green Sea Turtle which is an endangered species. While these turtles may not classify as "terrestrial vertebrates" since they spend most of their time in the ocean, they are known to be attempting to re-establish themselves at Moomomi Dunes on Molokai and there is a distinct possibility that they may consider nesting on remote Mokuleia and Kaena Point beaches as well. Significantly, these turtles are numerous in the area and I have seen them very close to shore. Unfortunately, they are not even mentioned in this or any other section of your impact study. This is a significant omission which must be corrected.

(c) Sea Life

The near-shore marine environmental survey done by Oceanit Laboratories for the impact study is flawed and fails to identify several important ocean species inhabiting the Mokuleia area. First of all, the method used for spotting fish was incredibly naive. Apparently divers swam through an area unrolling a "transect line" and then "waited approximately 10 minutes for frightened fish to return to the area" before counting them. Anyone remotely familiar with fishing, specifically fishing in Hawaiian coastal waters, knows that "frightened fish" will frequently not return for an area for hours. This is my experience in skin diving, gill netting and throw netting. Certainly a more effective method of inventorying fish could be followed.

Additionally, the study was admittedly conducted at a time when fish active at night and during dawn and dusk were not present. These may be the species most sensitive to development and the increased light and nocturnal activity it will generate. The study should attempt to identify those species and describe the project's impact on them.

Finally, the study was admittedly conducted when visibility in the area was very poor. This obviously resulted in an incomplete survey, yet there was no attempt to re-do the study when the water was clearer.

The marine study does not even mention sharks which have been known since prehistoric times to breed and congregate in the Mokuleia area. Hawaiian history is full of references to sharks and shark gods along this stretch of coast. See Sites of Oahu (1978). I have often seen "packs" of sharks just offshore from the proposed project and swimmers are frequently warned to leave the area during the summer breeding months. The project's impact on the various species of sharks frequenting the area should be identified and discussed.

As discussed above, the endangered turtles were not even mentioned, although it is common knowledge that they frequent the area.

In addition, the National Marine Fisheries Services reports sightings of the endangered Humpback Whale, the melon-headed whale and other sea mammals in the area. I believe there is also a resident school of dolphins which frequents the near-shore areas of Kaena and Mokuleia. Further information and documentation concerning this school, as well as other marine mammals in the area, can be obtained from Prof. Louis Herman of the University of Hawaii. The project's impact on these cetaceans should be fully considered.

The marine life survey was inadequate and should be redone in a more responsible and professional manner.

2. The Marine Environment

The Oceanit Laboratories survey purportedly studied currents, water quality, erosion, and drainage in the project area. Significantly, the only observations were conducted on May 29 and June 10, 1986, both times when currents and rains are at their lowest annual point. The most significant erosion factors in this area are the large waves and heavy rains that occur between October and April. It is impossible to adequately assess these conditions and the project's impact on them from observations conducted in the summer. The conclusions of the study are therefore fatally flawed with respect to these issues.

The study concludes that "offshore currents are mainly tidal driven and are predominantly in the westerly direction most of the year." However, there is no discussion of the impact of large winter swells on these currents. The study also states that "large swells reach this area from the north and northeast approximately 2.0% of the time." There is no mention of even larger swells from the west and northwest, which actually occur closer to 15% of the time, and their impact on currents and beach configuration. The report admits that the current data it generated is "scarce" and so it is hard to see how the study's conclusions concerning erosion and the effects of a proposed stream diversion can be valid.

Significantly, while a proposed re-routing of Kapaleau Stream to Makaleha Stream is discussed, there is

no disclosure of the reason for or manner of the diversion. The proposed changes to the streams should be shown clearly at an appropriate scale, as should any planned artificial streams or ponds. There is no description of the proposed "improvement" to Makaleha Stream. There is no discussion of maximum flows in these streams and no acknowledgment that both outlets may be needed in times of heavy rain.

Another fatal omission in the drainage discussion is the lack of mention of the increased run-off which occurs in a developed area when concrete streets, slabs, sidewalks and other non-porous earth coverings are introduced. There is no discussion of where this run-off will be diverted or how it will impact on the streams and stream outlets. This will be a significant problem during heavy winter rains. How will this storm drainage be handled?

In view of the study's lack of actual observation as to stream flow and winter currents, it is hard to conclude that questions of drainage and erosion have been adequately addressed. Depending on the nature of the "improvements" built in the coastal zone, the convergence of high waves and heavy rains could have a very significant impact on the area. The Impact Statement's failure to discuss these matters is significant and should be corrected.

3. Traffic Impact Report

The Traffic Impact Report is inadequate in its failure to address the substantial traffic impact this resort will have on the rest of the North Shore of Oahu. Traffic between Weed Circle and Kuilima is already a serious problem. On weekends, especially when the surf is high and/or the weather is good, traffic slows to a crawl between Haleiwa and Sunset Beach. This situation will already be made worse by the on-going development at Kavela Bay.

It is axiomatic that tourists do not come to Hawaii to sit in their hotel rooms. Their most frequent activity is touring around the island. It is hard to understand the study's failure to sincerely discuss the existing and expected traffic problems on Kaneohe Highway and the steps necessary to mitigate them.

The study also fails to acknowledge that at least some of the development's thousands of inhabitants will work in metropolitan Honolulu. There is no discussion of the project's impact on rush hour traffic in and out of Honolulu on H-2, H-1 and their feeder roads.

The traffic study is myopic and fails to discuss impacts which will occur to other areas and impacts which may be cumulative in nature. It should be redone with a fuller disclosure of all traffic problems this and similar resorts will bring to the entire North Shore and the roads leading to it.

4. Market Study

It seems that the entire justification for the project is built around the scenario set forth in the Market Study. Significantly, however, that study fails to discuss a number of highly probable contingencies which will affect tourism and the State economy in general.

First and foremost, the Market Study does not seriously take into account energy shortages which are likely to occur toward the end of this century. As we saw in the 1970s, increases in energy costs significantly affect tourism in Hawaii. While recent OPEC solidarity problems have led to a decrease in fuel costs, the long term indication is that those costs will rise significantly in the future. We are already seeing this at the gas pump. Coupled with the finite supply of fossil fuels (which some experts feel will be exhausted within our generation), there is little question that energy availability will be a serious factor in Hawaii's future tourism market. The study's failure to discuss these facts is disturbing.

In addition, the study does not acknowledge any optimum or maximum population level for Oahu. It seems to assume population can continue to grow unchecked.

Also disturbing is the study's failure to discuss the finite supply of land and water on this island and the fact that Oahu has a maximum carrying capacity which we are rapidly approaching. There is no discussion of the

cumulative impact of other similar projects, such as West Beach, Turtle Bay and Kavela Bay.

When the omissions concerning energy impacts and population realities are combined, it is clear that the study's assumption that Hawaii's tourism growth rate of the past 30 years will continue is a fairytale. That assumption ignores and conflicts with the law of diminishing returns and the fact of finite resources.

The Market Study touts the jobs which will be created but fails to disclose that many of those jobs will likely be part-time and/or minimum wage with little chance for advancement. The tourist industry consistently pays lower wages than agriculture and other activities, yet the study does not reveal these realities.

The balancing considerations of preserving lifestyle, quality of life, increasing self-sufficiency, preserving environmental values, etc. have hardly been touched upon. The Market Study seems to be a whitewash which fails to include the required "responsible opposing views" which exist concerning Hawaii's future needs for tourism. Were any other studies conducted at the request of Mokuleia Development Corp. concerning these market conditions? If so, I believe Environmental Council Rule 11-200-17 requires their inclusion:

In any event, it is essential that the sources of data used to identify, qualify or evaluate any and all environmental consequences be expressly noted.

Accordingly, please disclose any other studies which were done with respect to the proposed resort relating to the tourist industry and/or market conditions.

5. Parks and Recreation

The Impact Statement does not contain any study or substantive discussion concerning the need for park space on Oahu, generally, or on the North Shore, specifically. This is despite the fact that the developer wants to delete proposed parks in the project area. Especially significant is the fact that under the existing development plan those proposed parks are designated as preservation areas. There is no discussion of the rationale for wiping out preservation areas in favor of increased urbanization. This is a significant trade-off of high environmental impact and the failure to discuss it is a significant omission.

As mentioned above, there is no discussion of the project's impact on the proposed park at Kaena Point. That park has been set aside in large part because of the unique environmental resources existing there. The statement in this respect fails to describe the "environmental setting" and the project's probable impact on it. How will the nature of that proposed park be affected?

In addition, the statement does not identify what the present and projected recreational needs of the area are. Neither does it discuss the considerable

overcrowding and serious parking problems already existing at other North Shore parks such as Waimea Bay, Ehukai, Sunset Beach, etc. Your project proposes deleting parks and substituting "park-like" facilities, but the Impact Statement fails to fully describe the nature of those facilities or to assure that they will prove a satisfactory substitute for much needed North Shore beach parks.

Neither has there been a discussion of the need for camping space on Oahu. During the camping season, Mokuleia Beach Park is usually filled to capacity, as are virtually all of the other coastal camp sites on Oahu. There is clearly a need for more of this type of recreational opportunity on the North Shore, yet the proposed resort would eliminate proposed beach parks which are perfectly suited for camping.

In addition, the resort atmosphere would be incompatible with the very purpose of camping, i.e. to get away from crowds and development and to enjoy nature. A resort development seems inconsistent with this activity. Mokuleia camping will be drastically changed and become more like camping at Kapiolani or Ala Moana Park, surrounded by urban activity.

There has been no discussion of the resort's impact on the existing Camp Erdman which serves as one of the only Oahu beach camps for school age children. How will their wilderness experience be affected by rental cars, bus loads of tourists, and increased air traffic?

The resort's impact on recreational activities such as those offered at Camp Erdman should be more fully discussed.

The final Impact Statement should thoughtfully and honestly weigh the valid competing needs for preservation and recreation in unique settings like Mokuleia.

6. Relationship of Action to Existing Land Use Policies.

The Statement fails to meet the requirement that it adequately address "the relationship of the proposed action to land use plans, policies and controls to the affected area." Clearly, the policy heretofore has been to retain the Mokuleia/Kaena Point area in agriculture, preservation and parks. Your Statement fails to justify a change in these policies.

The Statement does not even acknowledge the beneficial goals and purposes of the existing land use designations. Neither does it discuss what impact the proposed change will have on those goals. What undeveloped coastal areas will be left on Oahu if the proposal is approved? Where can Oahu residents go if they want pristine coastal recreational opportunities? This would seem to be an "unresolved issue" which the Impact Statement likewise fails to discuss with any sincerity. No responsible opposing views have been presented.

7. Need and Alternatives

Based almost entirely on the Market Study, the Statement concludes that the planned project is needed. However, as pointed out above, that Market Study is significantly flawed and fails to address the realities of Hawaii's unique tourism situation. In view of those realities, it would appear that the Impact Statement should discuss other alternatives including less intense development of the land. There is no discussion of the possibility of an agricultural park or subdivision which would preserve the rural flavor of the land and serve other State land use goals. Neither are any other economically viable, yet less environmentally destructive, alternatives considered. This seems to be a violation of the requirement of Section 11-200-17(f) that:

The draft EIS shall contain any known alternatives for the action A rigorous exploration and objective 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 benefits, costs and risks shall be included

8. Aesthetic Considerations

Your study asserts that the resort project will increase the opportunity for appreciation of the area, but it fails to acknowledge that the resort itself will significantly alter the existing aesthetic appeal. The study does not seem to admit that multi-story condominiums

and/or hotels will negatively affect the visual impact of the natural setting. The resort will interfere with the serene beauty of the area, not only for those actually in the resort area, but also for those who use the surrounding waters and those who have a view of the striking Mokuleia coastline from adjacent North Shore areas. This negative interference is evidenced by the "concrete jungle" which already mars the coastline in the area of Puuiki Park, at the west end of Waialua Beach Road.

Adding concrete highrises of six or seven stories to an area where the tallest existing building is a two-story residence will be a major change in the area. As such, careful thought and due consideration are required before significantly and irreparably altering this beautiful area as proposed by the developer.

Perhaps the hardest aesthetic impact to describe and quantify is the loss of one of the last coastline wilderness experiences left on Oahu. Nowhere else can such quiet uncrowded beaches be found. This resource will be radically altered by the proposed development yet there has been no serious discussion of the impact on North Shore residents who need a place to get away from the fast-paced life on the rest of Oahu.

Will Oahu residents have to fly to the other Islands in order to experience wild beaches? When the country becomes a resort, where will Oahu's people be able to turn? Won't the development's lights interfere with

the remarkably good star viewing available only in that area? The final study should address these questions and try to justify the trade-off involved. While this is a hard issue to communicate, it is perhaps the central concern of many who are disturbed over the proposed development.

9. Airport Impacts

It seems that the Impact Statement glosses over the effects of increased air traffic due to the resort. The expected increase in air traffic is not quantified or adequately discussed, neither is the reality of increased annoyance to existing Mokuleia residents, including wild life. Again, the result will be further degrading of the country/wilderness experience at Mokuleia and Kaena Point. Such an impact is significant and should be more fully disclosed in the final Statement.

10. Historical and Archeological Resources

It is in the interest of the State of Hawaii to protect its archeological and historical resources. The draft Impact Statement seems incomplete and does not provide a sufficient description or map of the archeological sites located on the development parcel. The Waielua, Mokuleia and Kaena Point areas of Oahu are rich in Hawaiian history and are frequently mentioned in ancient chants and songs. Parts of this area were also rich in agricultural production, which may account for the name "Mokuleia" which means district of abundance. It

seems that the final Impact Statement should more fully discuss the historical significance of this area and proposed steps to preserve and/or enhance all that remains.

11. Sewage Treatment Plant

A sewage treatment plant is proposed to be built at the west end of Dillingham Air Field. There is no detailed description of the type of plant envisioned or the manner of effluent disposal. "Injection wells" are mentioned but there is no feasibility assessment taking into account the ground water situation. The Mokuleia/Kaena Point area has a number of springs and ponds which evidence a high ground water table. The impact of injection wells on water purity should be discussed. If an ocean discharge system is anticipated (even if only for emergencies) its impacts should also be fully discussed. The very pure and clean ocean water in the area should not be compromised for any reason. Accordingly, a full assessment of the alternatives, including pumping the sewage elsewhere, must be made.

The possibility for tidal wave and/or flood inundation of the sewage treatment plant must be considered, along with proposed mitigation measures in case of such a disaster. As it stands, the discussion of sewage treatment for the proposed resort is totally lacking in substance.

12. Fresh Water Needs and Limitations

The Statement contains no substantive discussion about the limited water resources on this Island or about the ever increasing demand. Can we afford to use the groundwater in this area for resort purposes? What will be the depletion rate versus the replenishment rate? How will increased water use in Mokuia affect other groundwater areas? Will water from the developer's wells continue to be available for public use? What if water from Mokuia is needed for other parts of Oahu during shortages? These and other important questions about this delicate resource should be raised and addressed in the final Impact Statement.

13. Impact of the Golf Courses

Pesticides and fertilizers are commonly used on golf courses. The Statement does not discuss the impacts of golf course run-off on fresh and salt water quality in the area. The result of increased nutrients and chemicals in the drainage basin should be fully evaluated and appropriate mitigation measures identified.

14. Construction Effects

Little discussion has been included concerning the various phases of construction and how the environment will be impacted during each phase. Often, construction itself is a severe impact on an area, with increased dust, noise, water pollution, heavy truck traffic, wildlife

disruption, etc. More attention should be given to this aspect of the proposed resort in the final Impact Statement.

III. Conclusion

Based on all of the above, it seems the draft Development Plan Environmental Impact Statement is more of an attempt to "sell" the proposed resort project than a serious and candid discussion of the environmental impacts involved. I believe the final Impact Statement should be much more detailed and objective and should more honestly disclose the effects such a development will have on the North Shore.

Thank you for the opportunity to comment on this document. I look forward to your response.

Very truly yours,

William W. Ramos-Saunders
William W. Ramos-Saunders

MWR-S:co
cc: Donald Clegg

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Mr. William W. Ramos-Saunders
April 8, 1987
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April 8, 1987

Mr. William W. Ramos-Saunders
59 Alepio Road
Haleiwa, Hawaii 96712

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuleia, Oahu

Dear Mr. Ramos-Saunders:

Thank you for your comments of March 24, 1987 and March 25, 1987
regarding the subject EIS. We respond as follows:

Letter Dated March 24, 1987

General Comments

1. Procedures Followed, Failure to Address Specific Impacts

The GP EIS and DP EIS were prepared in a manner which we believe complied with the spirit and intent of the EIS rules and regulations as well as with the letter of the law. Prior to embarking on this course of action, we consulted a number of times with both the Department of General Planning and the Office of Environmental Quality Control. Samples of how sections of the GP EIS should be handled were reviewed with the staff prior to proceeding. As indicated in your comment, this issue has been raised to the Environmental Council and we understand that the Council will address this challenge at its meeting scheduled for April 8, 1987.

2. Failure to Adequately Address Impacts Beyond the Project Area

We believe that the DEIS does adequately address impacts outside the project area. For example, there is an exhaustive market study addressing state and countywide tourism; in addition, there is a social impact assessment addressing issues of community concerns. In the case of traffic impacts the traffic study contained in the DEIS addresses traffic concerns to the intersection of Kaukonahua Road and Farrington Highway. In the opinion of our traffic engineer, impacts outside that area are related more to other factors than to the proposed development. (See response to your comments on traffic.) The potential impact on Kaena State Park will be discussed in response to your comments on parks.

3. Failure to Discuss Cumulative and Secondary Impacts

We believe that the market study and the social impact study (Appendix A and Appendix C to the DEIS) adequately discussed the issues raised in this comment. The Final EIS will contain an expanded version of the Social Impact Assessment in Appendix C and other specific comments will be discussed in this response.

4. Failure to Present Responsible Opposing Views

Notice of Preparation was sent to 54 agencies, individuals and groups for comment. In addition, 67 copies of the DEIS were distributed by the Office of Environmental Quality Control and numerous others, including yourself, reviewed the document and provided comments during the public review period, all of which will be included in the Final EIS.

5. Failure to Discuss Reasonable Alternatives

Part V of the DEIS describes alternative actions. In addition, Appendix G discusses the large supply of agricultural land awaiting the development of profitable crops and the opportunities for aquaculture are also detailed in that study.

6. Organization and Format

Your comments are well taken. We will correct errors in paging and cross referencing, and will endeavor to improve clarity where possible in the Final EIS.

Specific Comments

1. Biological Studies (Flora and Fauna, a and b)

The emphasis of the biological survey was focused primarily on the impact of the project on the study area and the immediately adjoining areas.

Regulatory policies and management of the Ka'ena Point lands fall under the State's Department of Land and Natural Resources' jurisdiction. An Environmental Impact Statement for a Makua-Ka'ena State Park was accepted by the State in 1977 (Hawaii Department of Land and Natural Resources 1977). The EIS prepared for the park addresses many of the concerns you have expressed regarding the preservation of rare and endangered plant species and the impact of increased pedestrian and vehicular traffic on the native coastal ecosystem.

The Makua-Ka'ena Park encompasses approximately 15,700 acres of coastline and mountain areas: Makua and Keawaula (Yokohama Bay) beaches, the leeward coastline stretching to Ka'ena Point, Ka'ena Point, the windward coastline extending to Camp Erdsen, and the upland mountain areas including Peacock Flats and the abandoned Mike Site. Most of the policies for the park are designed to provide management and control. Controlled access to the Ka'ena Point area should decrease the number of park users. Recommendations outlined in the park plan include (1) access within the Point by designated foot paths only; (2) post interpretive, regulatory, directional and warning signs; and (3) develop limited walkways and control access within the Natural Area Reserve (NAR). The Ka'ena NAR consists of approximately 12.46 acres of the coastal dune ecosystem at the Point. Chapter 20.9 of Title 13, Administrative Rules, regulates activities within a reserve.

Our consultant on these matters, Winona Char, is familiar with The Nature Conservancy's (TNC) Hawaii Heritage Program as she serves on TNC's Plant Advisory and Natural Communities Advisory Group.

The fauna report does point out, on page 32, that the survey was conducted during a time when a number of migratory bird species were absent from the site. A list of the common migratory species which might winter over on the study site is also provided.

Thank you for bringing to our attention the Laysan Albatross (*Diomedea immutabilis*) sighting on the Kealia parcel of the proposed development. Winona Char has observed at least three birds in the Ka'ena area, from Alei Pali to the Point. The endangered Hawaiian Stilt (*Himantopus mexicanus knudseni*) and the Hawaiian Gallinule (*Gallinula chloropus sandvicensis*) have been reported from the wetlands on the study area by the State Division of Forestry and Wildlife and the U.S. Fish and Wildlife Service.

The Koloa ducts disturbed on one of the Cronbar Ranch ponds flew off in the direction of a sugar cane reservoir pond (Kawaihapai Reservoir) located on the Ka'ena side of the proposed project (see page 34 of the fauna report). In addition, the abandoned quarry pit located next to Dillingham Airfield is also filled with water and is probably utilized by the waterbirds. The City and County of Honolulu has considered building a wastewater treatment plant (Waialua-Haleiwa Wastewater Facilities) on a portion of the cane fields located on the Ka'ena side of the proposed Mokule'ia project site. The Kawaihapai Reservoir may be incorporated into the facilities' plan. An Environmental Impact Statement to assess the impact of the proposed wastewater treatment plant on native waterbirds is being prepared by the City and County.

Increased human occupation in the areas surrounding the ponds is expected to have some impact on the waterbirds which utilize the ponds. Human disturbance and activity near the ponds will increase. This may affect breeding activity and the recovery of the endangered waterbirds. There may be increased predation of waterbirds by pet and feral cats and dogs; rodent populations may increase. In addition, there may be changes in drainage and runoff patterns as well as water quality due to construction in nearby areas.

The U.S. Fish and Wildlife Service has identified the ponds around the Cronbar Ranch as important habitat for the recovery of endangered Hawaiian waterbirds. The U.S. Fish and Wildlife Service has recommended that the design, planning, and modification of the wetlands (ponds and streams) on the project site be done in coordination with their office and the State Division of Forestry and Wildlife.

The consultant has recommended that buffer zones be established around the pond areas. Existing trees and shrubs should remain intact; additional plantings should be made in those areas without shrub cover.

Mr. William W. Ramos-Saunders
April 8, 1987
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The developer, the U.S. Fish and Wildlife Service, and the State Division of Forestry and Wildlife should develop a long-term maintenance program for the wetlands and a protection plan for the endangered waterbirds. Fencing of the pond areas would reduce disturbance from humans and the larger predators. In addition, an active trapping program for rodents and feral cats should be considered.

The final EIS will incorporate a discussion of Green Sea Turtles and the potential impacts of the development on them and mitigating measures.

2. Sea Life

It is unfortunate that surveyors cannot interview each and every subject of the population under investigation. This would provide the most accurate statistical determination of the population. However, due to various constraints, e.g., time, cost, etc., standard methods have been developed to describe population estimates. As long as methods employed are consistent, relative comparisons can be made between population sets. In general, these comparisons are adequate for decision making purposes. In the event that more detailed information is required, more refined methods can be employed. Oceanit Laboratories, Inc. used standard methods and practices to survey the coral and marine life. When considering that both Makalela and Kapala'au Streams have been discharging into Kai'ahulu Bay for many years and that the proposed modifications will reroute discharge from Kapala'au to Makalela Stream (discharge outlets (330 meters away), and that no significant changes in discharge frequency or volume are anticipated, we feel that the standard methods employed are more than adequate for describing the coral and marine life, particularly at the DP EIS level.

Water quality measurements indicated varying visibilities along the Mokuleia coastline, ranging from 0.65 to 1.49 Nephelometric Turbidity Units (NTU). These measurements were taken at specific locations that were selected to be representative of the nearshore marine environment and did not account for variations in space and time within the habitat/zones identified. Results from our survey are adequate for general decision making purposes regarding the general planning for the development and the DP EIS. More detailed methods are available for determining water quality variations along a coastline, as will be employed for needed permits,

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e.g., Department of Health's Water Quality Certification. Additionally, although visibility was poor in some of the nearshore areas, measurements and methods employed surveyed marine life as it naturally existed and were adequate for the purposes of the study.

Response to Comment 2, Page 12

We will be contacting Professor Louis Herman to discuss these considerations and will include his comments in the Final EIS. However, our study generally described nearshore marine habitats, degree of complexity, fish and coral, etc. so that general decisions regarding land use planning could be made. Impacts on specific species of marine life that periodically and/or seasonally utilize the Mokuleia coastline, including sharks, the humpback and melon-headed whales, sea turtles, dolphins, etc., were considered to be very small because the only proposed modifications to the shoreline included rerouting discharge from Kapala'au to Makalela Stream outlets, both outlets exist in Kai'ahulu Bay. Additionally, our investigation indicated that the Makalela Stream outlet was previously the major discharge outlet into Kai'ahulu Bay. Therefore, the impact on the nearshore marine environment is believed to be small because rerouting the stream discharge from one location to a previously used location is not expected to produce significant change in Kai'ahulu Bay.

3. The Marine Environment

More detailed determinations of currents, water quality, erosion, drainage, etc. will be obtained at later stages of the proposed development in compliance with required permits, i.e., Conservation District Use Application (CDUA), U.S. Army Corps of Engineers (COE), etc. For example, the Department of Health (DOH) regulates discharge with their Water Quality Certification application. In the event that DOH determines that certain information is required, to comply with their criteria, more data may be required, e.g., measurements of water quality, currents, waves, dispersion coefficients, etc.

Response to Comment 4, Page 13

Winter swells can cause currents along the coastline that may flow contra to the normal direction of currents and contra to simultaneously measured offshore currents. These currents can cause short-term changes in the nearshore marine environment, including changes in water quality, sediment transport and

erosion. In the event that stream discharge occurs during high surf conditions when nearshore currents are flowing contra to normal directions, the nearshore marine environment is expected to experience additional stress from the fresh water, nutrients and suspended solids. However, this condition has periodically occurred along the Mokuleia coastline for a long time and is expected to continue. Moreover, the proposed development is not expected to significantly change this condition.

Response to Comment 5, Page 13

Data describing the wave climate along the Mokuleia coastline are taken from data that were measured at Haleiwa, located along a related section of coastline. Results indicate a large component of wave energy comes from the west; however, the percent occurrence of waves that exceed 20 feet is very small and is much less than 15 percent. In the event that large swells occur, typically during the winter months, modifications to the shoreline can result from waves and locally generated currents. This concern will be addressed by the developer as more specific plans are made regarding the placement of buildings and infrastructure. However, without detailed knowledge regarding the type and placement of structures, it is difficult to discuss impacts on the shoreline.

In our study we concentrated on nearshore marine environmental effects from moving the major stream discharge point from Kepala'au Stream, east 330 meters, to its original discharge location at Makena Stream. Based on our information and our measurements, we concluded that the proposed stream modifications will have no significant impact on the nearshore marine environment. In the event that shoreline modifications are needed that include structures and devices, a Certification Report will be required, which will document potential effects or erosion from proposed shoreline modifications.

3. Traffic

The intent of the traffic analysis is to identify the potential impact of the specific project, in this case the development of a resort at Mokuleia, to respond to an expected demand in recreational accommodations on Oahu. Increases in traffic due to increased population or tourism are expected whether or not this project is developed. Traffic volumes on Kamehameha Highway, therefore, are expected to be similar. The discussion of the impacts of this increase and the suggestion of

mitigation measures should be part of an overall study of tourism growth rather than part of the project EIS.

The proposed project's residential units are not intended to be primary homes and are expected to have negligible effect on peak hour traffic volumes between central Honolulu and the project site. The development of employment opportunities in this area could result in a net decrease in peak hour, peak direction traffic demands on the existing congested roadways.

4. Market Study

Impact of energy shortages on visitor arrivals: Visitor arrivals were based on the Series M-F projections prepared by the Hawaii State Department of Planning and Economic Development (DPED).^{1/} The impact of possible energy shortages on visitor arrivals would be reflected in our analysis to the extent that it was considered significant by DPED in developing the Series M-F projections.

Optimum/Maximum Oahu Population and Availability of Water

Analyses of optimum and maximum population levels for Oahu and evaluation of the long-term supply of potable water was outside the scope of our market study.

Projected Growth Rate of Visitor Arrivals

The market study assumed a significant decline in Hawaii's tourism growth rate as compared to the past 30 years. We believe these projections are realistic because the declining rate of growth in visitor arrivals reflects, in part, the maturing of the resort facilities in the State and the emergence of alternative vacation destination areas outside the State. The growth rate of visitor arrivals was projected to decrease from 4% per year between 1985 and 1990 to 1% per year between 2000 and 2005, shown as follows:

1/ Hawaii State Department of Planning and Economic Development, Population and Economic Projections for the State of Hawaii, 1980 to 2005, dated July 1984.

Annual Growth Rate of Visitor Arrivals

	Year	Average annual growth rate
Historical:	1957-1986	13%
Projected:	1985-1990	4
	1990-1995	3
	1995-2000	2
	2000-2005	1

Source: Department of Planning and Economic Development.

Other Studies

We were not involved, nor are we aware of, other market studies which were prepared with respect to the proposed Mokualea community relating to the tourist industry and/or market conditions.

5. Parks

Preservation Land

The Draft EIS contains several discussions (Social-Economic Characteristics) pertaining to the adequacy of the supply of residential land and employment needs for the North Shore region over the next few decades. The "trade-off" between Preservation land in favor of "increased urbanization" is clearly centered on issues regarding basic housing and employment needs projected into the year 2005. While the EIS does not specifically discuss "trade-offs", the relevant issues in making such a comparison are not omitted.

Kaena Point State Park

The Kaena Point State Park wraps around Kaena Point. According to DLMR planners, the emphasis of the park (improvements and usage) is on the Waianae side due to more favorable beaches and camp grounds. Improvements to the North Shore side are not presently foreseen. Possible impacts may include greater visitation to the Kaena Point State Park and triggering the eventual need for improvements.

Regarding Present/Projected Recreational Needs

According to SCORP, the recreational needs for the North Shore are as follows:

- Medium need for inland recreational facilities (camping, hiking, camping)
- Medium need for fishing facilities
- High need for coastal recreational facilities (swimming, diving, beach picnicking)

The proposed Mokualea Development will meet the inland recreational needs through the re-establishment of public access to the mauka forest reserve and development of additional camp grounds. Shoreline fishing occurs along the entire coastline. Other than public shoreline access and parking within the project limits, no specific fishing improvements are anticipated. Coastal recreational improvements relating specifically to swimming and diving are not proposed.

Regarding "Park-Like Facilities"

The Draft EIS identifies several recreational facilities to include polo club and stables, biking trails, camping areas, sports center, tennis ranch, as well as golf course.

Regarding Impacts on Camp Erdman

Although Camp Erdman is located over three miles from the proposed site, increased vehicular usage of Farrington Highway may impact the camp.

6. Relationship of Action to Existing Land Use Policies

Section IX of the Final EIS will be expanded to further clarify this point.

7. Need and Alternatives

Agricultural and residential development alternatives were considered in Part VIII.B and C. An agricultural subdivision proposed in 1980 for the property featuring low density and agricultural development was not approved by the City and County.

8. Aesthetic Considerations

The Final EIS will include the results of a visual analysis currently being conducted.

The trade-off between development and ruralness was discussed in the DEIS.

9. Airport Impacts

The DEIS included a thorough discussion of airport impacts in the area of sound levels. Noise levels were based on estimated operations levels in 1995. The operations levels have fallen far below those projected for this time frame, thus making the noise study more conservative. We do not believe that the resort development will have a significant impact on operating levels at Dillingham Field.

10. Archaeological

The DEIS archaeological study describes a step-by-step program for studying the Archaeological Resources during the development approval process. The Department of Land and Natural Resources has commented that adherence to the recommended plan will ensure adequate safeguards for archaeological and historic sites.

11. Sewer Treatment Plant

The site described in the report was the site under consideration for the City's proposed Waialua Regional Treatment System. Since the EIS was drafted, an alternate site approximately one mile east of the project site and south of Farrington Highway is now under consideration by the City. The Sewer section of the EIS will be expanded to include a more detailed discussion. Final site selection is not expected to be available by the time the Final EIS is complete.

12. Fresh Water Needs and Limitations

We believe that relevant issues have been raised and discussed in the DEIS.

13. Impact of the Golf Course

The golf course may have some impact on water quality and wildlife. However, at the Development Plan level of planning, no design details are available to assess. The Final EIS will contain a discussion of the impact of golf courses.

14. Construction Effects

Additional discussion will be provided in the Final EIS.

Response to Supplemental Letter Dated March 25, 1987

Thank you for your comments on the Hawaiian Monk Seal. This information will be included in the Final EIS. Every effort will be made to minimize any adverse impacts that the proposed development may have on the Hawaiian Monk Seal and any other marine life that may utilize the Mokuleia coastline and nearshore coastal waters. As more detailed information becomes available regarding design, water sports, beach activities, etc., we anticipate additional studies will be performed to provide adequate information so that appropriate mitigating measures can be implemented to accommodate marine life utilizing the nearshore coastal environment.

Again, thank you for your comments.

Sincerely,

William E. Wanket

WEW:avp



SIERRA CLUB, HAWAII CHAPTER

HONOLULU GROUP
P.O. BOX 11070, HONOLULU, HAWAII 96828
(808) 946-6484

March 24, 1987

Mr. Donald A. Clegg, Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 S. King St.
Honolulu, Hawaii 96813

Re: Mokuleia Development Proposal, Mokuleia, Oahu

Dear Mr. Clegg:

The Conservation Committee of the Honolulu Group of the Hawaii Chapter of the Sierra Club has reviewed the Draft EIS on the Mokuleia Development Proposal and would like to make the following comments:

Since the proposal is in a general plan stage, we take the liberty to make suggestions for a project that would be more environmentally acceptable, as well as improving community relations, in as much as this proposal would completely change an entire area.

WATER:

In stating that the project area is well supplied with fresh water potential, only requiring the drilling of an additional well, some factors highly important to water were neglected.

1. According to some court opinions (Waihee Water case, etc.), two State funded water commission findings and recommendations, the recent Water Round Table and the Water Codes being worked on by the Legislature, water is a resource that belongs to the State and its people. Therefore, when water wells are drilled and water taken from the aquifer, this water is a concern to all of Hawaii's people.

2. The area has long been in agriculture, under which condition a large percentage of the water is returned to the aquifer. The same is not true when water is used in development for human use where water ends in a sewer system. In addition, increasing the area covered by cement and buildings leads to water run-off rather than to water absorption into the aquifer.

-2-

3. The project has been planned to be developed over several years, yet the same future thinking has not been given to conserving the resources. We strongly suggest that development plans include facilities for desalination, for recycling and for water conservation rather than depending upon water from the aquifer, which will be constantly decreasing.

ACCESS FROM THE OCEAN TO THE MOUNTAINS:

Here again we are talking about resources that are valuable to the State and its people. Early Hawaiians considered such access as sacred. That philosophy contributes to needed quality of life.

Mokuleia has beaches which could be considered "pearls". By law and by tradition the people have a right to be on the beach to the high-tide mark. Yet, more and more, access to the beach is being lost or discouraged.

As has been pointed out, the Dennis Hwang studies show these beaches to be "active or moving beaches". They are highly subject to high wave action and tsunamis. It is our recommendation, therefore, that Hwang's complete studies be looked at and that his recommendations for AMPLE SETBACK be followed. He strongly recommends that nature be allowed to take its course in the movement of the beaches for the very good reason that this path leads to the least "after-effects" Groins and such engineering strategies only increase the problems in the long run. Of your "specific actions", IV-6, we can only approve of providing set-backs to produce a more attractive community and to prevent future problems. Other tourist areas around the World have successfully used the open beach front approach. We suggest that the developers of Mokuleia use this novel, for Hawaii, approach. A development of such magnitude can afford to be creative.

Hiking clubs such as Sierra and Trail and Mountain Clubs had traditional access to the trails in Mokuleia under Dillingham ownership. In the seventies we easily gained permission for access to Peacock Flats for camping for our High School Hikers. It is an excellent place to teach young people about dry forests with their unique variety and the importance of careful use of fires, about camping techniques and leaving a camp in improved condition.

The EIS refers to "Peacock Flats" as if it is part and parcel of the land to be developed. The fact is that the largest portion (about 7/8) of this site is under State ownership and is above the Mokuleia Forest Reserve. Unfortunately, the State has failed to protect our right of access to such forest lands. We strongly request that access be returned to the public. The statements in the EIS do not give us any confidence that we will be assured this access. We feel that the developer should be prepared to give something in return for a requested land-use-change of such a large parcel of land, as well as for use of natural resources.

We are aware that landowners are in a difficult position in regards to public access. There are laws that do address the liability which have not yet been tested in court. In addition, the State through its Department of Land and Natural Resources has failed to protect access to its forest lands. A solution would be for the landowners to deed access to the State. There is presently a Task Force for Trail Access made up of several community groups interested in hiking, scientific study and hunting that is working on solutions to this problem. A representative would be glad to meet with you. Call the Chair, Steve Brown, at (w) 946-7979 or (h) 836-4940 or member, Alan Burdick, attorney, at (w)547-5600. (h) 262-0581

AGRICULTURE:

We cannot agree with your premise that the prime agricultural land will not be needed. If every proposed development acts on that premise, there will be NO PRIME AG LAND left on Oahu. It is alarming to us that there can be so many proposals which will increase the population and so little concern with the self-sufficiency of the Island. Again, the proposal is longer-sighted in planning for the development than it is in conserving and maintaining the resources required. The proposal makes assumptions that cannot be justified except in the short-run. Hawaii can be so easily isolated from its sources of supply, and yet we are presently dependent upon import in the neighborhood of 80% for food alone!

We would suggest that a much better balanced, attractive and interesting community would be developed if diversified agriculture is included on the best land for agriculture, enough to make the projected community self-sufficient in all of the products that can be grown. Oahu has a long list of educated farmers who cannot find land to lease. This would be a novel approach, a creative idea that is not found in development proposals, but which would pay off in the long run. Thank you for permitting us to comment.

Lola N. Mench

Lola N. Mench
Honolulu Group Conservation
Committee.

cc.

Mr. Barry Okuda

Hawaii Department of Land and NATURAL Resources
Honolulu City and County Planning Commission
Task Force on Trail Access
Hawaii Department of Agriculture

filed 3-31-87

WILLIAM
E.
WANNETT
INC.
Land Use Consultants

Ms. Lola M. Mench
April 8, 1987
Page 2

April 8, 1987

Ms. Lola M. Mench
Conservation Group Committee
Honolulu Group
Sierra Club, Hawaii Chapter
P.O. Box 11070
Honolulu, Hawaii 96828

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuiaia, Oahu

Dear Ms. Mench:

Thank you for your comments of March 24, 1987 regarding the
subject EIS. We respond as follows:

Water

1. State Water Policy

The applicant is aware that a state water code is under
consideration; however, this is not the first year that
such a code has been proposed. The DEIS indicates that
the Mokuiaia Aquifer is under the control of the State
Department of Land and Natural Resources and that any
development of additional water resources would have to be
approved by DLNR. As an agency of the state government,
DLNR would presumably enforce state policies relating to
water and any changes thereto should they be adopted by
the Legislature.

2. Impact on Aquifer

The development of the project should have little impact
on the hydrology of the Mokuiaia Aquifer for the follow-
ing reasons. As indicated on the Concept Plan, Exhibit
12, only a small portion of the site would have buildings
and roadways. Intensive development would be concen-
trated on the shoreline. As indicated on Exhibit 10,
shoreline parcels and property close to Farrington
Highway are below the Board of Water Supply No-Pass Line,
indicating no connection between surface water and the
aquifer. Beyond the No-Pass Line development proposed by
the concept plan indicates a predominance of low-density
house lots, golf course and recreational amenities which
should have little or no impact on soil permeability.

Other mitigating factors include that the subject area
proposed for development makes up only a minor portion of
the Mokuiaia aquifer. In addition, rainfall gradients
indicate that annual rainfall is greater in mountain
areas than in the area proposed for development, thus
making the area's contribution to recharge even smaller.

3. Conservation of Resources

We disagree with your contention that water from the
aquifer will be constantly decreasing. This statement
would indicate that, from the supply side, either the
climate or the geology of the island would be changing or
that the demand for water would be increasing. Neither
point is demonstrated. In fact, the recent announcement
by Castle & Cooke on the closure of Waialua Sugar may
indicate that the demand from the Waialua/Mokuiaia
Aquifer may decrease.

We agree with your comments that conservation efforts
should be considered. Desalination, however, is known to
be a very expensive alternative and should be considered
if there is a basic change in the existing conditions.
Recycling of water through use of effluent for irrigation
and water conservation are elements which should be
considered during design development of the project.

Ocean and Mountain Access

Part VI-P.8 of the DEIS discussed the question of beach
and mountain access. We believe that the discussion is
adequate for the level of planning that is now available.

Ms. Lola N. Mench
April 8, 1987
Page 3

The applicant favors the use of setbacks for the development of in shoreline areas in order to mitigate against erosion impacts and to provide for enhancement of ocean resources. The Final EIS will contain a fuller discussion of the means for erosion control.

At the Development Plan level the applicant has tried to focus on the development of a program that will ensure adequate public access to both the ocean and the mountains and to enhance their enjoyment through the development of resource management plans in conjunction with concerned State and City agencies. We believe that interest group comments during the approval process will result in optimizing benefits to both the public and the resort development.

The Final EIS will reflect that the State owns and controls the bulk of the Peacock Flats area.

The applicant has been in contact with area residents and community groups seeking input into the project. Contacts will be expanded to groups like the Sierra Club to include areas of wider community concern as the planning process continues.

4. Agriculture

Self-Sufficiency

Hawaii's agricultural industry will be enhanced by a larger population and ongoing transportation improvements which will provide improved access to large mainland markets. At the same time, these same transportation improvements provide to mainland growers improved access to Hawaii's consumers. The result is increased trade, a larger selection of foods, fresher and cheaper foods, a higher standard of living, but reduced self-sufficiency.

The projected community would be far too small to support commercial farms.

Availability of Agricultural Land for Lease

Even though considerable agricultural land is available, the supply of low-rent parcels for small-scale farmers is limited. This is partially because of County regulations

Ms. Lola N. Mench
April 8, 1987
Page 4

which require electrical power, paved rather than gravel roads, and buried rather than surface water lines. These requirements are appropriate for rural estates, but are unnecessary for agricultural use of the lands. The added expense for these items makes it uneconomical for large land owners to subdivide their land into small agricultural lots. Because of this, a number of government-sponsored agricultural parks have been developed throughout the State, with land rents too low to cover operations and the debt service on the land purchase and improvements.

Again, thank you for your comments.

Sincerely,

William E. Manket

WEM:avp

Edwin B. Stevens
47-585 Ahuimanu Road
Kahala, Oahu, Hawaii 96744
March 25, 1987

Donald A. Clegg, Chief Planning Officer
Department of General Planning
City & County of Honolulu
650 South King Street, 8th Floor
Honolulu, Hawaii 96813

Hokuleia Development Proposal
Draft Environmental Impact Statement

Dear Mr. Clegg:

Please consider this letter and my letter of July 29, 1986 to Northwestern Mutual Life Insurance Company (attached) to be my comments in response to the Draft Environmental Impact Statement for the Hokuleia Development Proposal.

Thank you for the opportunity to be a consulted party. I will look forward to receiving a copy of the Final Environmental Impact Statement when it has been completed.

Sincerely,
Edwin B. Stevens

ESK 2-20-87

Attachment: ES letter of 7-29-86 to NHL
Copy: Barry R. Okuda Inc., Consultant

EDWIN BRADLEY STEVENS
47-585 AHUIMANU ROAD
KAHALA, OAHU, HAWAII 96744

July 22, 1986

Donald J. Schweske, President & C.E.O.
Northwestern Mutual Life Insurance Company
720 East Wisconsin Avenue
Milwaukee, Wisconsin 53202

Dear Mr. Schweske:

As a long time policy owner, I wish to register my objection to the Plans of Northwestern Mutual Life and its subsidiary, Hokuleia Development Corporation, for the north shore of Oahu.

Our City & County General Plan does not call for resort or other intense development on this part of the island but, rather, seeks to maintain the area as rural. Our remaining landward, north shore windward rural areas are important to the well being of our entire population. It would be inappropriate to seek State land use district boundary amendments and City & County general plan, development plan and zoning changes that would upset the desirable balance of land uses that we now have.

It is unfortunate that NML purchased this property if it was the intention to substantially increase land values or to alter the existing rural atmosphere, agricultural character, open space amenities and low key life style of ordinary residents.

I appreciate the efforts of NML to maximize its investment return for the benefit of policy owners (2, for one, now receive dividends far in excess of premiums on my several policies). However, there is an overriding responsibility to the wider community to concentrate on appropriate projects such as your award winning Bishop Square - Temarind Park development which strengthens the existing city center and to avoid projects such as your proposal for Moxuleia which would undermine comprehensive islandwide planning efforts.

Sincerely
Edwin B. Stevens

Copies: Kwach Kim Yee, Project Manager
Moxuleia Development Corporation
Maryl Anderson, Chair
North Shore Neighborhood Board

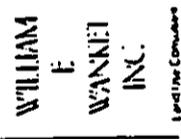
Northwestern seeking balance in Moxuleia

The Northwest Development Corp. is seeking a balance between the interests of the community and the interests of the investors in the Moxuleia development. The company is currently in the process of negotiating with the local government to secure the necessary permits for the project. The project is a large-scale development that will include a mix of residential, commercial, and recreational uses. The company is committed to ensuring that the development is in line with the community's needs and expectations. The local government is also seeking to ensure that the development is in line with the community's needs and expectations. The company is currently in the process of negotiating with the local government to secure the necessary permits for the project. The project is a large-scale development that will include a mix of residential, commercial, and recreational uses. The company is committed to ensuring that the development is in line with the community's needs and expectations. The local government is also seeking to ensure that the development is in line with the community's needs and expectations.



Few regret that hotel was demolished

The demolition of the hotel in Moxuleia has been met with little regret from the community. The hotel was a large, multi-story building that had become a landmark in the area. However, many residents and business owners believe that the demolition was necessary to make way for a more modern and functional development. The new development is expected to include a mix of residential, commercial, and recreational uses, which will help to revitalize the area and create new jobs. The community is looking forward to the completion of the project and the new development that it will bring to the area.



DGP 6/87 1050

NORTH SHORE CAREER TRAINING CORPORATION
P.O. Box 465 • Kahuku, Hawaii 96731 • Telephone (808) 293-9214

April 8, 1987

Mr. Edwin Stevens
47-585 Ahuimanu Road
Kahalu'u, Oahu, Hawaii 96744

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuleia, Oahu

Dear Mr. Stevens:

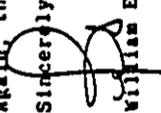
The Department of General Planning has forwarded your comment of July 22, 1986 to us for inclusion in the EIS. We respond as follows:

The DEIS indicates that current General Plan and Development Plan policy does not permit resort development in the North Shore area. The applicant has requested that these policies be changed and has prepared an EIS to discuss the impacts of such a change.

The sentiments expressed in your letter are well documented throughout the EIS and must be weighed against the expected economic and job creation benefits which the project would generate.

Again, thank you for your comments.

Sincerely,


William E. Manket
WEM:awp

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu, HI 96813
Phone
(808) 333-1071

Board of Directors
Thomas L. Dickard, Jr.
Peter T. Dyer
Cally Hameroff
Lorna Samaha
Buddy Alo
Carl A. Chew

Executive Director
Robert F. Comeau

March 30, 1987

Mr. Donald A. Clegg, Chief Planning
Officer
Department of General Planning
City & County of Honolulu
650 S. King Street
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Subject: Environmental Impact Statement
Mokuleia Development Proposal

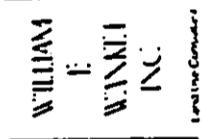
We have reviewed the subject E.I.S. and offer the following comments relating to the Socio-Economic Characteristics section of the report.

1. We note, and concur with, the finding that 'hidden unemployment' and underemployment are major undocumented problems which adversely affect the overall economic well-being of the community.
2. The lack of well paying jobs throughout the Koolauloa/North Shore area has been a chronic dilemma made worse in recent years by the phase-out of the sugar industry.
3. The reference to the potential social/psychological costs of resort development (Section IV, pages 39, 40) versus continuing negative family impacts associated with poverty/unemployment, which presumably would improve with access to new resort jobs, is an interesting and timely observation worthy of further discussion and study. This will be an important issue as developer/community dialog evolves.

Thank you for the opportunity to comment.

Aloha,

Robert F. Comeau
Executive Director



260 9/87 187

NORTH SHORE NEIGHBORHOOD BOARD NO. 27
P.O. BOX 465
KABUKU, HAWAII 96731

RECEIVED



'87 MAR 29 PM 3:54

DEPT. OF
GENERAL SERVICES
STATE OF HAWAII

March 24, 1987

April 8, 1987

Mr. Robert F. Comeau
Executive Director
North Shore Career Training Corporation
P.O. Box 465
Kabuku, Hawaii 96731

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuleia, Oahu

Dear Mr. Comeau:

Thank you for your comments of March 30, 1987 regarding the
subject EIS. We respond as follows:

1. No response required.
2. No response required.
3. We concur with your comments on this issue. We believe that developer/community dialogue will be most important in developing a program that meets the community needs.

Again, thank you for your comments.

Sincerely,

[Signature]
William E. Vanket

WEV:swp

Mr. Donald Clegg,
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 S. King Street, 8th Floor
Honolulu, Hawaii 96813

SUBJECT: MOKULEIA DEVELOPMENT COMPANY
EIS - FINAL COMMENTS

Dear Mr. Clegg:

We have found, after reviewing the Final Environmental Impact Statement (EIS) for a Secondary Resort at Mokuleia, that there are still too many negative impacts. These include the possibility of reducing production capabilities for Waiialua Sugar Company, excessive traffic, overloading of area public facilities, change to community lifestyle, shortage of housing, over population, and the impact of Kuliama/Turtle Bay's hotels. The North Shore Neighborhood Board continues to recommend denial.

The membership is especially anxious to meet with the new owners and to obtain their personal opinions on the project.

Again, we do appreciate the opportunity to address this matter. Please continue to keep us informed of any new developments.

Most sincerely,

[Signature]
Meryl M. Andersen
Chairman

cc: Councilmember Randall Iwase
Senator Gerald Hagino
Representative Joseph Leong
Neighborhood Commission

MAR 27 1987

Pacific Times
Suite 1010
1001 Bishop Street
Honolulu, Hawaii 96813

WILLIAM
E.
WANKET
INC.
Land Use Consultant

April 7, 1987

Ms. Meryl M. Andersen, Chairman
North Shore Neighborhood Board No. 27
P.O. Box 607
Haleiwa, Hawaii 96712

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuleia, Oahu

Dear Ms. Andersen:

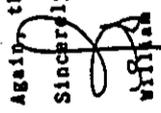
The Department of General Planning forwarded your comments on
the General Plan EIS to us for inclusion in the subject EIS.
We respond as follows:

We believe that the DEIS has adequately addressed the con-
cerns raised in your letter.

Your comments will be included in the Final EIS.

Again, thank you for your comments.

Sincerely,


William E. Wanket

WEW:awp

Paralel Lines
Scale 1:100
10011 B-1000 Sheet
HAWAIIAN PLANNING
INC.

0 6 APR 1987

Directorate of Facilities Engineering

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:

The Draft Environmental Impact Statement (DEIS) for the Mokuleia Development Proposal, Mokuleia, Oahu has been reviewed. The following comments are provided:

a. As reflected in the DEIS and the enclosed noise assessment study done by the U.S. Army Environmental Hygiene Agency, aircraft activities at Dillingham Airfield will result in significant noise impacts to the proposed development. We believe that the noise concerns are valid and may result in complaints that will force the curtailment or elimination of military and civilian aircraft operations at Dillingham Airfield. As an absolute minimum, tenants should be advised of these operations and be required to execute appropriate waivers concerning them.

b. The DEIS does not show safety zones for Dillingham Airfield. Enclosed is information on Department of Defense safety zones for airfields. Because Dillingham Airfield is operated by the State Department of Transportation, you should contact them for specifics on Dillingham safety zones.

c. The DEIS does not indicate the impacts that may result at Mokuleia Army Beach, shown on the enclosed map and apparently located adjacent to Developmental Parcel D. One result of the proposed development will be increased usage of the existing Army restroom facilities. Other potential impacts should be evaluated.

I hope the above information assists you in your environmental review. We appreciate the opportunity to comment on the DEIS.

If you require additional information, please contact the Environmental Management Office at 655-0091.

Sincerely,

Original signed by
MAURICE M. FUJIMOTO
fr Joseph S. Wasielewski
Colonel, Corps of Engineers
Director of Facilities
Engineering

Enclosures

Copy Furnished:

William E. Wanket, Inc.
Pacific Tower, Suite 1010
1001 Bishop Street
Honolulu, Hawaii 96813



DEPARTMENT OF THE ARMY
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND, MARYLAND 21010

Dr. Lewis/siw/AUTOVON
584-3797

REPLY TO
ATTENTION OF

HSHB-OB/HP

6 MAR 1984

SUBJECT: Environmental Noise Assessment Study No. 52-34-0466-84, Noise
Contours for Night Vision Goggles Operations, Dillingham Army
Airfield, Hawaii, December 1983

Commander
US Army Western Command
ATTN: APMD
Fort Shafter, HI 96858

1. AUTHORITY. Letter, HSHK-PV-V, Tripler Army Medical Center,
13 March 1983, subject: ICUZ Study for: Dillingham Airfield.
2. REFERENCES.
 - a. AR 200-1, Environmental Protection and Enhancement, 15 June 1982.
 - b. TM 5-803-2, Environmental Protection: Planning in the Noise
Environment, 15 June 1978.
3. PURPOSE. To provide the Installation Compatible Use Noise Zone (ICUZ)
contours for Night Goggles Operations at Dillingham Army Airfield (DAAF).
4. GENERAL.
 - a. Background. DAAF is located along the Pacific Ocean near the
northwest corner of Oahu. The airfield is adjacent to Mokuleia Beach,
which is becoming developed as a surfing area. DAAF is used for training,
including night vision goggles operations, by aviators from the 25th
Infantry Division.
 - b. Criteria.
 - (1) The A-weighted day-night sound level (DNL) is used to evaluate
the environmental impact of aircraft noise. The DNL is discussed in
reference 2b and Inclosure 1.

HSXB-08

SUBJECT: Environmental Noise Assessment Study No. 52-34-0466-84, Noise Contours for Night Vision Goggles Operations, Dillingham Army Airfield, Hawaii, December 1983

(2) AR 200-1 (reference 2a) defines three noise zones, referred to as Zone I, Zone II and Zone III. Zone I is defined as the area where the DNL is less than 65 A-weighted decibels (dBA). This area is acceptable for noise-sensitive land uses, including housing, schools and medical facilities. Zone II is defined as the area where the DNL is between 65 and 75 dBA. This area is normally unacceptable for noise-sensitive land uses. Zone III is defined as the area where the DNL is greater than 75 dBA. This area is clearly unacceptable for noise-sensitive land uses.

5. PROCEDURE.

a. The noise zones for DAAF are generated using the NOISEMAP computer program. The required inputs to the program are the flight tracks and the number of each type of aircraft using each flight track. The program sums the acoustic energy arriving at many ground points from the aircraft operations in the vicinity of the flight tracks to generate these contours. These contours are printed out by the computer.

b. The flight patterns and number of operations by aircraft type were provided as inclosures to the authority letter. The data for 198 days are summarized in the Table (Inclosure 2). It was assumed based on operating hours, that 20 percent of these operations were during nighttime (2200-0700) hours.

6. FINDINGS AND DISCUSSION.

a. The noise contours for the night vision goggles operations at DAAF are shown in the Figure (Inclosure 3). The contours extend beyond the airfield boundary at the southwest corner and in the northeast area, where the contour extends into Mokuleia Beach Park and the adjacent beach area. The area enclosed by these contours is normally unacceptable for noise-sensitive land uses.

b. The US Army Western Command should establish an ICUZ program for DAAF as required by AR 200-1 (reference 2a). This program should include coordination with the Honolulu County planning and zoning agencies to assure that the land uses around DAAF remain compatible with the noise environment. This coordination will insure that these agencies are aware of the existing noise environment and that future land use changes do not interfere with DAAF's mission.

HSHB-08

SUBJECT: Environmental Noise Assessment Study No: 52-34-0466-84, Noise Contours for Night Vision Goggles Operations, Dillingham Army Airfield, Hawaii, December 1983

7. CONCLUSIONS.

a. The noise contours for the night vision goggles operations at DAAF extend beyond the airfield boundary into the Mokuleia Beach area

b. The US Army Western Command should establish an ICUZ program at DAAF.

8. RECOMMENDATION. Establish an ICUZ program at DAAF as required by AR 200-1.

FOR THE COMMANDER:

3 Incl
as

for Roslyn M. Blair
JOEL C. GAYDOS, M.D.
Colonel, MC
Director, Occupational and
Environmental Health.

CF:
HQDA (DAEN-ECE-I)
HQDA (DAEN-ZCE)
HQDA (DASG-PSP)
Cdr, HSC (HSCL-P)
Comdt, AHS (HSHA-IPM)
Cdr, TAMC (PVNTMED Actv) (2 cy)
Cdr, Wheeler AAF (2 cy)
Cdr, US Army Pacific, EHEA

HSHB-OB
SUBJECT: Environmental Noise Assessment Study No. 52-34-0468-84, Noise
Contours for Night Vision Goggles Operations, Dillingham Army
Airfield, Hawaii, December 1983

TABLE. SUMMARY OF OPERATIONS

Flight Track	Number of Operations		
	UH-1	AH-1	OH-58
Pattern	4160	1280	1760
Haleiwa Approach	520	160	220
Haleiwa Departure	260	80	110
Pineapple Departure	260	80	110

HSHB-OB/WP

SUBJECT: Environmental Noise Assessment Study No. 52-34-0466-84, Noise Contours for Night Vision Goggles Operations, Dillingham Army Airfield, Hawaii, December 1983



Figure. Noise Zones for DAAF.



AFR 86-14

TM 5-803-7

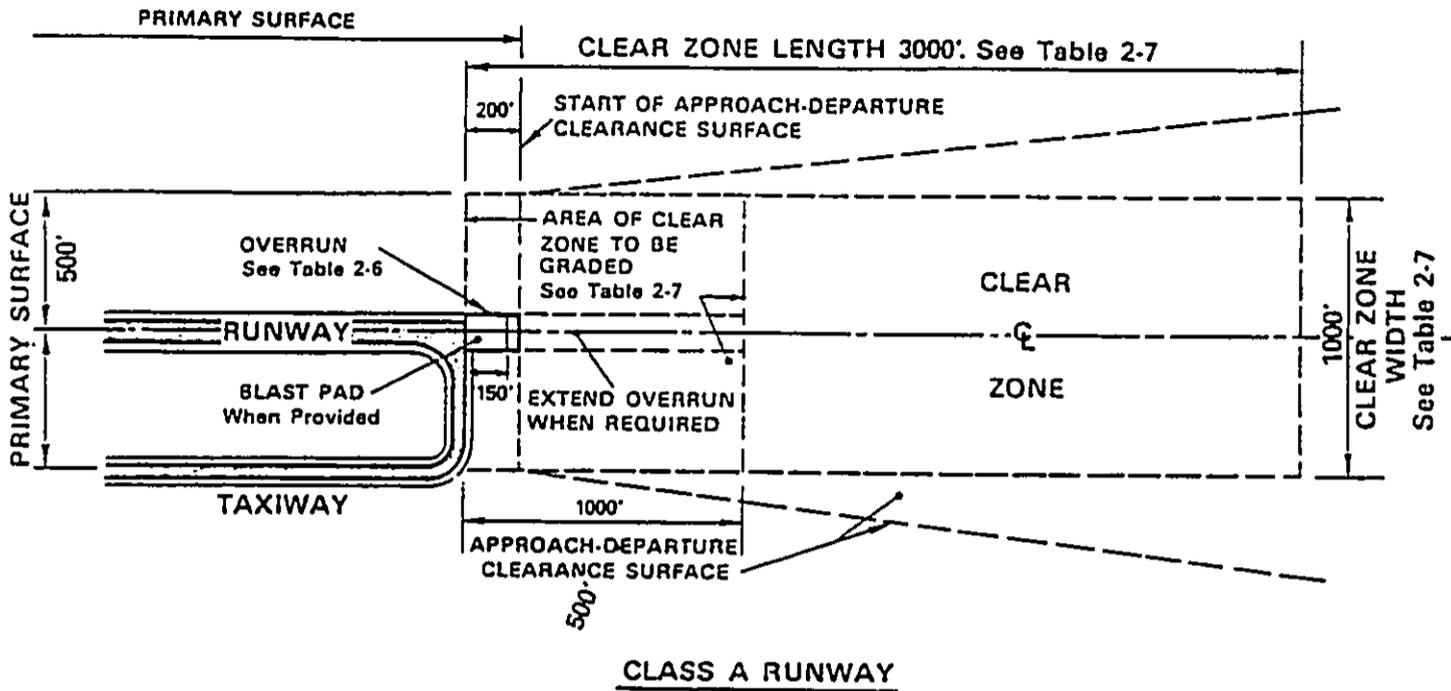
NAVFAC P-971

Civil Engineering Programming

AIRFIELD AND HELIPORT PLANNING CRITERIA

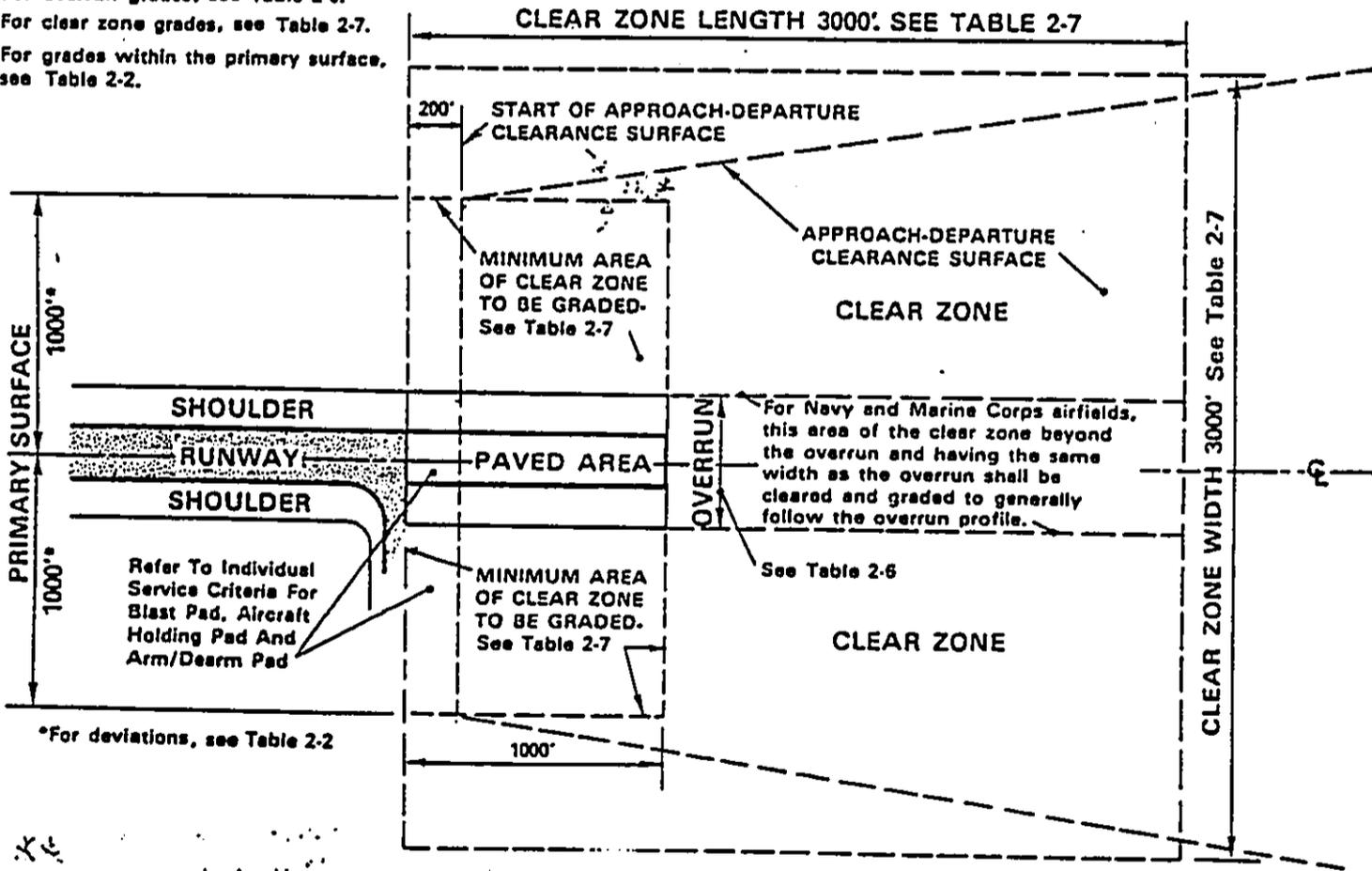
12 MAY 1981

DEPARTMENTS OF THE AIR FORCE,
THE ARMY AND THE NAVY



NOTES

1. For overrun grades, see Table 2-6.
2. For clear zone grades, see Table 2-7.
3. For grades within the primary surface, see Table 2-2.



*For deviations, see Table 2-2

CLASS B RUNWAY

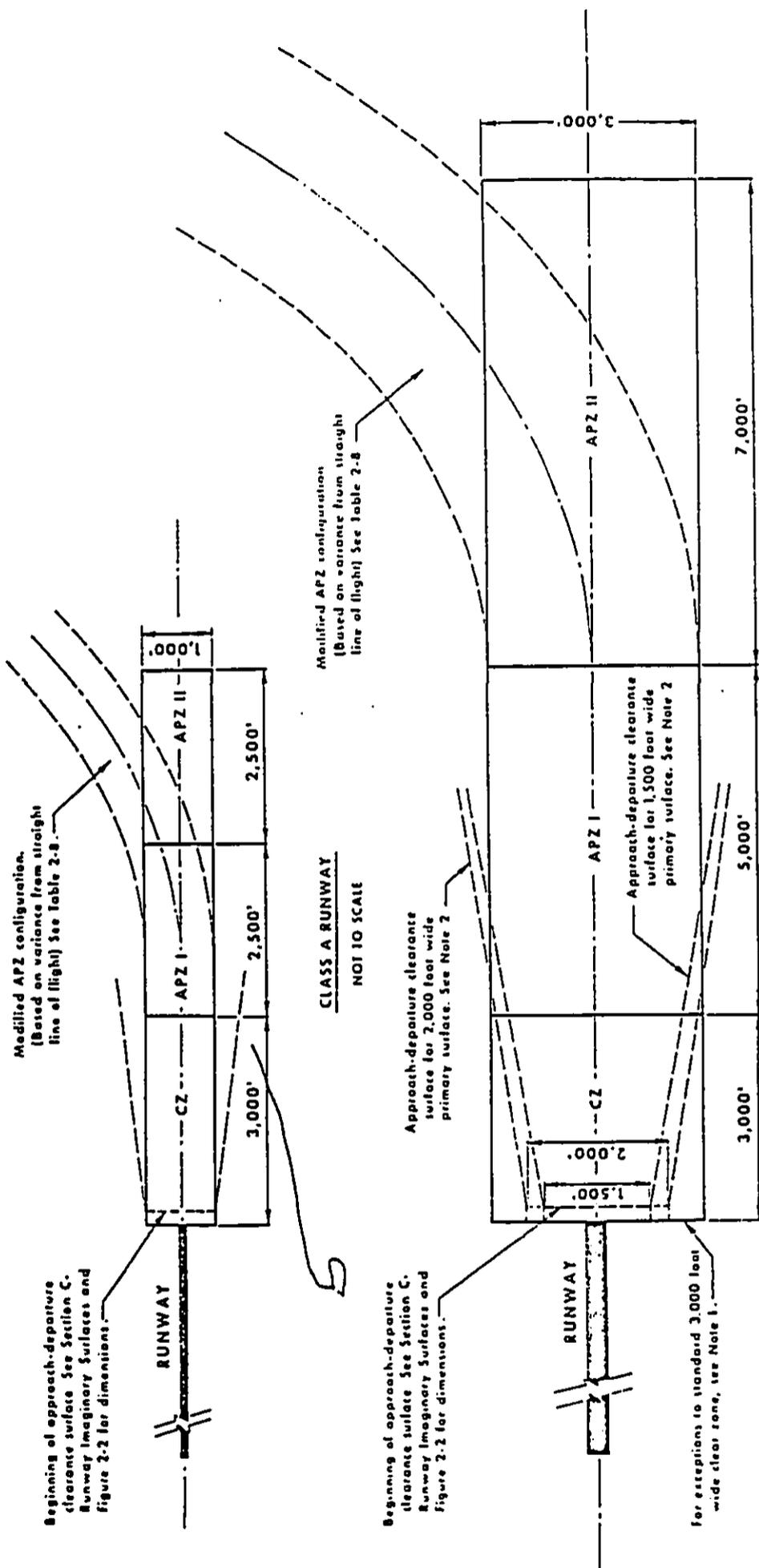


Figure 2-3. Accident Potential Zone Guidelines.

**DEPARTMENT OF DEFENSE
LAND USE COMPATIBILITY GUIDELINES FOR CLEAR ZONE
AND ACCIDENT POTENTIAL ZONES**

Land Use Category	Compatibility ¹		
	Clear Zone	APZ I	APZ II
Residential			
Single family	NO	NO	YES ²
2-4 family	NO	NO	NO
Multifamily dwellings	NO	NO	NO
Group quarters	NO	NO	NO
Residential hotels	NO	NO	NO
Mobile home parks or courts	NO	NO	NO
Other residential	NO	NO	NO
Industrial and Manufacturing³			
Food and kindred products	NO	NO	YES
Textile mill products	NO	NO	YES
Apparel	NO	NO	NO
Lumber and wood products	NO	YES	YES
Furniture and fixtures	NO	YES	YES
Paper and allied products	NO	YES	YES
Printing, publishing	NO	YES	YES
Chemicals and allied products	NO	NO	NO
Petroleum refining and related industries	NO	NO	NO
Rubber and miscellaneous plastic goods	NO	NO	NO
Stone, clay, and glass products	NO	YES	YES
Primary metal industries	NO	YES	YES
Fabricated metal products	NO	YES	YES
Professional, scientific and controlling instruments	NO	NO	NO
Miscellaneous manufacturing	NO	YES	YES
Transportation, Communications and Utilities⁴			
Railroad, rapid rail transit (on-grade)	NO	YES ⁵	YES
Highway and street rights-of-way	YES ⁵	YES	YES
Auto parking	NO	YES	YES
Communication	YES ⁵	YES	YES
Utilities	YES ⁵	YES ⁵	YES
Other transportation, communications and utilities	YES ⁵	YES	YES
Commercial and Retail Trade			
Wholesale trade	NO	YES	YES
Building materials (retail)	NO	YES	YES
General merchandise (retail)	NO	NO	YES
Food—retail	NO	NO	YES
Automotive, marine, aviation (retail)	NO	YES	YES
Apparel and accessories (retail)	NO	NO	YES
Furniture, homefurnishing (retail)	NO	NO	YES
Eating and drinking places	NO	NO	NO
Other retail trade	NO	NO	YES
Personal and Business Services⁶			
Finance, insurance and real estate	NO	NO	YES
Personal services	NO	NO	YES
Business services	NO	NO	YES
Repair services	NO	YES	YES
Professional services	NO	NO	YES
Contract construction services	NO	YES	YES
Indoor recreation services	NO	NO	YES
Other services	NO	NO	YES
Public Services			

Land Use Category	Compatibility ¹		
	Clear Zone	APZ I	APZ II
Cultural activities	NO	NO	NO
Medical and other health services	NO	NO	NO
Cemeteries	NO	YES ⁷	YES ⁷
Non-profit organizations including churches	NO	NO	NO
Other public and quasi-public services	NO	NO	YES
Outdoor Recreation			
Playground's neighboring parks	NO	NO	YES
Community and regional parks	NO	YES ⁸	YES ⁸
Nature exhibits	NO	YES	YES
Spectator sports including arenas	NO	NO	NO
Golf course ⁹ , riding stables ¹⁰	NO	YES	YES
Water based recreational areas	NO	YES	YES
Resort and group camps	NO	NO	NO
Entertainment assembly	NO	NO	NO
Other outdoor recreation	NO	YES ⁸	YES
Resource Production & Extraction and Open Land			
Agriculture ¹¹	YES	YES	YES
Livestock farming, animal breeding ¹²	NO	YES	YES
Forestry activities	NO	YES	YES
Fishing activities and related services ¹³	NO ¹⁴	YES ¹³	YES
Mining activities	NO	YES	YES
Permanent open space	YES	YES	YES
Water areas ¹³	YES	YES	YES

Footnotes

1. A "Yes" or "No" designation for compatible land use is to be used only for gross comparison. Within each, uses exist where further definition may be needed as to whether it is clear or usually acceptable/unacceptable owing to variations in densities of people and structures.
2. Suggested maximum density 1-2 dwelling units per acre, possibly increased under a Planned Unit Development where maximum lot covered less than 20 percent.
3. Factors to be considered: Labor intensity, structural coverage, explosive characteristics, air pollution.
4. No passenger terminals and no major above ground transmission lines in APZ I.
5. Not permitted in graded area, except as noted in table 2-7.
6. Low intensity office uses only. Meeting places, auditoriums, etc., not recommended.
7. Excludes chapels.
8. Facilities must be low intensity.
9. Clubhouse not recommended.
10. Concentrated rings with large classes not recommended.
11. Includes livestock grazing but excludes feedlots and intensive animal husbandry.
12. Includes feedlots and intensive animal husbandry.
13. Includes hunting and fishing.
14. Controlled hunting and fishing may be permitted for the purpose of wildlife control.

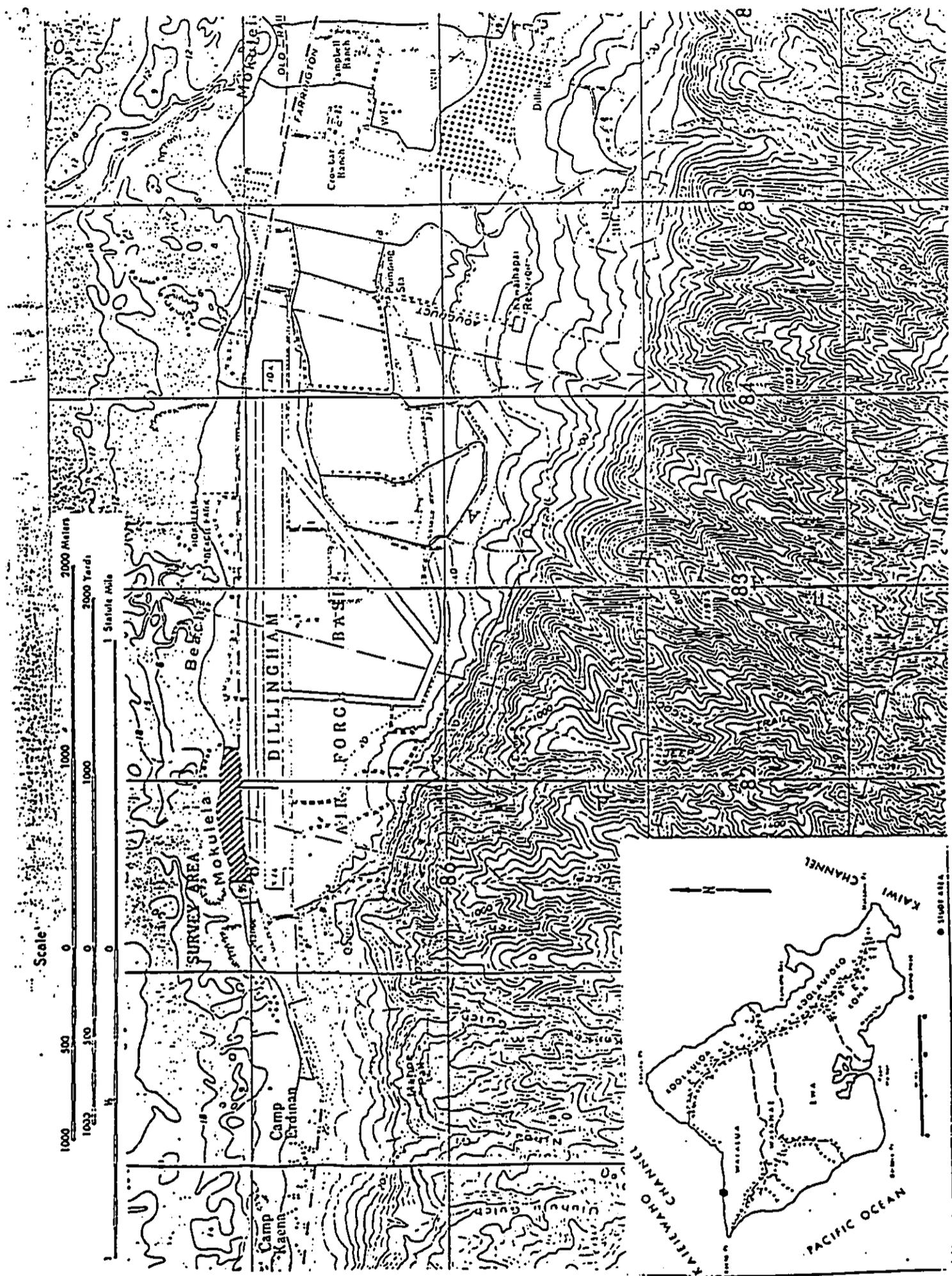


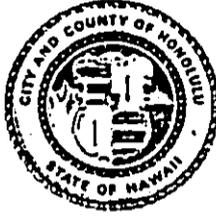
FIGURE 3

Survey Area Location (Hatched Area). Defense Mapping Agency, 1964.
 (Mokuleia Army Beach)

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1455 S. BERETANIA STREET, ROOM 305
HONOLULU, HAWAII 96814

FRANK F. FASI
MAYOR



FRANK K. KAHOOHANOHANO
FIRE CHIEF

LIONEL E. CAMARA
DEPUTY FIRE CHIEF

April 14, 1987

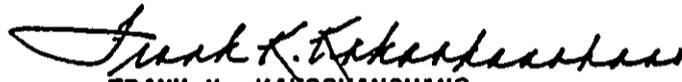
TO : MR. DONALD A. CLEGG, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM : FRANK K. KAHOOHANOHANO, FIRE CHIEF

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT
MOKULEIA DEVELOPMENT PROPOSAL
MOKULEIA, OAHU

We have reviewed the subject EIS and have no additional comments at this time.

Should you have any questions, please contact Battalion Chief Kenneth Word at 943-3838.


FRANK K. KAHOOHANOHANO
Fire Chief

FK./KAW:sb

Attachment

cc: ✓ Mr. William Wankett, Inc.
Land Use Consultant
Pacific Tower
1001 Bishop Suite 1010
Honolulu, HI 96813

DGR 4187 1101

JOHN WAIHEE
GOVERNOR OF HAWAII



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

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

In reply, please refer to:
EPHSD

April 1, 1987

MEMORANDUM

To: Mr. Donald A. Clegg, Chief Planning Officer, Department of General Planning
City & County of Honolulu

From: Director of Health

Subject: Draft Environmental Impact Statement for Mokuleia Development Proposal,
Mokuleia, Oahu

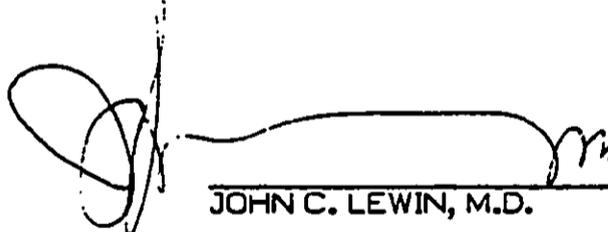
Thank you for allowing us to review and comment on the subject draft EIS. We provide the following comments:

Drinking Water

The existence of two water systems, one potable and one nonpotable, introduces the opportunity for cross connections. Care should be taken to protect the potable water lines from cross connection with the nonpotable irrigation lines.

Vector Control

Night mosquitoes will probably be a problem due to vast breeding sites in the vicinity of the project.



JOHN C. LEWIN, M.D.

cc: Mr. Barry Okuda

WILLIAM
I
WILLIAM
I

April 16, 1987

Mr. Edward Y. Hirata, Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuleia, Oahu

Dear Mr. Hirata:

It has been brought to our attention that our response to your March 30, 1987 comments regarding Aircraft Noise was inappropriate. We apologize for this error on our part, which resulted from the inclusion of a response to a comment from another agency on an aircraft noise related matter. The response that we had intended to send is shown below:

Aircraft Noise

Because of the late submittal of the comment, there was insufficient time to obtain the necessary input data and to perform the evaluation required to generate a composite military and civilian noise contour map for existing and projected airport operations. The intention is to provide such a map and to restrict resort/residential development within the 60 Ldn and greater areas unless special noise mitigation features are incorporated into the structures. In the 55-60 Ldn noise impact areas, a disclosure will be made to advise developers and tenants that the areas are subjected to noise from aircraft activity.

Mr. Edward Y. Hirata, Director
April 16, 1987
Page 2

We thank you for your patience and your cooperation in this matter. If we can be of further assistance, please don't hesitate to contact us. Again, thank you for your comments.

Sincerely,



William E. Wanket

WEW:awp

WILLIAM
E.
WANKET
INC.

Land Use Consultant

April 20, 1987

Ms. Jacquelin N. Miller
Acting Associate Environmental Coordinator
University of Hawaii at Manoa
Environmental Center
2550 Campus Road, Crawford 317
Honolulu, Hawaii 96822

Re: Responses to Comments on the DEIS for the Proposed
Development at Mokuleia, Oahu

Dear Ms. Miller:

In reviewing my response to your comments of March 25, 1987 on the subject DEIS, I noticed several misspellings and an incorrect statement that was inadvertently made. I apologize for these errors. Below are the corrections using the Ramseyer method:

Reference Page 4, Traffic/Environmental Concerns, 2nd para:

Traffic volumes between Honolulu and Haleiwa are expected to be affected more by factors other than the proposed project, such as [increases] increases in island-wide population, tourism activity, and development elsewhere. Construction of [te] the proposed Haleiwa bypass highway would [eae] ease the expected increases in traffic at Weed Circle.

Reference Page 6, Solid Waste, 1st para:

At the present level of planning, data on the forecasted volume and quality of the waste that will be generated from the proposed development was not determined.

Again, thank you very much for your interest and concern in the Mokuleia development.

Sincerely,


William E. Wanket

cc: Department of General Planning
Office of Environmental Quality Control

Pacific Tower
Suite 1010
1001 Bishop Street
Honolulu HI 96813
Phone
(808) 533-4937

APPENDICES

- A. Market Study
(John Child & Company)
- B. Economic and Fiscal Impact Study
(John Child & Company)
- C. Socio-Economic Impact Study
(Community Resources)
- D. Development Plan Public Facilities Amendment
(Engineers, Surveyors Hawaii, Inc.)
- E. Ocean Hazard Study
(Charles L. Bretschneider & Associates)
- F. Ocean Engineering Study
(Oceanit Laboratories, Inc.)
- G. Agricultural Impact Study
(Decision Analysts Hawaii, Inc.)
- H. Archaeological Study
(Joseph Kennedy)
- I. Flora and Fauna
(Char & Associates)
- J. Air Quality Study
(Barry D. Root)
- K. Noise Study
(Darby and Associates)
- L. Traffic Study
(Parsons, Brinckerhoff, Quade & Douglas, Inc.)
- M. Visual Impact Analysis
(Michael S. Chu, Land Architect)

APPENDIX A

Market Assessment for
MOKULEIA
Mokuleia, Oahu, Hawaii

Prepared for
Mokuleia Development Corporation

July 1986



JOHN CHILD INC
1001 BISHOP STREET
SUITE 979
HONOLULU, HAWAII 96813

Market Assessment for

MOKULEIA

Hokuleia, Oahu, Hawaii

Prepared for
Hokuleia Development Corporation

July 1986

July 22, 1986

Mr. K. Tim Yee
Chairman
Hokuleia Development Corporation
1001 Bishop Street, Suite 979
Honolulu, Hawaii 96813

Dear Mr. Yee:

At your request, we have completed our market assessment for the proposed Mokuleia community at Mokuleia, Oahu, Hawaii. The accompanying report summarizes our conclusions regarding cur assessments of the markets for hotel, condominium, residential, and ancillary land uses in the proposed master-planned development.

BACKGROUND

NDC proposes to develop about 2,900 acres in Mokuleia. Preliminary development concepts are being studied. MDC is evaluating these concepts in terms of community needs, market support, physical and financial feasibility. Important goals of the development concept are to create jobs and business opportunities in the community.

A tentative land use plan has been proposed. This plan is meant to consider the existing image and character of Mokuleia and the North Shore community, address any specific development needs for Oahu and Hawaii residents and the realities of financial limitations for the developer.

Based on the preliminary land use plan, Mokuleia is envisioned to be a recreational community in a relatively rural, low-density environment. NDC proposes to orient land uses and facilities to serve residents in the adjoining communities as well as others on Oahu.

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I - EXECUTIVE SUMMARY

Mokuleia Development Corporation (MDC) engaged John Child & Company, Inc. (John Child) to prepare a market assessment for the proposed Mokuleia development. This section presents the study background, objectives and approach and summarizes the preliminary development plan, major findings and conclusions of our study.

BACKGROUND

MDC proposes to develop about 2,900 acres in Mokuleia. Preliminary development concepts are being studied. MDC is evaluating these concepts in terms of community needs, market support, physical and financial feasibility. Important goals of the development concept are to create jobs and business opportunities in the community.

A tentative land use plan has been proposed. This plan is meant to consider the existing image and character of Mokuleia and the North Shore community, address any specific development needs for Oahu and Hawaii residents and the realities of financial limitations for the developer.

Based on the preliminary land use plan, Mokuleia is envisioned to be a recreational community in a relatively rural, low-density environment. MDC proposes to orient land uses and facilities to serve residents in the adjoining communities as well as others on Oahu.

MDC is preparing, or has prepared, applications for general plan and development plan amendments to permit a master-planned development on the site. In this regard, MDC has asked John Child to evaluate the market support for development of the site and to assist in preparing the master development plan.

OBJECTIVE

The primary objective of our assistance is to assess the market support for proposed land uses at Mokuleia. The principal land uses tentatively include:

- Hotels
- Multi-family condominium units
- Residential units
- Commercial facilities
- Golf course.

This report may be incorporated in applications for amendments to the State of Hawaii Land Use District and the City and County of Honolulu General Plan and Development Plan.

STUDY APPROACH

Market trends on Oahu and in Hawaii were studied to assess the market support for development of a master-planned, recreation-oriented community at Mokuleia. The market assessments are analyzed in terms of hotel, multi-family condominium, residential units, commercial and recreational development.

MOKULEIA SITE

The Mokuleia site is described in terms of its location and physical characteristics.

Location

The Mokuleia site is on the North Shore of Oahu, about six miles west of Haleiwa. The North Shore region is rural; the primary land uses and economic activities derive from agriculture and the visitor industries.

The North Shore is known for its scenic coastlines, beaches, and world-class surfing areas. It has long been an area for family beach houses, which are frequented primarily on the weekends and in summers.

In addition, local residents associate Mokuleia with hiking trails, camp grounds, polo fields, and air activities including gliding and aerobatics.

Site Characteristics

The 2,900-acre site has diverse physical characteristics. The property fronts Farrington Highway. The makai (oceanside) portion of the site consists of four noncontiguous parcels totaling about 120 acres. These sites have about 1.5 miles of ocean frontage along white sand beaches.

The mauka (mountainside) portion of the site includes about 2,780 acres. The site slopes gently from sea level to about 300 feet over a distance of about a mile to the base of the Waianae mountain range. From this point to the top of the mountain range, the topography is steep and rugged; the vegetation shifts from typical ranch scrub to more lush foliage. Development is to be confined to about 1,000 acres of the total site.

PRELIMINARY DEVELOPMENT CONCEPT

The preliminary development concept envisioned for Mokuleia focuses on land uses and recreational facilities which would be

enjoyed by Hawaii families as well as visitors. Land uses are planned to complement the existing image and character of the area. As a result, the development is proposed as a low-density, recreation-oriented master-planned community.

Proposed land uses within Mokuleia which were assessed are briefly described as follows:

Hotel and Condominium Apartment Development

Hotel and condominium apartment development would provide transient and long-term accommodations at Mokuleia. Hotel development would provide a broad range and depth of guest services, food and beverage facilities, retail shops and recreational opportunities for both local and off-island visitors. Condominium apartments would typically offer larger facilities with kitchens for long-term guests or permanent residents.

Residential Development

Residential development would offer a range of choices in terms of living style and investment in Mokuleia. Residential units provide families privacy as well as flexibility in design and orientation. For growing families, the units may be desirable as primary residences; for other families, a secondary or weekend home could be built. In addition, residential development may represent an opportunity to invest in a property which could be enjoyed in retirement.

Commercial Development

Commercial development would provide convenient facilities for goods and services for guests and residents of Mokuleia and for the North Shore community. The commercial development would include retail shopping, dining and entertainment facilities in addition to those that may be provided in the hotel and condominium facilities.

Recreational Development

Onsite recreational development would include 36 holes of golf course and possibly polo fields, stable, hiking and riding trails, camping areas, tennis ranch and sports center. These facilities would supplement other recreational facilities developed at the hotel and condominium projects.

HOTEL MARKET ASSESSMENT

Based on the preliminary development plan, the proposed hotels at Mokuleia are expected to attract both local residents and off-island visitors. Factors which would attract hotel guests to Mokuleia include:

- Unique location on Oahu:
 - Accessible to and from Waikiki, the Honolulu central business district and all areas of Oahu
 - Oceanfront, rural environment
- Range of recreational opportunities:
 - Onsite Golf course, possibly polo field, hiking trails, riding trails, camping grounds, tennis ranch and sports center
 - Beach activities including swimming, surfing, windsailing, and boating
- Range of entertainment and commercial services:
 - Entertainment at hotel facilities
 - Variety of food and beverage services at hotel and commercial facilities.

Market Share

The supportable hotel rooms were estimated based on Mokuleia's projected market position in relationship to overall Oahu room demand.

Initially, Waikiki hotels and condominium units are estimated to capture about 93% of the Oahu hotel room demand. Waikiki is expected to continue to dominate the Oahu visitor accommodations industry. However, as master-planned resort developments in areas outside Waikiki emerge, Waikiki's share could be expected to decline from its current level of about 93% to about 75% by 2005. This decline in market share would result from:

- Limited amount and availability of suitable development sites in Waikiki.
- Development and maturation of resort destination areas outside Waikiki.
- Increasing preference of repeat visitors to stay outside of Waikiki.
- Increasing number and length of stay of local resident hotel guests.

The North Shore/Koolauloa area currently captures about 2% of the room demand on Oahu. Based on the plans for expansion at the

Turtle Bay Resort and the proposed development plan for Mokuleia, the North Shore is projected to capture a 12.5% market share of room demand on Oahu by 2005, as shown in the following table.

Potential Market Share Distribution
of Oahu Visitor Units

	1984	1995	2005
Waikiki/Kahala	93.0%	87.5%	75.0%
West Beach/Leeward	3.0	4.5	10.0
North Shore/Koolauloa	2.0	6.0	12.5
Other (airport, downtown, etc.)	2.0	2.0	2.5
Total	100.0%	100.0%	100.0%

Supportable Hotel Rooms on Oahu

Based on the anticipated supply and demand relationships for visitor units on Oahu, the visitor industry could be expected to require about 18,900 to 22,700 additional rooms by 2005. This represents a requirement of 9,500 to 13,300 rooms in addition to the inventory which is currently being planned for Oahu.

Hotel rooms are expected to continue to account for about 70% of total demand for visitor rooms on Oahu. As a result, the number of supportable hotel rooms on Oahu is projected to range between 40,300 to 42,900 rooms by 2005.

Supportable Hotel Rooms at Mokuleia

Based on the proposed development concept, Mokuleia could achieve a market capture rate of about 1.5% in 1990, increasing to 5% by 2005. At these estimated market capture rates, the number of supportable hotel rooms at Mokuleia is projected to increase from about 500 units in 1990 to between about 2,000 and 2,200 in 2005, shown as follows.

	Projected Supportable Hotel Rooms at Mokuleia 1990-2005	
	Estimated market share	Supportable hotel rooms
1990	1.5%	480- 510
1995	3.0	1,080-1,160
2000	4.0	1,560-1,660
2005	5.0	2,020-2,150

Recommended Hotel Development

The recommended hotel development for Mokuleia would include oceanfront resort-type hotels and possibly a village hotel and conference center hotel. The village hotel and conference center hotel could be mauka of Farrington Highway. The hotels could be planned as follows.

Oceanfront Hotels

Three or more oceanfront resort-type hotels could be designed to maximize the scenic ocean views and minimize any adverse influences on the two neighboring developments. The hotels should be activity-oriented and offer a broad range of onsite recreational and entertainment opportunities.

Village Hotel

A hotel mauka of Farrington Highway with a thoughtful design concept could result in a low-density village atmosphere. Extensive interior landscaping and waterways could compensate for the lack of ocean frontage and limited ocean views. The hotel would provide a relaxed environment for guests who seek a slower-paced vacation experience than experienced in Waikiki.

Conference Center Hotel

The conference center would cater to small- to medium-sized conventions and meetings and corporate incentive groups. The hotel would include meeting and conference rooms, audio/visual and telecommunications facilities, pavilions, and banquet halls. Onsite recreational facilities including swimming pools and whirlpools, racquet sports, and a health center would provide active recreational complements to the more business-like meeting rooms.

CONDOMINIUM APARTMENT MARKET ASSESSMENT

The preliminary condominium development concept for Mokuleia takes into account recent trends in the condominium market, characteristics and history of comparable projects on all islands and the projected market support at Mokuleia.

Market Review

The developments envisioned for Mokuleia could be expected to appeal to residents and visitors seeking an active recreational environment. For purposes of comparison, 30 similar condominium projects were studied. Selection was based on the following criteria:

- Projects in rural locations on Oahu.

- Projects in or near master-planned resort areas on the neighbor islands.

These projects were found to share the following characteristics:

- Location - Condominium developments are typically located to offer attractive views and surroundings. In order of desirability, condominium orientations are usually:

- (1) Oceanfront
- (2) Ocean view
- (3) Golf-front, and
- (4) Interior.

View orientations of the sampled units were as follows:

Oceanfront	242
Ocean view	22
Golf-front	27
Interior	27
	<u>1002</u>

- Project Density - This is a general indicator of the relative open space and privacy available to individual units. The average project density for similar projects is 12 units per acre. Project densities ranged from 8 units per acre at Wailea and Princeville to 23 units per acre at Makaha, Mokuleia, Punahoa and Kaaawa condominiums.

- Unit Mix - The majority of projects include one- and two-bedroom units. The unit mix is distributed as follows:

Studio units	32
One-bedroom units	47
Two-bedroom units	43
Three-bedroom units	7
	<u>1002</u>

The majority of studio units are located on Oahu, while most three-bedroom units are on Maui or in Keauhou resort on the island of Hawaii.

- Unit Size - Unit sizes ranged as follows:

Unit Type	Area (sq)
Studio	400- 600
One-bedroom	500-1,400
Two-bedroom	750-1,800
Three-bedroom	1,200-2,300

- Project Amenities - The projects generally offer a recreation center and at least one swimming pool. Many also front along a beach suitable for swimming. Other amenities provided include whirlpools, saunas, tennis courts, barbecue areas and landscaping.

Sales Absorption

Rural Oahu includes nearly 3,500 units in 31 condominium projects, including 9 projects considered comparable to concepts for Mokuleia. Since 1979, these 31 projects have averaged 300 sales per year. The 9 selected projects accounted for 29% of sales in all 31 projects and averaged 86 sales or resales per year during this period. Kuliima Estates East and West accounted for nearly 40% of these sales.

The shortest marketing periods and the greatest numbers of units sold occurred in 1975 and 1979, when the selected projects achieved annual sales of 100 to 200 units. Since 1980, sales rates have declined, and currently average between 20 and 35 units per year.

Initial sales rates of new units in rural Oahu and the selected neighbor island resort areas range from 30 to 93 units per year and average 50 units per year.

Buyer Characteristics

Condominium buyers are generally motivated by a desire to acquire a retirement or vacation home or by perceived investment opportunities. Nearly 50% of those purchasing condominiums in rural Oahu are from Hawaii.

Market Assessment

Initially, the condominium buyers at Mokuleia could be expected to be Oahu residents and visitors who return frequently. Buyers are expected to be:

- Primarily from Hawaii as well as the western United States.

in planned resort communities (community lots) and lots of one acre or more available in rural Oahu (acreage lots).

Market Review

The characteristics and market performance of community and acreage lots are discussed as follows.

Community Lots

To date, planned resort community on Oahu have not included single-family lots (community lots). On the neighbor islands, about 2,149 community lots were developed in five resort communities. The majority of these are at Waikoloa Village and Princeville resorts. However, over the next two decades, about 6,900 community lots are planned for development on the neighbor islands.

The existing and planned community lots are described as follows:

Location - The majority are either hillside with ocean and/or valley views or interior lots. Lot developments that about golf course fairways are the next most common type, while oceanfront lots represent only about 3% of the total.

Size - Typical lots range from 9,500sf to 20,000sf, and average 10,000sf to 14,000sf. Golf course lots are generally larger and have higher prices.

Amenities - Most community lot subdivisions do not include extensive amenities, because buyers are reluctant to pay for the maintenance of such facilities. Instead, most projects offer short-term, complimentary or voluntary memberships at the resort golf or tennis facilities.

Absorption - Community lot subdivisions averaged about 63 sales per year since 1971. Sales rates have fluctuated with general real estate cycles, with fewer sales between 1982 and 1983. Lots that have sold since 1982 have typically been lower-priced or offered at discounted prices.

Buyer Characteristics - Buyers of community lots tend to be 40 to 55 years of age, and either from the U.S. west coast or the island where the project is located. While view lots are preferred, buyers who:

- visit the area frequently,
- are Hawaii residents, or
- intend to retire in the area

1-10

- Predominantly married couples, aged 35 to 60 years.

- Physically active and seeking access to golf courses, tennis courts, beaches and restaurants.

The market support for condominium units at Mokuleia is dependent on its reputation and image as a major recreational development, which is expected to attract a large base of local residents from which condominium buyers may emerge. Based on the sales history of similar projects, average sales absorption for oceanfront condominiums could increase from about 70 to 80 units per year over the first decade of development. Similarly, the average sales absorption rates for condominiums on the mauka portion of Mokuleia could be projected to increase from about 45 to 55 units per year. Total projected sales absorption support about 1,725 units; however, the current development concepts include only about 1,200 units.

Proposed Development Guidelines

The current development concepts for Mokuleia center on sites which are best suited for condominium development.

- Oceanfront Sites - These sites offer views and private beachfronts. Density could average about 25 units per acre, and total about 1,000 units. The unit mix could be predominantly one-bedroom units, with secondary emphasis on studio and two-bedroom units. Units would be efficiently designed. The oceanfront sites are physically removed from the remainder of the community. Thus, it will be important to either minimize perceived distances or to create a self-contained environment with complete facilities and amenities and an orientation to the ocean.

- Golf Course Frontage Sites - The golf-frontage sites could be attractive to residents and repeat visitors to attract Oahu buyers. Development density could average between 10 and 15 units per acre. These developments should include swimming pools, recreation centers, and other amenities as well. The unit mix could offer a greater number of two-bedroom units to be attractive to local families and investment hails.

RESIDENTIAL MARKET ASSESSMENT

The location, preliminary development concepts and recreation orientation in Mokuleia are unique. Because the project is unlike any existing area in Hawaii, comparisons with existing residential projects include residential lots of less than one acre available

1-9

are often willing to forego a view for lower-priced lots. Historically, the majority of purchasers have bought community lots for future improvement as a retirement home or for investment or speculative building.

Acreege Lots

Development of acreage lots has occurred primarily in rural areas in the State. On Oahu, such developments are typically in Kahaluu, Pupukea, Mokuleia and Hakaha. Most acreage lot subdivisions include less than 25 lots. Six acreage lot developments on Oahu, Maui and Molokai were selected for study and are described as follows.

Location - Lots are generally considered to be view lots if they have ocean views of varying quality and/or views of mountain ranges. Lot locations in the selected subdivisions are described as follows:

View lots	54%
Interior lots	42
Oceanfront lots	<u>4</u>

100%

Size - Typical lot sizes range between $\frac{1}{2}$ to 7 acres. Lot sizes generally do not vary substantially within subdivisions.

Amenities - None of the projects studied provide any common community facilities or security.

Absorption - The subdivisions have averaged about eight lot sales per year since 1978. Sales are generally the highest in the initial years when the developer markets the lots.

Buyer Profile - The acreage lot buyer is similar to the buyer for community lots, except that the former prefers a higher degree of privacy. In addition, between 75% and 100% of the buyers are from within the State.

Market Assessment

The primary buyers for residential lots could be expected to be those seeking:

- Primary residence in a recreation-oriented community, or
- Vacation or retirement home.

1-11

A secondary market could include the speculative builder and investor markets.

The rate of residential lot sales at Mokuleia may be expected to be related to visitor facility development and the maturity of the resort as a visitor destination. Sales are projected to increase with the opening of hotels and condominiums. In addition, these lots would provide a unique opportunity for residential units in a quality recreation-oriented community on Oahu.

Annual community lot sales are projected to increase from 30 to 50 lots per year over a 15-year period; annual acreage lot sales could increase from 10 to 20 lots per year. Total absorption at Mokuleia could amount to 825 lots by 2005; however, the current development concepts include only 700 lots.

Proposed Development Guidelines

Residential development at Mokuleia could be oriented around the golf course and base of the Waianae mountains. Design should maximize the number of golf course frontage and view units. Specific recommendations are:

- Project Phasing and Product Segmentation - Lot development should be phased to provide an adequate supply of both types of lots at a given time, but to minimize competition between similar lot types.
- Size - Community lots could range from 9,000sq ft to 11,000sq ft; acreage lots could average one acre in size.
- Residential Unit Types - Duplex and cluster units could also be considered in the development.

COMMERCIAL AND RECREATIONAL FACILITIES ASSESSMENT

Commercial and recreational facilities would complement the development envisioned at Mokuleia. The market support for a retail shopping center, golf course and other recreational facilities and amenities were assessed.

Retail Facilities

Market support for retail space at Mokuleia would result from shopping needs of onsite visitors and residents, off-resort visitors and neighboring North Shore residents. The average daily population of these four groups is projected to be over 20,000 by 2005.

1-12

Golf Courses

As well as being a desirable recreational facility, a golf course enhances the image of the development. It offers the intangible benefits of open space, tranquility and aesthetic value. The presence of a course also lowers the overall density of units in the area and gives a feeling of spaciousness to the resort. Golf courses also enhance the land values of areas surrounding the resort.

A well designed course is able to draw visitors to an area based on its reputation. Thus, resort golf courses are generally "championship" courses, featuring extensive landscaping and challenging, but forgiving, play.

The demand for golf has been projected based on estimated on- and off-resort population and golf utilization rates. The number of rounds of golf are projected to increase from about 166 rounds per day by 1995 to about 320 rounds per day by 2005.

Resort golf courses are often developed prior to the completion of other visitor and community facilities to enable the course to mature and to attract potential visitors to the area. Thus, while the golf course may not be fully supported in terms of desired rounds of play, the first golf course should be developed for completion concurrently with the first major hotel facility. A second golf course could be developed later as the resort matures, to prevent overcrowding and deterioration of the first course.

Other Recreational Facilities

Mokuleia's diverse physical features and other recreational facilities are not typically found on Oahu. As a result, Mokuleia has the opportunity to establish itself as a recreation-oriented destination on Oahu. Other recreational facilities could include:

- Polo Club and Stables - Mokuleia is already well known for its polo matches. The development could include a club and stables surrounded by condominiums and golf fairways. This would enhance the rural, ranch-like atmosphere of the community. During off-season, the facilities could be used for rodeos and other equestrian events.
- Hiking Trails - Several trails now lead from the lowlands to a plateau of the Waianae Mountains known as Peacock Flats. These and other similar trails could be developed to offer visitors and residents the opportunity to experience and enjoy the rugged, natural beauty of the region.
- Camping Areas - Camp grounds, developed in conjunction with the hiking trails, could augment the recreational facilities and appeal of the community.

I-14

The total annual retail sales in Mokuleia by these four markets are estimated to amount to about \$4.9 million in 1990 and to increase to about \$27.6 million by 2005. Visitor dollars are expected to account for the majority of total expenditures (93%); Mokuleia resident expenditures are estimated to account for about 3%. Offsite visitors and North Shore resident expenditures are expected to represent 4% of total expenditures.

The sales level appropriate for retail facilities at Mokuleia has been estimated at \$275 per square foot, based on sales levels at comparable centers. The net demand for freestanding retail space could be expected to support about 10,500 sq ft by 1990 and 68,900 sq ft by 2005. "Net demand" is defined as total retail space demanded in Mokuleia less that which could be expected to be built in its hotels.

The retail center could include widely recognized restaurant and other food service establishments. The facility could be designed to take advantage of adjoining inland waterways by including wide, landscaped promenades and park areas. To accommodate such malls, walkways and public areas, a development site of 6 to 7 acres would be appropriate.

Alternate Commercial Facilities

Given the unique recreational orientation of Mokuleia, alternate commercial facilities could be supported on 22 to 23 acres. Potential uses being considered include:

- Multi-Media Complex - This complex could provide facilities for theatrical, cinematic and musical performances. It could also be used for public meetings and forums. The complex could provide a diverse range of entertainment opportunities to benefit the North Shore community.
- Interactive Sports Museum - This facility could showcase the diversity of recreational activities in Hawaii, as well as offer visitors opportunities to participate in these activities. Sports which could be featured include surfing, paniolo rodeo, hang gliding, polo, canoe racing and ancient Hawaiian games.

Recreational Facilities

The image of the Mokuleia area is widely associated with recreational activities. A wide range of recreational amenities would enhance the attractiveness of the development to both residents and visitors.

I-13

- **Sports Center** - A sports center could include a pavilion and outdoor track and field. The pavilion could include basketball and volleyball courts which could be adapted for boxing, wrestling, gymnastics and other indoor sports, as well as locker rooms and showers. Outdoor activities could include track and field events, soccer, rugby and football.

- **Tennis Ranch** - A tennis ranch could include courts suitable for tournament play and provide ancillary facilities such as locker rooms, showers, pro shop and a restaurant. With the proper design and approach, a tennis ranch could accommodate several tennis tournaments each year.

SUMMARY OF MARKET ASSESSMENTS

In summary, Mokuleia could be developed as a community serving both residents of and visitors to Oahu. To be consistent with the current image and attractiveness of the North Shore region, development should be low-density, with an emphasis on recreational activities and facilities. The major land uses could include hotels, multi-family condominium and residential units, golf courses, commercial areas and other complementary facilities and amenities.

Assessment of the market for the various types of facilities under consideration indicates that Mokuleia could support development of the proposed 2,100 hotel units with a range of guest services, 1,200 condominium units, 700 residential units, a commercial complex, 36 holes of golf, polo field, hiking trails, camping areas and sports center.

This development would result in a community with a variety of facilities with appeal to the island resident and repeat visitor. Through careful planning, it could offer a unique residential or vacation experience in a relaxed, rural atmosphere which has previously been found only on the neighbor islands. However, its location on Oahu could give it a competitive edge over neighbor island locations.

II - REGIONAL SETTING

This section presents a regional overview of the State of Hawaii, the Island of Oahu, the North Shore region and describes the sites under consideration in terms of location, characteristics, and development concepts.

STATE OF HAWAII

In 1984 the resident population of the State of Hawaii was estimated to be 1,038,700, including 57,300 members of the military and 67,100 of their dependents. The estimated de facto population of the State, which includes visitors present and excludes residents absent, was about 1,140,600.

The visitor industry is the largest industry in the State, surpassing the two historical bases of Hawaii's economy, sugar and pineapple. In 1984 nearly 4.9 million visitors brought in about \$4.6 billion in visitor expenditures to the State.

Oahu has historically been the primary visitor destination. More recently the visitor industry has expanded on the neighbor islands. New resort complexes along with their supporting industries and services have been established on Maui, Kauai, Hawaii and Molokai.

ISLAND OF OAHU

Mokuleia is in the North Shore region on Oahu. Oahu, with 618 square miles, is the fourth largest island in the State. The relationship between Mokuleia and the major towns and cities of Oahu are shown in Exhibit II-A.

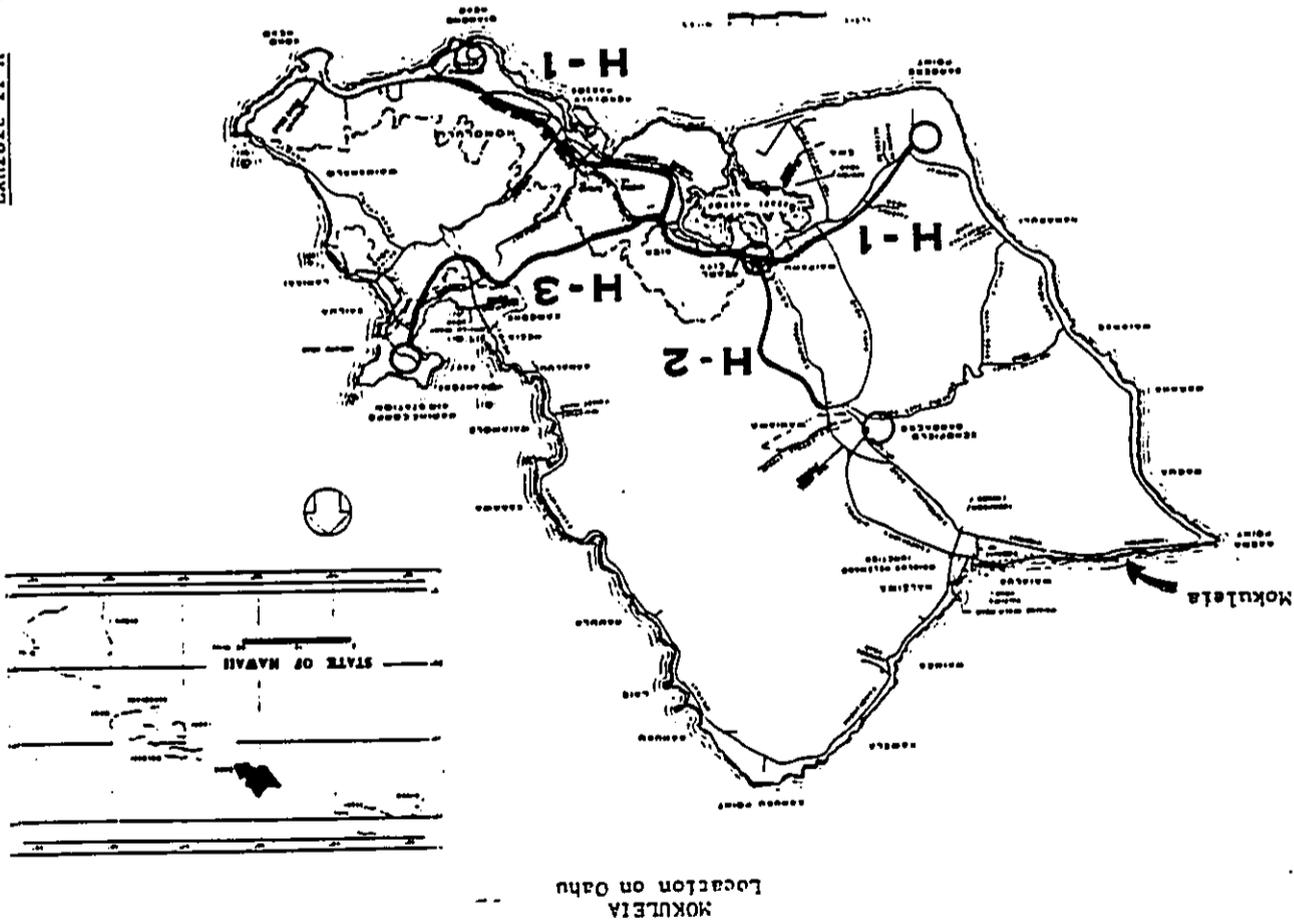
This section reviews the demographic characteristics of Oahu.

Population

In 1984 Oahu housed about 762 of Hawaii's resident population and included only about 10% of the State's land area. Oahu's population was estimated at 865,200, including military personnel. Military personnel and dependents on Oahu are estimated at 127,100 residents, and represent about 15% of the total Oahu population. Oahu includes a sizable visitor population, mostly centered in Waikiki. The daily census averaged 67,370 visitors.

Resident population growth is projected by the Department of Planning and Economic Development (DPED) to decline from the 1.8% rate of growth experienced between 1970 and 1984, to 1.1% per annum between 1985 and 1990 and 0.7% through 2005.

Exhibit II-A



Age Distribution

In 1980 the median age of Oahu residents was 28.0 years compared with 30.0 years nationally. However, the population of Oahu is maturing and the median age has increased from 24.6 years in 1970 to 28.0 years in 1980. By 2005, the median age is projected at 34.7 years.

Household Size

Oahu households averaged 3.15 persons in 1980 and continue to be significantly larger than the national average of 2.76 persons. However, the average Oahu household size has decreased from an average of 3.6 persons per household in 1970 to 3.15 persons in 1980. This trend is expected to continue.

Employment

Labor force participation on Oahu is higher than national averages. On Oahu, 69.2% of the eligible population over 16 years of age were in the work force in 1980 compared to 63.8% nationally. Labor force participation in Hawaii has also increased by more than 2% from a decade earlier.

Female labor force participation rates on Oahu have increased by almost 9% over the last decade. These rates are significantly higher than national averages. In 1980, 58.3% of the working age female population of Oahu participated in the labor force compared to 51.5% for the United States as a whole. These higher participation rates for women are partially attributed to the relatively higher cost of living and housing in Hawaii.

NORTH SHORE REGION

Mokuleia is located within the northwesterly end of Oahu. This area is described by the City and County of Honolulu as the North Shore development plan area and is the primary impact region for any development.

The North Shore region includes the northwest portion of the island, extending from Kahuku Point to Kaena Point. Residential developments on the North Shore include Sunset Beach, Waimea, Pupukea, Haleiwa and Waiolua.

The North Shore region is rural in character. It consists mainly of primary residences within a few blocks of Farrington and Kamehameha Highways, interspersed with freestanding commercial buildings.

MOKULEIA

MDC proposes to develop about 2,900 acres in Mokuleia. Preliminary development concepts, now under study, envision a master-planned, recreation-oriented community, to include:

- Hotels.
- Multi-family condominium units.
- Residential units.
- Commercial facilities.
- Golf course.
- Related recreational facilities and amenities.

The plan considers the existing character of and addresses specific development for Mokuleia and the North Shore Community. The following sections describe these preliminary development concepts, location and description, tentative master plan, access and area attractions.

Preliminary Development Concepts

A tentative land use plan for Mokuleia has been proposed. Based on this plan, Mokuleia is envisioned to be a recreational community in a relatively rural, low-density environment. MDC proposed to orient land uses and facilities to serve residents in the adjoining communities as well as others on Oahu.

The development would offer a variety of facilities and services to meet the majority of residents' and guests' needs for lodging, dining, recreation, entertainment and relaxation.

The location and recreation-orientation of Mokuleia is unlike any existing area in Hawaii. The concepts envisioned for the area incorporate land uses and amenities similar to major resort destination areas on the neighbor islands. However, the Oahu location offers greater accessibility to Oahu residents.

Location and Description

Mokuleia is located near the northeasterly point of Oahu. The 2,900-acre property is divided by Farrington Highway, the major traffic artery in the area.

The makai (oceanside) portion of the site consists of four non-contiguous parcels totalling about 120 acres. While relatively narrow, the sites have about 1.5 miles of ocean frontage along white sand beaches.

The mauka (mountainside) portion of the site contains about 2,780 acres. About 890 of these acres are on a low-lying plane that

slopes gently from sea level to about 300 feet over a distance of about a mile. Beyond, as the property ascends towards the Waianae Mountain range, the vegetation shifts from the typical ranch scrub foliage and becomes more lush. In addition, excellent ocean views are afforded towards the coastline.

An access easement in favor of Castle and Cooke, Inc. extends across a portion of the mauka site.

The site is bounded to the east by lands cultivated in sugar, to the west by the Dillingham Air Field, to the south by the Waianae Mountain range, and to the north by the Pacific Ocean.

The Waialua Sugar Company is adjacent to the site and has maintained a climatological research station for a number of years. The records reveal:

- Average annual temperature has been 73.5°F with the average monthly temperature never dropping below 70°F.
- Rainfall at the station averages about 30 inches a year. As for most of Hawaii, rainfall is higher in the upper elevations, providing a consistent source of ground water. The coastal areas are predominantly sunny and dry.
- The prevailing breezes are tradewinds from the east-northeast. During the evenings, the wind pattern changes direction and blows from off the Koolau and Waianae Mountain ranges.

Tentative Development Plan

Mokuleia is tentatively planned to include 4,000 hotel and residential units and ancillary recreational facilities and amenities. The major components of the community are listed in Exhibit 11-8.

The tentative land use plan is shown in Exhibit 11-C and the conceptual plan in Exhibit 11-D. Sites have been configured to optimize ocean views, golf course frontage, and harmony between neighboring land uses. As presently planned, Mokuleia has a low development density with about 2,300 acres or about 80% of the total land area devoted to open or greenbelt areas. The proposed plan complements and maintains the rural environment in the North Shore area.

Exhibit II-B

**MOKULEIA
Proposed Master Plan Units and Area
at Completion**

	<u>Units</u>	<u>Acres 1/</u>
Principal land uses:		
Hotels	2,100)	313 2/
Condominium units	1,200)	
Residential units	700	331
Total	<u>4,000</u>	<u>644</u>
Other land uses:		
Commercial complex		33
Two 18-hole golf courses with clubhouse		342
Potential land uses:		
Polo field		--
Hiking trails		--
Camping areas		--
Sports center		--
Tennis ranch		--

1/ Preliminary.
2/ Combined acreage.
Source: Mokuleia Development Corporation.

Exhibit II-C

**MOKULEIA
Tentative Land Use Plan**

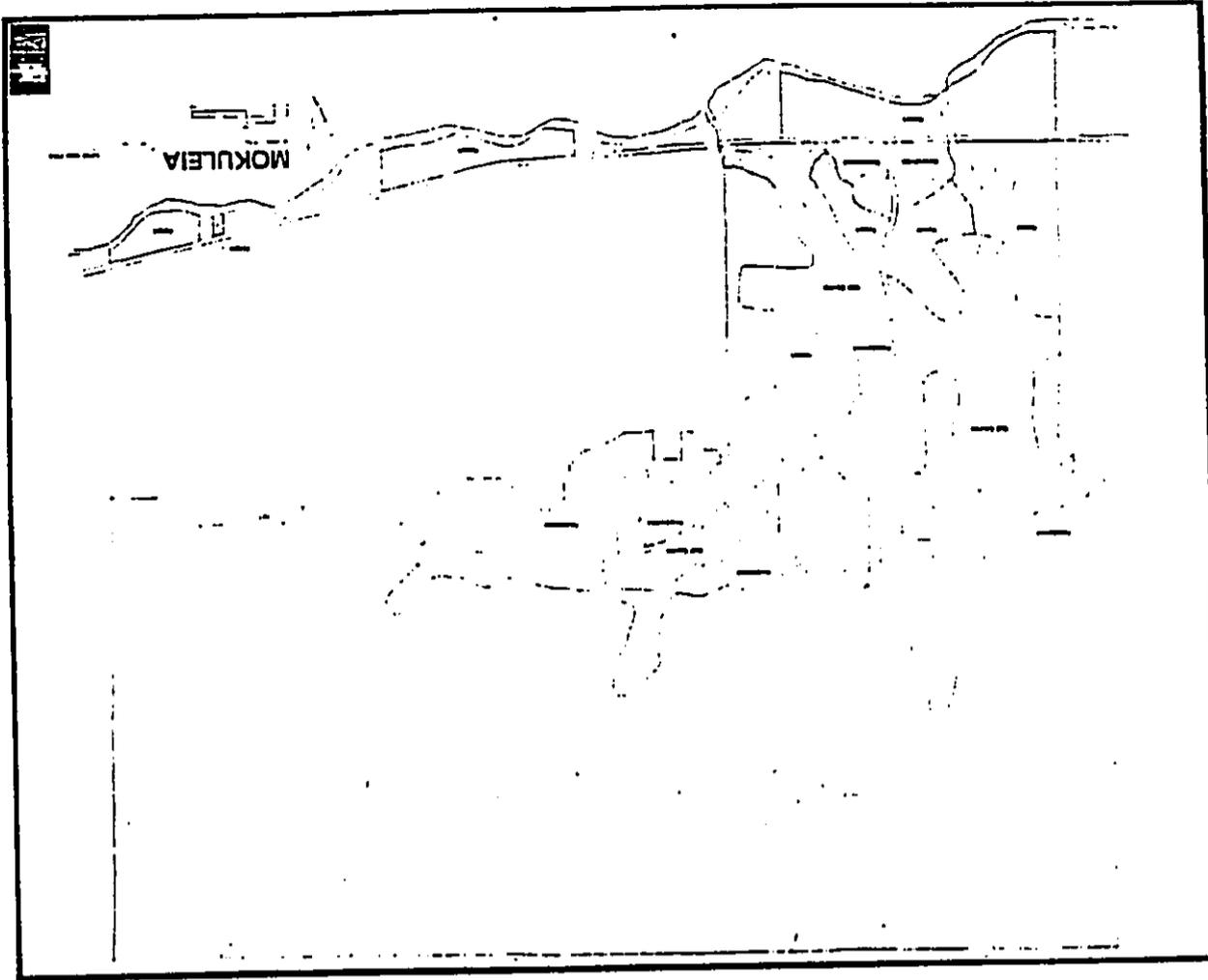
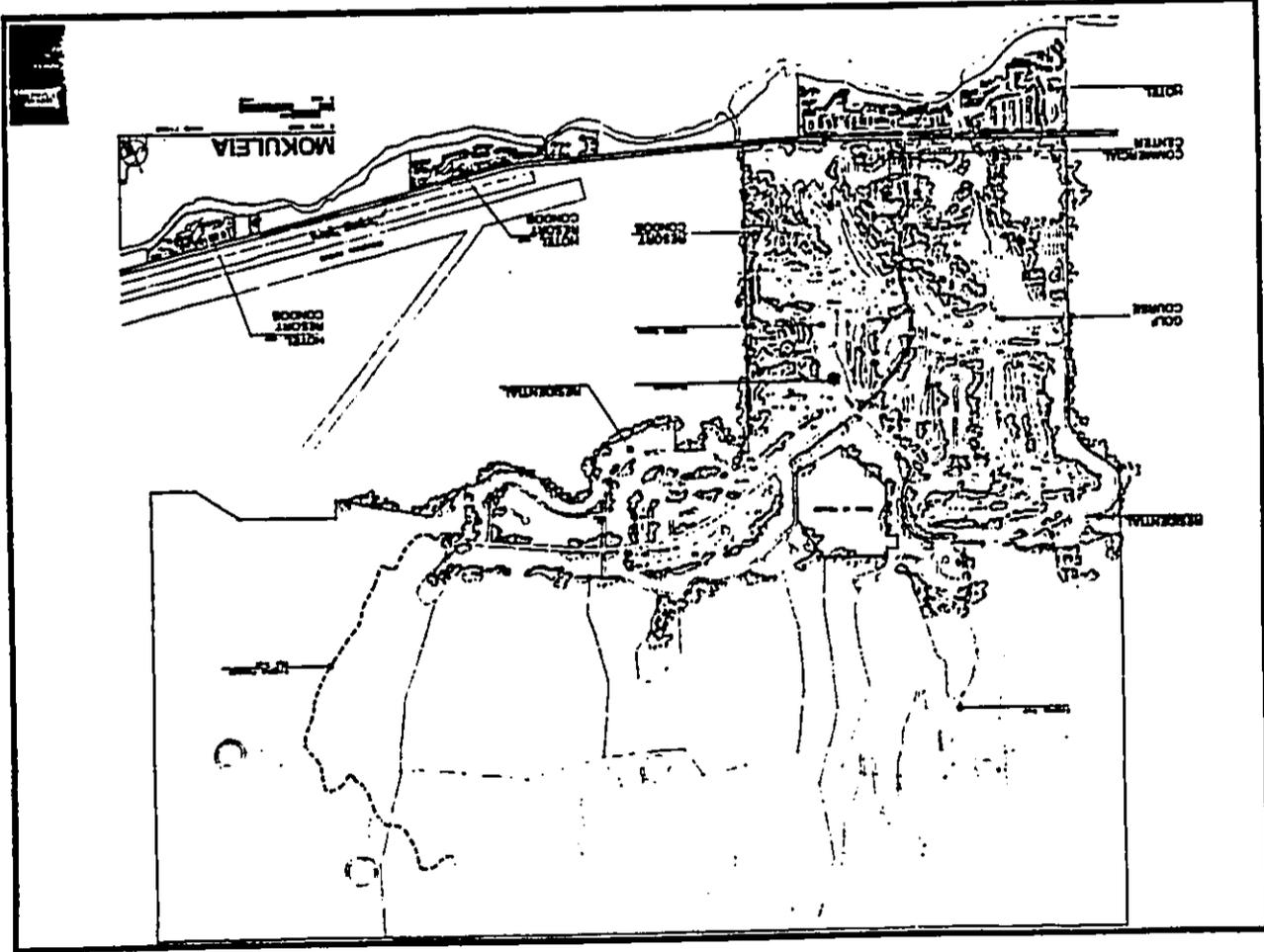


Exhibit II-D

MOKULEIA
Conceptual Plan



Access

Primary access between Mokuleia and Honolulu is provided via the H-2 Freeway and Kamehameha and Farrington Highways, the only arterials to the area.

Kamehameha Highway is a two-lane highway which extends from the H-2 Freeway and passes through Wahiawa, Haleiwa, and along the Windward coastline.

Farrington Highway extends from a point south of Weed Junction, paralleling the ocean, and terminates about six miles west of Mokuleia.

The airport is about 28 miles from Mokuleia, or 30 to 40 minutes by car. By comparison, the Waikiki, Kaanapali, Kapalua, and Turtle Bay resort areas are located 10, 28, 32, and 36 miles, respectively, from the nearest major airports.

III - HAWAII VISITOR INDUSTRY REVIEW

This section presents an overview of trends in the visitor industry in the State of Hawaii and on Oahu. In addition, major resorts on Oahu and the neighbor island are reviewed to provide a perspective for the potential market position for hotel development at Hokuieia.

STATE OF HAWAII VISITOR TRENDS

Visitors are one of the two largest sources of income and employment for Hawaii. For statistical purposes, the Hawaii Visitors Bureau (HVB) separates overnight visitors to the State in terms of travel direction. Westbound visitors include those arriving from North America while eastbound visitors include those from Asia (primarily Japan) and the Pacific. Recent trends in the visitor industry in the State and neighbor islands of Hawaii are reviewed in this section.

Historical Visitor Arrivals

In 1985 visitor arrivals to the State totalled nearly 4.9 million, only 0.3% above total arrivals in 1984. Growth in visitor arrivals to the State has declined during the past 25 years, as shown in Exhibit III-A. This downward trend in growth is due primarily to the increasing visitor base and the maturing of the State as a visitor destination.

Westbound visitors continue to represent the majority of the arrivals to the State, averaging between 75% and 85% to total arrivals during the past 10 years, as shown in Exhibit III-8.

Growth in westbound visitor arrivals has declined from an average rate of 18.1% per year between 1960 and 1970, to 8.7% per year between 1970 and 1980, and to 4.0% between 1980 and 1985. The smaller eastbound segment of visitor arrivals has grown faster than westbound arrivals, with average annual increases of 24.6% between 1960 and 1970, 7.8% between 1970 and 1980, and 5.7% between 1980 and 1985.

In 1985 visitor arrivals were severely curtailed by the 29-day long United Airlines strike in May and June. Losses in westbound arrivals were partially offset by healthy growth in eastbound visitor arrivals, resulting in total year-end visitor arrivals nearly identical to 1984 levels.

HOKUIEIA
Visitor Arrival Trends for the State of Hawaii
1960 to 1985

Year	Number	Percent Increase since Previous Year	Westbound	Eastbound	Total
1960	250,795	-2	45,722	296,517	18.6
1965	567,218	17.7	119,710	686,928	20.5
1970	1,326,135	18.5	420,835	1,746,970	13.0
1975	2,207,417	12.1	621,688	2,829,105	(.7)
1980	3,046,132	(3.0)	888,372	3,934,504	7.8
1981	2,974,791	(2.3)	959,832	3,934,623	2.9
1982	3,278,519	10.2	964,397	4,242,916	11.2
1983	3,395,880	3.6	972,000	4,367,880	8.5
1984	3,721,380	9.6	1,134,200	4,855,580	4.4
1985	3,699,140	(.6)	1,170,990	4,870,130	19.4
Compound annual percentage increase:		18.1	26.9	19.4	
1970 to 1980		8.7	7.8	8.5	
1980 to 1985		4.0	5.7	4.4	

1/ Visitor statistics collection system revised in 1964.
2/ Not significant.
Source: Hawaii Visitors Bureau, annual and monthly reports; and First Hawaiian Bank Research Department.
Economic Indicators, January/February 1986.

Exhibit III-B

MOKULEIA
Westbound Visitor Arrivals to Oahu
1970 to 1985

Year	Total visitors	Percent of State westbound total	Percent increase (decrease) since previous year
1970	1,246,970	94.02	-2
1975	1,889,790	85.6	8.7
1980	2,398,740	78.7	(5.7)
1981	2,398,480	80.6	-
1982	2,589,190	79.0	8.0
1983	2,591,635	76.3	.1
1984	2,901,320	78.0	11.9
1985	2,818,950	76.2	(2.8)

Compound annual percentage increase -
1970 to 1985

5.6

Oahu Visitor Arrivals

In 1985 Oahu attracted about 76% of all westbound visitors, as shown in Exhibit III-C. However, this is down from 1970, when Oahu captured 94% of the westbound visitor market.

Oahu is expected to continue to be the most visited island; however, an increasing share of the State's guests could be expected to also visit the neighbor islands or forego Oahu entirely. This trend could be slowed with the development of major destination resorts on Oahu that offer both first-time and repeat visitors an alternative to staying in hotels in Waikiki.

Neighbor Island Visitor Arrivals

Westbound visitor arrivals have grown at a faster rate on the neighbor islands than on Oahu. Since 1970, the neighbor islands have had an average growth rate of 6.5% per year, compared to 5.6% per year on Oahu, as shown in Exhibit III-C. Increased travel to the neighbor islands result from:

- Greater development of integrated resort destinations on the neighbor islands.
- Increasing numbers of repeat visitors to the State seeking new vacation experiences.
- Increased air service including direct flights from major mainland cities to the neighbor islands.
- Decline in new visitor facilities and the aging of existing facilities on Oahu.

On the islands of Maui, Kauai and Hawaii, major destination resorts have been developed with hotel, condominium and single-family accommodations, golf courses, tennis facilities and other master-planned amenities. In addition, outer island resorts offer repeat visitors new destinations in Hawaii with different visitor attractions and a resort life style.

The neighbor islands have been able to capture an increasingly larger share of total visitor arrivals because they have demonstrated their responsiveness to the growing needs of the visitor for newer vacation experiences. With Oahu's existing visitor plant aging and the neighbor island resorts growing in prominence and recognition, the neighbor islands are anticipated to continue to capture a growing share of total visitor arrivals.

Source: Figures represent all overnight and longer westbound visitors to and beyond Hawaii as reported by the Hawaii Visitors Bureau, Annual Research Report, annual; and First Hawaiian Bank, Economic Indicators, January/February 1986.

Exhibit III-C

MOKULEIA
Westbound Visitors to the Neighbor Islands
1970 to 1985

Year	Neighbor Islands				Total
	Oahu	Hawaii	MauI	Kauai	
1970	1,246,970	445,401	447,985	410,075	1,326,135
1975	1,889,790	769,779	931,863	632,821	2,207,417
1980	2,398,740	761,103	1,378,189	781,409	3,046,132
1981	2,398,480	672,683	1,389,892	757,811	2,974,791
1982	2,589,190	678,170	1,550,080	733,295	3,278,519
1983	2,591,635	712,380	1,644,605	691,940	3,395,880
1984	2,901,320	756,890	1,849,800	806,620	3,721,380
1985	2,818,950	695,340	1,626,980	830,380	3,699,140

Compound annual
percentage
increase -
1970 to 1985

3.32 3.02 9.82 4.82 4.22

VISITOR CHARACTERISTICS

Most westbound visitors travel to Hawaii for vacations. In 1984, over 90% of the westbound travel to the State was for pleasure or business and pleasure, as shown in Exhibit III-D.

Westbound visitors have typically traveled to Hawaii independently. Independent travellers averaged about 75% of total visitors since 1970, also shown in the exhibit.

Hotels continue to serve the majority of visitors for accommodations. Since 1975, condominium units have been growing in popularity as an alternative, increasing from less than 1% in 1975 to nearly 20% in 1984.

The average length of stay in the State has remained relatively stable over the last ten years at approximately ten days. By island, length of stay is longest on Oahu at 7.5 days and shortest on the island of Hawaii at 3.6 days. Maui has shown the greatest nominal growth in length of stay, increasing by 3.5 days from 1970 to 1984. It currently averages 6.5 days.

Average persons per party has slowly increased from 1.74 persons in 1975 to 1.84 persons in 1984. This increase may be attributable to more family groups and easier access to the State from mainland destinations.

Visitors aged 30 to 49 were by far the largest age group to visit Hawaii, representing nearly 40% of all westbound arrivals in 1984 as shown in Exhibit III-E. Next largest is the 20 to 29 age group which accounted for approximately 18% in 1984.

Persons in professional and technical occupations were the largest employment segment to visit the State in 1984. This group represented about 36% of visitors. They were followed by visitors in business, managerial and official occupations, 25.2%.

About half of Hawaii's visitors are first-time visitors to the State, as also shown in the exhibit. Repeat visitors have increased from only 33% in 1970 to 47% in 1984.

Westbound visitors to the State typically reside in the continental United States. The largest segment is residents of the West Coast States and Alaska, representing 35% of all westbound visitors. Foreign visitors were primarily Japanese and Canadian citizens. During recent years, foreign visitor arrivals have declined due to the relatively stronger U.S. dollar.

Source: Includes westbound visitors to and beyond Hawaii, as reported by the Hawaii Visitors Bureau, Annual Research Reports, annual; Hawaii Visitors Bureau, Research Report, December 1985; and First Hawaiian Bank Research Department, Economic Indicators, January/February 1986.

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Exhibit III-D

HOKULEIA
Travel Patterns of Westbound Visitors
1970 to 1984

	1970	1975	1980	1984
Purpose of trip:				
Pleasure	74.6%	76.4%	75.4%	79.7%
Business	3.8	2.6	2.9	2.3
Business and pleasure	9.9	10.7	13.3	11.5
Military and government	.6	.3	.4	.5
Relatives	6.3	3.7	4.1	2.9
Convention	4.5	6.2	3.5	2.7
Other	.3	.1	.4	.4
Total	100.0%	100.0%	100.0%	100.0%
Travel status: I/				
Group	21.9%	45.1%	23.9%	18.8%
Individual basis	77.5	54.6	72.0	75.0
Incentive	.6	.3	3.7	5.7
Government - military			.4	.5
Total	100.0%	100.0%	100.0%	100.0%
Accommodations used:				
Hotel or apartment hotel	84.2%	91.7%	71.2%	69.1%
Rented home or apartment	.8	.5	16.4	19.6
condominium	12.6	6.8	10.6	8.0
Friends or relatives	2.4	1.0	1.8	3.3
Others				
Total	100.0%	100.0%	100.0%	100.0%
Average stay in State (days)	10.3	10.5	10.6	10.3
Persons per party	1.55	1.74	1.79	1.84

I/ Represents percentage of westbound visitors to and beyond Hawaii.

Source: Hawaii Visitors Bureau, Annual Research Reports, annual.

Exhibit III-E

HOKULEIA
Demographic Characteristics of
Westbound Visitors to Hawaii
1970 to 1984

	1970	1975	1980	1984
Age:				
Under 20	11.6%	9.2%	10.5%	10.9%
20 - 29	22.9	16.2	17.6	18.1
30 - 49	34.0	36.0	38.0	39.4
50 - 59	18.9	22.8	19.4	15.9
60 and older	12.6	15.8	14.5	15.7
Total	100.0%	100.0%	100.0%	100.0%
Median age	60.7	44.5	41.3	40.1
Occupation:				
Professional and technical	27.9%	33.5%	35.8%	36.3%
Business, managerial and official	21.6	26.9	26.2	25.2
Clerical, office and sales	12.2	11.2	9.7	9.6
Military and dependents	13.7	.9	1.0	1.3
Other employed	7.2	8.0	7.6	7.0
Retired	7.6	12.5	11.5	13.6
Students and unemployed	9.8	7.0	8.2	7.0
Total	100.0%	100.0%	100.0%	100.0%
Trips to Hawaii:				
First	67.2%	60.3%	51.6%	52.7%
Second	14.7	17.1	18.8	18.6
Third	5.6	7.2	9.1	8.6
Fourth	12.5	15.6	20.5	20.1
Total	100.0%	100.0%	100.0%	100.0%
Repeat visitors	32.8%	39.7%	48.4%	47.3%
Origin:				
United States:	33.4%	24.8%	30.6%	27.2%
California	8.6	9.7	10.1	6.0
Other Pacific Coast	5.7	5.2	6.4	6.7
Mountain	26.7	29.2	23.4	28.4
Central	20.0	19.0	16.9	19.7
Atlantic				
Canada	94.4	87.9	87.4	90.0
Other foreign	5.0	11.0	11.0	8.4
	.6	1.1	1.6	1.6
Total	100.0%	100.0%	100.0%	100.0%

Source: Hawaii Visitors Bureau, Annual Research Reports, annual.

VISITOR MARKET SEGMENTS

Visitors may be distinguished by their travel status. The five major segments of Hawaii's visitor market are described as follows:

- **Free independent travelers** - Free independent travelers (FITs) travel individually rather than with a group. FITs typically have higher-than-average incomes and patronize the higher-priced visitor accommodations. These travelers are often repeat visitors who are familiar with the State.
- **Group tour travelers** - The group traveler market includes tours and convention-oriented visitor packages. In contrast to FITs, the group travelers, also known as group inclusive travelers (GIT), have declined as a percent of westbound visitors over the last decade.
- **Convention attendees** - The convention market consists of groups meeting in Hawaii for meetings or conventions. The convention market is quite irregular, as a large meeting can distort figures for a given year.
- **Incentive travelers** - The incentive group market represent a small but sought-after market segment. It consists of management personnel and executives who are given expense paid trips as bonuses or incentives. This group usually has high income, a higher propensity to return as visitors, spends more money and frequents more expensive restaurants and hotel accommodations.
- **Government and military visitors** - This group typically represents less than 1% of overnight visitors to the islands and are not considered in further detail.

In summary, FITs account for the largest market segment, representing over 73% of westbound visitors, as shown in Exhibit III-F. The fastest rates of growth were experienced by incentive groups at 18.4% and FITs at 8%. In contrast, convention travelers have remained relatively stable, while group and other travelers have declined by 1.1% and 11%, respectively, as also shown in the exhibit.

VISITOR EXPENDITURES

Visitor expenditures in the State totalled over \$4.5 billion in 1984 and have shown double-digit increases every year since 1970, except for 1981, as shown in Exhibit III-G. Expenditures per visitor have also increased but at a slower rate than total visitor expenditures.

Year	FIT	Group	Convention	Incentive group	Government military/other 1/	Total westbound visitors to Hawaii 2/
1980	1,934,393	410,646	230,891	100,367	42,566	2,718,863
1981	1,916,160	412,370	181,662	90,972	11,998	2,611,162
1982	2,163,210	396,797	167,558	126,615	42,075	2,896,255
1983	2,272,080	344,386	211,764	127,360	132,450	3,088,020
1984	2,482,360	367,388	255,152	189,800	91,180	3,385,880
1978	1,563,746	738,897	230,273	68,750	97,165	2,698,831
Compound annual percentage increase (decrease)	8.0%	(11.0)%	1.7%	18.4%	(1.1)%	3.9%

HAWAII VISITOR MARKET SEGMENTS 1978 to 1984

1/ Includes nonrespondents.
2/ Includes all westbound visitors to Hawaii (exclusive of visitors traveling beyond Hawaii).
Source: Hawaii Visitors Bureau, Annual Research Reports, annual.

Exhibit III-G

HOKULEIA
Visitor Expenditures in Hawaii
1970 to 1984

Year	Total		Per Visitor	
	Amount (billions)	Annual Increase	Amount	Annual Increase
1970	\$0.595	-2	\$341	-2
1975	1.360	18.0	481	7.1
1980	2.875	16.2	731	14.0
1981	3.200	11.3	813	11.2
1982	3.700	15.6	872	7.3
1983	3.974	7.4	910	4.4
1984	4.582	15.3	943	3.6

Westbound and eastbound visitor spending patterns vary significantly. Visitor expenditure surveys conducted by HVB indicate that Japanese visitors spend significantly more per day than do all other visitors. In 1983, the average daily expenditure for Japanese visitors was \$227, about 160% more than the \$86 spent by all other visitors.

Spending patterns are influenced by the relatively shorter average length of stay of eastbound visitors (in 1983, 4.9 days compared to 10.3 days for westbound visitors). Also those who visit Oahu only tend to spend less than visitors to the State as a whole. According to statistics provided by the HVB, the relatively greater expenditures made by neighbor island visitors are due to expenditures for lodging, ground transportation, and tours.

PROJECTED VISITOR ARRIVALS

This section reviews visitor arrival projections to the State of Hawaii and Oahu.

State of Hawaii

Hawaii's position in the world market has been enhanced in recent years because of the:

- Growing number of alternative visitor destination in the State which appeal to a wide variety of visitors.
- Lower airtares making travel to Hawaii more affordable.
- Increased advertising and publicity effort by hotels, resorts, and visitor associations to promote the vacation experience in Hawaii.
- International conflicts and tension which have made travel to Europe and the Mediterranean less attractive than in the past.
- Deregulation of Japanese overseas air service which increased competition among Japanese air carriers for air service between Japan, Hawaii, and the mainland United States.

Source: Hawaii Visitors Bureau, Annual Research Report, annual; and Bank of Hawaii, Hawaii 1985, 1985.

Westbound and eastbound visitor arrivals to the State of Hawaii over the next 20 years are based on projections by the Department of Planning and Economic Development (DPED), prepared in July 1984. Based on these projections, westbound and eastbound visitor arrivals to the State are expected to increase at a slower than historical rate of growth. This slower rate is based on the relative maturity of Hawaii as a visitor destination, as reflected by the declining rates of growth of visitor arrivals between 1960 and 1985, as previously shown in Exhibit III-A. According to DPED, total visitor arrivals to the State are projected at 6.1 million by 1990, 7.1 million by 1995, 7.8 million by 2000, and 8.2 million by 2005, as shown in Exhibit III-H. This represents an average growth rate of about 2.5% compounded annually over the next 20 years.

Oahu

Oahu visitor arrivals are projected as a percentage of visitor arrivals to the State and are also presented in Exhibit III-H. A decreasing proportion of the State's visitors are projected to visit Oahu.

Over the next 20 years, the percentage of State visitors staying overnight on Oahu is projected to decline by about 8% to a 70% share of total State visitors. Eastbound visitors to Oahu are projected to fall from almost 100% of visitors to the State in 1985 to about 60% by 2005. Stabilization in Oahu's market share could result from increasing resort development on Oahu which provides the type of vacation experience currently found on the neighbor islands.

Visitors to Oahu are projected to increase by about 2.2% annually through 2005, compared to 2.6% for the State. Oahu visitors are estimated to increase by about 50% from about 4 million in 1985 to 6.2 million by the year 2005. Of this number, westbound arrivals are projected to account for about 68%, while eastbound visitors are projected to account for about 32%.

RESORTS IN HAWAII

A resort is a self-contained community which provides a variety of facilities for the accommodation, leisure, and other needs of the visitors. Resorts must be known to a sufficient number of potential visitors to attract and motivate travel in themselves.

The development concepts for Mokuleia are not primarily a major destination resort; however, they share many characteristics with resorts in the State. This section reviews the characteristics of major resorts in Hawaii to provide a perspective as to the market position of the community at Mokuleia.

MOKULEIA
Historical and Projected Visitor Arrivals to the State and Oahu
1980 to 2005

Year	Westbound		Eastbound		Total Visitors	Compound annual percentage increase - 1980 to 2005
	Percent of State	Oahu	Percent of State	Oahu		
Historical:						
1980	78.7%	2,198,740	88.8%	99.6%	3,283,559	3.9%
1981	80.6%	2,198,480	99.7%	99.7%	3,355,433	
1982	79.0%	2,589,190	99.6%	99.6%	3,549,729	
1983	76.3%	2,991,635	97.2%	99.5%	3,558,775	
1984	78.0%	2,901,320	1,134,200	99.5%	4,029,849	
1985	76.2%	2,818,950	1,170,990	99.0%	4,978,250	
Projected:						
1990	75.0%	3,745,800	1,622,300	97.0%	4,919,400	
1995	73.0%	3,775,300	1,880,500	94.0%	5,543,000	
2000	71.0%	4,054,000	2,076,300	92.0%	6,164,900	
2005	70.0%	4,200,800	2,182,300	90.0%	6,164,900	

1/ Estimated based on surveys of Japanese visitors to Oahu as reported by the Hawaii Visitors Bureau, Annual Research Report, 1980 and 1983.
 2/ Based on the rate of increase of non-Japanese visitors as projected by the Department of Planning and Economic Development, State of Hawaii.
 3/ Based on the rate of increase of Japanese visitors as projected by the Department of Planning and Economic Development, State of Hawaii, and assuming a proportionate increase to other eastbound visitors.
 Sources: Hawaii Visitors Bureau, Annual Research Reports and Research Report, December 1985; First Hawaiian Bank Research Department, Economic Indicators, January/February 1985; Department of Planning and Economic Development, State of Hawaii, Population and Economic Projections for the State of Hawaii, 1980 to 2005, July 1984; and estimates by John Child & Company, Inc.

Westbound and eastbound visitor arrivals to the State of Hawaii over the next 20 years are based on projections by the Department of Planning and Economic Development (DPED), prepared in July 1984. Based on these projections, westbound and eastbound visitor arrivals to the State are expected to increase at a slower than historical rate of growth. This slower rate is based on the relative maturity of Hawaii as a visitor destination, as reflected by the declining rates of growth of visitor arrivals between 1960 and 1985, as previously shown in Exhibit III-A. According to DPED, total visitor arrivals to the State are projected at 6.1 million by 1990, 7.1 million by 1995, 7.8 million by 2000, and 8.2 million by 2005, as shown in Exhibit III-H. This represents an average growth rate of about 2.5% compounded annually over the next 20 years.

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Oahu visitor arrivals are projected as a percentage of visitor arrivals to the State and are also presented in Exhibit III-H. A decreasing proportion of the State's visitors are projected to visit Oahu.

Over the next 20 years, the percentage of State visitors staying overnight on Oahu is projected to decline by about 8% to a 70% share of total State visitors. Eastbound visitors to Oahu are projected to fall from almost 100% of visitors to the State in 1985 to about 90% by 2005. Stabilization in Oahu's market share could result from increasing resort development on Oahu which provides the type of vacation experience currently found on the neighbor islands.

Visitors to Oahu are projected to increase by about 2.2% annually through 2005, compared to 2.6% for the State. Oahu visitors are estimated to increase by about 50% from about 4 million in 1985 to 6.2 million by the year 2005. Of this number, westbound arrivals are projected to account for about 68%, while eastbound visitors are projected to account for about 32%.

RESORTS IN HAWAII

A resort is a self-contained community which provides a variety of facilities for the accommodation, leisure, and other needs of the visitors. Resorts must be known to a sufficient number of potential visitors to attract and motivate travel in themselves.

The development concepts for Mokuleia are not primarily a major destination resort; however, they share many characteristics with resorts in the State. This section reviews the characteristics of major resorts in Hawaii to provide a perspective as to the market position of the community at Mokuleia.

III-6

MOKULEIA
Historical and Projected Visitor Arrivals to the State and Oahu
1980 to 2005

	Westbound			Eastbound			Total Visitors	
	State	Percent of State	Oahu	State	Percent of State	Oahu	State	Oahu
Historical:								
1980	3,046,132	78.7%	2,398,740	888,372	99.6% ^{1/}	884,819	3,934,504	3,283,559
1981	2,974,791	80.6	2,398,480	959,832	99.7 ^{1/}	956,953	3,934,623	3,355,433
1982	3,278,519	79.0	2,589,190	964,397	99.6 ^{1/}	960,539	4,242,916	3,549,729
1983	3,295,880	76.3	2,591,635	972,000	99.5 ^{1/}	967,140	4,367,880	3,558,775
1984	3,721,380	78.0	2,901,320	1,134,200	99.5	1,128,529	4,855,580	4,029,849
1985	3,699,140	76.2	2,818,950	1,170,990	99.0	1,159,300	4,870,130	3,978,250
Projected:								
1990	4,461,000 ^{2/}	75.0	3,345,800	1,622,300 ^{3/}	97.0	1,573,600	6,083,300	4,919,400
1995	5,171,700 ^{2/}	73.0	3,775,300	1,880,500 ^{3/}	94.0	1,767,700	7,052,200	5,543,000
2000	5,709,900 ^{2/}	71.0	4,054,000	2,076,300 ^{3/}	92.0	1,910,200	7,786,200	5,964,200
2005	6,001,100 ^{2/}	70.0	4,200,800	2,182,300 ^{3/}	90.0	1,964,100	8,183,400	6,164,900
Compound annual percentage increase -								
1980 to 1985	4.0%		3.3%	5.7%		5.6%	4.4%	3.9%
1985 to 2005	2.4%		2.0%	3.2%		2.7%	2.6%	2.2%

- ^{1/} Estimated based on surveys of Japanese visitors to Oahu as reported by the Hawaii Visitors Bureau, Annual Research Report, 1980 and 1983.
- ^{2/} Based on the rate of increase of non-Japanese visitors as projected by the Department of Planning and Economic Development, State of Hawaii.
- ^{3/} Based on the rate of increase of Japanese visitors as projected by the Department of Planning and Economic Development, State of Hawaii, and assuming a proportionate increase to other eastbound visitors.
- Sources: Hawaii Visitors Bureau, Annual Research Reports and Research Report, December 1985; First Hawaiian Bank Research Department, Economic Indicators, January/February 1985; Department of Planning and Economic Development, State of Hawaii, Population and Economic Projections for the State of Hawaii, 1980 to 2005, July 1984; and estimates by John Child & Company, Inc.

Exhibit III-II

Oahu Resorts

Oahu includes two existing resorts outside of Waikiki. They are:

- Turtle Bay Resort.
- Makaha Resort.

A third resort, West Beach, is planned for development in the Ewa area on Oahu.

The characteristics of the three resorts are summarized in terms of physical characteristics, existing developments, room rates and prices, market appeal and visitor profile in Exhibit III-1. Resort development on Oahu is far more extensive than those found on the neighbor islands.

Neighbor Island Resorts

Nine major resorts are on the neighbor islands. The characteristics of these resorts are summarized in Exhibit III-J.

Resort sizes vary between 400 units or lots at the Mauna Kea, Mauna Lani and Kalua Kai Resorts, and 5,500 units at Kaanapali Resort.

The appeal of these resorts generally stems from the locational characteristics and scope of facilities offered. The resorts typically have good swimming beaches and offer a variety of recreational amenities including golf, tennis, and water-oriented activities.

The resorts include a variety of hotel classes, ranging from economy to luxury. Resorts on Maui, Kauai, and Molokai cater to a broad range of guests while the resorts on the island of Hawaii are oriented at either the tourist first-class market at Keahou, or the luxury market at Mauna Kea, Mauna Lani, and the proposed development at Waikoloa.

MOLOKAI
Characteristics of Oahu Resorts

	Existing Resorts		Proposed Resort
	Makaha	Turtle Bay	West Beach
Site Area (Acres) 1/ Distance from interisland airport	617 31 miles	608 37 miles	642 20 miles
Special site characteristics	Secluded valley with equestrian trails.	Protected bay. Bird sanctuary. Equestrian center (planned).	Four manmade lagoons (2 to 15.5 acres). Public park center. Historic railroad.
Existing development: Hotel rooms Condominium units Single-family lots Total units	195 611 - <u>806</u>	487 168 - <u>655</u>	2,000 (resort) 2,000 (resort) 5,200 (residential) <u>9,200</u>
Planned at completion (units)	Not available	4,350	9,200
Amenities: Beach	No ocean frontage. Makaha Beach shuttle bus.	Except rocky, limited swimming except for Kaheia Bay.	Rocky, limited swimming. Two sandy beaches to be created.
shoreline (linear feet) Commercial space in shopping centers Golf course holes Tennis courts Onsite activities	- - 36 6 Horseback riding	5 miles 40,000 (planned) 18, 18 planned 10 Snorkeling, scuba diving, horseback riding, dune cycling	1.9 miles 185,000 ^{2/} 18 Not determined Hawaiian cultural center, boating
Hotel developments: Hotel class 1984 average hotel room rates: 3/ Single Double/triple	\$75 - \$200 75 - 200	\$75 - \$700 75 - 700	Not available Not available
Typical condominium unit sales price (1984) 3/	Not available	\$60,000 - \$90,000	Not available
Market appeal	Secluded, heavily oriented to golf, tennis, horseback riding. Operations hampered by lack of beach access and locational attributes.	Planned to be a major destination resort which would compete directly with neighbor island resorts. Close to major visitor attractions.	A quality resort and residential community with extensive recreational amenities.
Typical visitor profile	FIT visitors represent 70%. Resort guests include: 30% - 35% (local) 15 - 40 (weekend) 25 - 35 (Japanese)	Oriented to both FIT and CIT guests from the mainland and Oahu.	Oriented more to FIT visitors.

1/ Includes all master-planned areas, including nondesignated or conservation and buffer areas. Portions may not be master-planned for development at this time.
2/ Unpublished room rates for major hotels and condominiums as published by the Hawaii Visitors Bureau, Visitor Accommodation Guide, 1983.
3/ Hawaii Real Estate Investor, Multiple Listing Service and discussions with developers or realtors of the respective resorts.
Sources: Discussions with developers, filed environmental impact statements and other published materials.

MOOREIA
Characteristics of Neighbor Island Resorts

	Kaohia Beach	Kaohia Beach (Kaohia) at Kaohia	Mauna Kea	Mauna Kea
Site area (acres) // Distance from nearest island airport	490 (existing resort) 10 miles (Kaohia)	490 12 miles (Kaohia)	1,100 26 miles (Kaohia)	614 20 miles (Kaohia)
Existing development - Hotel rooms Condominium units Single-family lots Total units	340 - - 340	1,302 412 28 1,742	110 22 55 187	101 - - 101
Beach	White sand	Ruaky, jave swimming, public beach nearby	White sand	Sandy, rocky bottom
Shoreline (feet) (est) Percent usable for swimming	7,400 100	13,000 0%	14,100 100	14,200 100
Recreational space in developed areas Tennis courts Water activities	Proposed 18 0 Deep-sea fishing, scuba diving, water safari cruises, sailing, windsurfing	Not available 30 10 Fishing, boating, snorkeling, scuba diving	Proposed 18 9 Deep-sea fishing, scuba diving, cateran cruises, horseback riding, hunting	Proposed 18 10 Jugging water, hiking, scuba diving, horseback riding
Hotel development - Hotel class 1966 average hotel room rates // Single Double/triple	Luxury/first-class 280 - 3200 85 - 300	Tourist/first-class 242 - 2105 42 - 105	Luxury \$235 - 2310 250 - 125	Luxury \$182 - \$300 182 - 300
Typical condominium unit sales price (1964) //	\$200,000 - \$240,000	\$295,000 - \$170,000	\$750,000 - \$1,450,000	\$240,000 - \$890,000
Market appeal	Quality hotel and golf course devel- opment with pleasant luxury hotels and condominiums.	Activity-oriented resort which benefits from proximity to the Kaohia-Kaohia resort area and area visitor attractions.	Mid-class (retention) resort which enjoys a wide reputation and loyal visitor base.	Quality hotel, condominium and golf course development incorporated in a unique natural setting including black lava fields and ancient fish pools.
Typical visitor profile	Report-oriented mainly to GIT visitors and occasional groups. Planned devel- opment to cater to the very upscale world-class market. Average room rates for the planned hotels range from between \$200 to \$1,000 per day.	Oriented to both GIT and FIT visitors from middle to upper income groups.	Attracts to travelers who are gener- ally mature, very affluent and return annually.	Directed to affluent individual visitors.

// Includes all master-planned areas, including relinquished or conservation and buffer areas. Portions may not be master-planned for devel-
opment at this time.
// Unpublished room rates for major hotels or condominiums as published by the Hawaii Visitors Bureau, Number Accommodation Guide, 1965.
// Hawaii Real Estate Institute, Multiple Listing Service and discussions with developers or realtors of the respective resorts. (Continued)

Exhibit III-J
Page 1

MOOREIA
Characteristics of Neighbor Island Resorts, Continued

	Kaohia Beach	Mauna Kea Kaohia	Kaohia Kaohia	Kaohia - Kaohia	Mauna Kea - Kaohia
Site area (acres) // Distance from nearest island airport	1,100 26 miles (Kaohia)	1,450 15 miles (Kaohia)	750 32 miles (Kaohia)	1,713 28 miles (Kaohia)	1,530 11 miles (Kaohia)
Existing development - Hotel rooms Condominium units Single-family lots Total units	1,000 1,000 - 2,000	400 200 140 740	194 208 - 402	290 400 221 911	292 25 50 367
Beach	White sand	White sand	Sandy cove	Black ocean cliff, some beaches below, rough waters	White sand
Shoreline (feet) (est) Percent usable for swimming	10,000 100	7,000 Not available	4,500 100	14,000 Not available	12,700 100
Recreational space in developed areas Tennis courts Water activities	Proposed 18 0 Deep-sea fishing, scuba diving, water safari cruises, sailing, windsurfing	Not available 30 10 Scuba diving, excursion boats	22,000 30 10 All water sports	20,000 27 - Fishing, horseback riding, hiking, hunting, boating	- 18 - Fishing or hunting activities
Hotel development - Hotel class 1966 average hotel room rates // Single Double/triple	Luxury/first-class 237 - 2195 80 - 195	First-class/retention 285 - 2175 85 - 175	Luxury/first-class \$140 - \$300 140 - 100	First-class 240 - 2145 80 - 165	Tourist/first-class 240 - 590 80 - 90
Typical condominium unit sales price (1964) //	\$150,000 - \$290,000	\$150,000 - \$120,000	\$180,000 - \$300,000	\$100,000 - \$240,000	Not available
Market appeal	Recently oriented towards hotels. Planned as an integrated resort whereby all attractions are identi- fied as one.	Mixture of hotel and condo- minium units at a wide range of prices and inter- national. Newly recrea- tion-oriented due to premium golf and tennis facilities.	Oriented to midlife, luxury hotel and condominium unit development naturally inte- grated into a striking terrain.	Current development oriented exclusively to condominiums and single-family lot sales. Resort has a rural appeal with low night- time activities.	Appeals to visitors who prefer undiscovered area destinations and golf, fishing or hunting activities.
Typical visitor profile	Attract mainly divided between GIT and FIT visitors. Primarily attracts mature, upper middle and middle income travelers from the West Coast and Canada.	Wide variety of visitors including both GIT and FIT guests, typically.	Directed entirely to affluent individual visitors who return annually.	Oriented to upper and middle income travelers and social consumers including both GIT and FIT travelers.	Oriented to Hawaii and mainland FIT visitors and package tours.

// Sold.
// Innd.
// Not.
Sources: Compiled by John Child & Company, Inc. based on the Hawaii Resort Developer's Conference, Survey of Resort Development, 1963 and
other published sources.

Exhibit III-J
Page 2

CORRECTION

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

Exhibit III-C

HOKULEIHA
Westbound Visitors to the Neighbor Islands
1970 to 1985

Year	Neighbor Islands				Total
	Oahu	Hawaii	MauI	Kauai	
1970	1,246,970	445,401	447,985	410,075	1,326,135
1975	1,889,790	769,779	931,863	632,821	2,207,417
1980	2,398,740	761,103	1,378,189	781,409	3,046,132
1981	2,398,480	672,683	1,389,892	757,811	2,974,791
1982	2,589,190	678,170	1,550,080	733,295	3,278,519
1983	2,591,635	712,380	1,644,605	691,940	3,395,880
1984	2,901,320	756,890	1,849,800	806,620	3,721,380
1985	2,818,950	695,340	1,826,980	830,380	3,699,140

Compound annual
percentage
increase -
1970 to 1985

3.32 3.02 9.82 4.82 4.22

VISITOR CHARACTERISTICS

Most westbound visitors travel to Hawaii for vacations. In 1984, over 90% of the westbound travel to the State was for pleasure or business and pleasure, as shown in Exhibit III-D.

Westbound visitors have typically traveled to Hawaii independently. Independent travellers averaged about 75% of total visitors since 1970, also shown in the exhibit.

Hotels continue to serve the majority of visitors for accommodations. Since 1975, condominium units have been growing in popularity as an alternative. Increasing from less than 1% in 1975 to nearly 20% in 1984.

The average length of stay in the State has remained relatively stable over the last ten years at approximately ten days. By Island, length of stay is longest on Oahu at 7.5 days and shortest on the Island of Hawaii at 3.6 days. Maui has shown the greatest nominal growth in length of stay, increasing by 3.5 days from 1970 to 1984. It currently averages 6.5 days.

Average persons per party has slowly increased from 1.74 persons in 1975 to 1.84 persons in 1984. This increase may be attributable to more family groups and easier access to the State from mainland destinations.

Visitors aged 30 to 49 were by far the largest age group to visit Hawaii, representing nearly 40% of all westbound arrivals in 1984 as shown in Exhibit III-E. Next largest is the 20 to 29 age group which accounted for approximately 18% in 1984.

Persons in professional and technical occupations were the largest employment segment to visit the State in 1984. This group represented about 36% of visitors. They were followed by visitors in business, managerial and official occupations, 25.2%.

About half of Hawaii's visitors are first-time visitors to the State, as also shown in the exhibit. Repeat visitors have increased from only 33% in 1970 to 47% in 1984.

Westbound visitors to the State typically reside in the continental United States. The largest segment is residents of the West Coast States and Alaska, representing 52% of all westbound visitors. Foreign visitors were primarily Japanese and Canadian citizens. During recent years, foreign visitor arrivals have declined due to the relatively stronger U.S. dollar.

Source: Includes westbound visitors to and beyond Hawaii, as reported by the Hawaii Visitors Bureau, Annual Research Reports, annual; Hawaii Visitors Bureau, Research Report, December 1985; and First Hawaiian Bank Research Department, Economic Indicators, January/February 1986.

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Exhibit III-D

HOKULEI'A
Travel Patterns of Westbound Visitors
1970 to 1984

	1970	1975	1980	1984
Purpose of trip:				
Pleasure	74.62	76.42	75.42	79.72
Business	3.8	2.6	2.9	2.3
Business and pleasure	9.9	10.7	13.3	11.5
Military and government	.6	.3	.4	.5
Relatives	6.3	3.7	4.1	2.9
Convention	4.5	6.2	3.5	2.7
Other	.3	.1	.4	.4
Total	100.02	100.02	100.02	100.02
Travel status: 1/				
Group	21.92	45.12	23.92	18.82
Individual basis	77.5	54.6	72.0	75.0
Incentive	-	-	3.7	5.7
Government - military	.6	.3	.4	.5
Total	100.02	100.02	100.02	100.02
Accommodations used:				
Hotel or apartment hotel	84.22	91.72	71.22	69.12
Rented home or apartment	.8	.5	16.4	19.6
condominium	12.6	6.8	10.6	8.0
Friends or relatives	2.4	1.0	1.8	3.3
Others	-	-	-	-
Total	100.02	100.02	100.02	100.02
Average stay in State (days)	10.3	10.5	10.6	10.3
Persons per party	1.55	1.74	1.79	1.84

1/ Represents percentage of westbound visitors to and beyond Hawaii.
Source: Hawaii Visitors Bureau, Annual Research Reports, annual.

Exhibit III-E

HOKULEI'A
Demographic Characteristics of
Westbound Visitors to Hawaii
1970 to 1984

	1970	1975	1980	1984
Age:				
Under 20	11.62	9.22	10.52	10.92
20 - 29	22.9	16.2	17.6	18.1
30 - 49	34.0	36.0	38.0	39.4
50 - 59	18.9	22.8	19.4	15.9
60 and older	12.6	15.8	14.5	15.7
Total	100.02	100.02	100.02	100.02
Median age	40.7	44.5	41.3	40.1
Occupation:				
Professional and technical	27.92	33.52	35.82	36.32
Business, managerial and official	21.6	26.9	26.2	25.2
Clerical, office and sales	12.2	11.2	9.7	9.6
Military and dependents	13.7	.9	1.0	1.3
Other employed	7.2	8.0	7.6	7.0
Retired	7.6	12.5	11.5	13.6
Students and unemployed	9.8	7.0	8.2	7.0
Total	100.02	100.02	100.02	100.02
Trips to Hawaii:				
First	67.22	60.32	51.62	52.72
Second	14.7	17.1	18.8	18.6
Third	5.6	7.2	9.1	8.6
Fourth	12.5	15.4	20.5	20.1
Total	100.02	100.02	100.02	100.02
Repeat visitors	32.82	39.72	48.42	47.32
Origin:				
United States:				
California	33.42	24.82	30.62	27.22
Other Pacific Coast	8.6	9.7	10.1	6.0
Mountain	5.7	5.2	6.4	6.7
Central	26.7	29.2	23.4	28.4
Atlantic	20.6	19.0	16.9	19.7
Canada	94.4	87.9	87.4	90.0
Other foreign	5.0	11.0	11.0	8.4
	.6	1.1	1.6	1.6
Total	100.02	100.02	100.02	100.02

Source: Hawaii Visitors Bureau, Annual Research Reports, annual.

VISITOR MARKET SEGMENTS

Visitors may be distinguished by their travel status. The five major segments of Hawaii's visitor market are described as follows:

- Free independent travelers - Free independent travelers (FITs) travel individually rather than with a group. FITs typically have higher-than-average incomes and patronize the higher-priced visitor accommodations. These travelers are often repeat visitors who are familiar with the State.
- Group tour travelers - The group traveler market includes tours and convention-oriented visitor packages. In contrast to FITs, the group travelers, also known as group inclusive travelers (GIT), have declined as a percent of westbound visitors over the last decade.
- Convention attendees - The convention market consists of groups meeting in Hawaii for meetings or conventions. The convention market is quite irregular, as a large meeting can distort figures for a given year.
- Incentive travelers - The incentive group market represent a small but sought-after market segment. It consists of management personnel and executives who are given expense paid trips as bonuses or incentives. This group usually has high income, a higher propensity to return as visitors, spends more money and frequents more expensive restaurants and hotel accommodations.
- Government and military visitors - This group typically represents less than 1% of overnight visitors to the Islands and are not considered in further detail.

In summary, FITs account for the largest market segment, representing over 73% of westbound visitors, as shown in Exhibit III-F. The fastest rates of growth were experienced by incentive groups at 18.4% and FITs at 8%. In contrast, convention travelers have remained relatively stable, while group and other travelers have declined by 1.1% and 11%, respectively, as also shown in the exhibit.

VISITOR EXPENDITURES

Visitor expenditures in the State totalled over \$6.5 billion in 1984 and have shown double-digit increases every year since 1970, except for 1983, as shown in Exhibit III-G. Expenditures per visitor have also increased but at a slower rate than total visitor expenditures.

MOKULEIA
Hawaii Visitor Market Segments
1978 to 1984

Year	FIT	Group	Convention	Incentive group	Government military/ other 1/	Total westbound visitors to Hawaii 2/
1978	1,563,746	738,897	230,273	68,750	97,165	2,698,831
1980	1,934,393	410,646	230,891	100,367	42,566	2,718,863
1981	1,914,140	412,370	181,662	90,972	11,998	2,611,142
1982	2,163,210	396,797	167,558	126,615	42,075	2,896,255
1983	2,272,080	344,386	211,764	127,340	132,450	3,088,020
1984	2,482,360	367,388	255,152	189,800	91,180	3,385,880
Compound annual percentage increase (decrease)	8.02	(11.0)%	1.7%	18.4%	(1.1)%	3.9%

1/ Includes nonrespondents.

2/ Includes all westbound visitors to Hawaii (exclusive of visitors traveling beyond Hawaii).

Source: Hawaii Visitors Bureau, Annual Research Reports, annual.

Exhibit III-C

MOKULEIA
Visitor Expenditures in Hawaii
1970 to 1984

Year	Total		Per Visitor	
	Amount (billions)	Annual Increase	Amount	Annual Increase
1970	\$0.595	-2	\$341	-2
1975	1.360	18.0	481	7.1
1980	2.875	16.2	731	14.0
1981	3.200	11.3	813	11.2
1982	3.700	15.6	872	7.3
1983	3.974	7.4	910	4.4
1984	4.582	15.3	943	3.6

Westbound and eastbound visitor spending patterns vary significantly. Visitor expenditure surveys conducted by HVB indicate that Japanese visitors spend significantly more per day than do all other visitors. In 1983, the average daily expenditure for Japanese visitors was \$227, about 160% more than the \$86 spent by all other visitors.

Spending patterns are influenced by the relatively shorter average length of stay of eastbound visitors (in 1983, 4.9 days compared to 10.3 days for westbound visitors). Also those who visit Oahu only tend to spend less than visitors to the State as a whole. According to statistics provided by the HVB, the relatively greater expenditures made by neighbor island visitors are due to expenditures for lodging, ground transportation, and tours.

PROJECTED VISITOR ARRIVALS

This section reviews visitor arrival projections to the State of Hawaii and Oahu.

State of Hawaii

Hawaii's position in the world market has been enhanced in recent years because of the:

- Growing number of alternative visitor destination in the State which appeal to a wide variety of visitors.
- Lower airfares making travel to Hawaii more affordable.
- Increased advertising and publicity effort by hotels, resorts, and visitor associations to promote the vacation experience in Hawaii.
- International conflicts and tension which have made travel to Europe and the Mediterranean less attractive than in the past.
- Deregulation of Japanese overseas air service which increased competition among Japanese air carriers for air service between Japan, Hawaii, and the mainland United States.

Source: Hawaii Visitors Bureau, Annual Research Report, annual; and Bank of Hawaii, Hawaii 1985, 1985.

Westbound and eastbound visitor arrivals to the State of Hawaii over the next 20 years are based on projections by the Department of Planning and Economic Development (DPED), prepared in July 1984. Based on these projections, westbound and eastbound visitor arrivals to the State are expected to increase at a slower than historical rate of growth. This slower rate is based on the relative maturity of Hawaii as a visitor destination, as reflected by the declining rates of growth of visitor arrivals between 1960 and 1985, as previously shown in Exhibit III-A. According to DPED, total visitor arrivals to the State are projected to 6.1 million by 1990, 7.1 million by 1995, 7.8 million by 2000, and 8.2 million by 2005, as shown in Exhibit III-H. This represents an average growth rate of about 2.5% compounded annually over the next 20 years.

Oahu

Oahu visitor arrivals are projected as a percentage of visitor arrivals to the State and are also presented in Exhibit III-H. A decreasing proportion of the State's visitors are projected to visit Oahu.

Over the next 20 years, the percentage of State visitors staying overnight on Oahu is projected to decline by about 8% to a 70% share of total State visitors. Eastbound visitors to Oahu are projected to fall from almost 100% of visitors to the State in 1985 to about 90% by 2005. Stabilization in Oahu's market share could result from increasing resort development on Oahu which provides the type of vacation experience currently found on the neighbor islands.

Visitors to Oahu are projected to increase by about 2.2% annually through 2005, compared to 2.6% for the State. Oahu visitors are estimated to increase by about 50% from about 4 million in 1985 to 6.2 million by the year 2005. Of this number, westbound arrivals are projected to account for about 68%, while eastbound visitors are projected to account for about 32%.

RESORTS IN HAWAII

A resort is a self-contained community which provides a variety of facilities for the accommodation, leisure, and other needs of the visitors. Resorts must be known to a sufficient number of potential visitors to attract and motivate travel in themselves.

The development concepts for Mokuleia are not primarily a major destination resort; however, they share many characteristics with major resorts in the State. This section reviews the characteristics of major resorts in Hawaii to provide a perspective as to the market position of the community at Mokuleia.

MOKULEIA
Historical and Projected Visitor Arrivals to the State and Oahu
1980 to 2005

	Westbound			Eastbound			Total Visitors	
	State	Percent of State	Oahu	State	Percent of State	Oahu	State	Oahu
Historical:								
1980	3,046,132	78.7%	2,398,740	888,372	99.6% ^{1/}	884,819	3,934,504	3,283,559
1981	2,974,791	80.6	2,398,480	959,832	99.7 ^{1/}	956,953	3,934,623	3,355,433
1982	3,278,519	79.0	2,589,190	964,397	99.6 ^{1/}	960,539	4,242,916	3,549,729
1983	3,395,880	76.3	2,591,635	972,000	99.5 ^{1/}	967,140	4,367,880	3,558,775
1984	3,721,380	78.0	2,901,320	1,134,200	99.5	1,128,529	4,855,580	4,029,849
1985	3,699,140	76.2	2,818,950	1,170,990	99.0	1,159,300	4,870,130	3,978,250
Projected:								
1990	4,461,000 ^{2/}	75.0	3,345,800	1,622,300 ^{3/}	97.0	1,573,600	6,083,300	4,919,400
1995	5,171,700 ^{2/}	73.0	3,775,300	1,880,500 ^{3/}	94.0	1,767,700	7,052,200	5,543,000
2000	5,709,900 ^{2/}	71.0	4,054,000	2,076,300 ^{3/}	92.0	1,910,200	7,786,200	5,964,200
2005	6,001,100 ^{2/}	70.0	4,200,800	2,182,300 ^{3/}	90.0	1,964,100	8,183,400	6,164,900
Compound annual percentage increase -								
1980 to 1985	4.0%		3.3%	5.7%		5.6%	4.4%	3.9%
1985 to 2005	2.4%		2.0%	3.2%		2.7%	2.6%	2.2%

^{1/} Estimated based on surveys of Japanese visitors to Oahu as reported by the Hawaii Visitors Bureau, Annual Research Report, 1980 and 1983.
^{2/} Based on the rate of increase of non-Japanese visitors as projected by the Department of Planning and Economic Development, State of Hawaii.
^{3/} Based on the rate of increase of Japanese visitors as projected by the Department of Planning and Economic Development, State of Hawaii, and assuming a proportionate increase to other eastbound visitors.
Sources: Hawaii Visitors Bureau, Annual Research Reports and Research Report, December 1985; First Hawaiian Bank Research Department, Economic Indicators, January/February 1985; Department of Planning and Economic Development, State of Hawaii, Population and Economic Projections for the State of Hawaii, 1980 to 2005, July 1984; and estimates by John Child & Company, Inc.

Oahu Resorts

Oahu includes two existing resorts outside of Waikiki. They are:

- Turtle Bay Resort.
- Makaha Resort.

A third resort, West Beach, is planned for development in the Ewa area on Oahu.

The characteristics of the three resorts are summarized in terms of physical characteristics, existing developments, room rates and prices, market appeal and visitor profile in Exhibit III-I. Resort development on Oahu is far more extensive than those found on the neighbor islands.

Neighbor Island Resorts

Nine major resorts are on the neighbor islands. The characteristics of these resorts are summarized in Exhibit III-J.

Resort sizes vary between 400 units or lots at the Hauna Kea, Mauna Lani and Kaiua Kai Resorts, and 5,500 units at Kaanapali Resort.

The appeal of these resorts generally stems from the locational characteristics and scope of facilities offered. The resorts typically have good swimming beaches and offer a variety of recreational amenities including golf, tennis, and water-oriented activities.

The resorts include a variety of hotel classes, ranging from economy to luxury. Resorts on Maui, Kauai, and Molokai cater to a broad range of guests while the resorts on the Island of Hawaii are oriented at either the tourist first-class market at Keahou, or the luxury market at Mauna Kea, Mauna Lani, and the proposed development at Waikoloa.

MOLOKAI
Characteristics of Oahu Resorts

	Existing Resorts		Proposed Resort West Beach
	Makaha	Turtle Bay	
Site area (acres) 1/	617	408	642
Distance from interisland airport	31 miles	37 miles	20 miles
Special site characteristics	Secluded valley with equestrian trails.	Protected bay. Bird sanctuary. Equestrian center (planned).	Four manmade lagoons (2 to 15.5 acres). Public park center. Historic railroad.
Existing development:			
Hotel rooms	145	487	2,000 (resort)
Condominium units	611	168	2,000 (resort)
Single-family lots	-	-	5,200 (residential)
Total units	<u>806</u>	<u>655</u>	<u>9,200</u>
Required at completion (units)	Not available	4,350	9,200
Amenities:			
Beach	No ocean frontage. Makaha Beach shuttle bus.	Mostly rocky, limited swimming except for Kawaia Bay.	Rocky, limited swimming. Two sandy beaches to be created.
Thruway (linear feet)	-	5 miles	1.9 miles
Commercial space in shopping centers	-	40,000 (planned)	185,000 (planned)
Golf course holes	36	18, 18 planned	18
Tennis courts	4	10	Not determined
Onsite activities	Horseback riding	Snorkeling, scuba diving, horseback riding, dune cycling	Hawaiian cultural center, boating
Hotel developments:			
Hotel class			
1986 average hotel room rates: 2/			
Single	\$75 - \$200	\$75 - \$700	Not available
Double/triple	75 - 200	75 - 700	Not available
Typical condominium unit sales prices (1984) 2/	Not available	\$60,000 - \$90,000	Not available
Market appeal	Secluded, heavily oriented to golf, tennis, horseback riding. Operations hampered by lack of beach access and locational attributes.	Planned to be a major destination resort which would compete directly with neighbor island resorts. Close to major visitor attractions.	A quality resort and residential community with extensive recreational amenities.
Typical visitor profile	FIT visitors represent 70%. Resort guests include: 30% - 35% (local) 35 - 40 (westbound) 25 - 35 (Japanese)	Oriented to both FIT and GIT guests from the mainland and Oahu.	Oriented more to FIT visitors.

1/ Includes all master-planned areas, including nondesignated or conservation and buffer areas. Portions may not be master-planned for development at this time.
2/ Unpublished room rates for major hotels or condominiums as published by the Hawaii Visitors Bureau, Master Accommodation Guide, 1985.
3/ Hawaii Real Estate Investor, Multiple Listing Service and discussions with developers or realtors of the respective resorts.
Sources: Discussions with developers, filed environmental impact statements and other published materials.

HONOLULU
Characteristics of Neighbor Island Resorts

	Hawaii Resorts			
	Maui - Kahului	Kauai - Hanalei	Molokai - Maui	Molokai - Maui
Site area (acres) 1/	496 (including reserve)	690	1,100	614
Distance from Honolulu airport	10 miles (Kahului)	12 miles (Hanalei)	20 miles (Maui)	20 miles (Maui)
Existing development:				
Hotel rooms	268	1,402	310	351
Condominium units	-	412	23	80
Single-family lots	10	24	55	-
Total units	278	1,838	388	431
Vegetation:				
Beach	White sand	Rocky, just swimming, public beach nearby	White sand	Sandy, rocky bottom
Surfline (linear feet)	7,900	11,000	14,100	14,200
Percent usable for swimming	100	00	100	100
Commercial space in shopping centers	Proposed	Not available	Proposed	Proposed
Self-storage facilities	0	10	18	10
Tennis courts	0	10	9	10
Recreational activities	Deep-sea fishing, water diving, water-skiing, sailing, windsurfing	Fishing, hunting, snorkeling, water diving	Deep-sea fishing, water diving, catamaran cruises, horseback riding, hunting	Fishing, water skiing, horseback riding
Hotel development:				
Hotel class	Luxury/first-class	Tourist/first-class	Luxury	Luxury
1986 average hotel room rates 2/				
Single	\$85 - \$100	\$62 - \$105	\$235 - \$310	\$182 - \$300
Double/triple	\$5 - \$100	\$7 - \$105	\$90 - \$125	\$62 - \$100
Typical condominium unit sales prices (1984) 3/	\$200,000 - \$240,000	\$95,000 - \$170,000	\$150,000 - \$1,450,000	\$100,000 - \$800,000
Market appeal	Quality hotel and golf course development with planned luxury hotels and condominiums.	Activity-oriented resort which benefits from proximity to the Kailua-Kona resort area and area visitor attractions.	World-class destination resort which enjoys a wide reputation and loyal visitor base.	Quality hotel, condominium and golf course development incorporated in a unique natural setting including black lava fields and ancient fish ponds.
Typical visitor profile	Resort-oriented mainly to GIT visitors and convention groups. Planned development in order to the very upscale world-class market. Average room rates for the planned hotels range from between \$200 to \$1,000 per day.	Oriented to both GIT and FIT visitors from middle to upper income groups.	Caters to travelers who are generally mature, very affluent and return annually.	Marketed to affluent individual visitors.

1/ Includes all master-planned areas, including non-designated or conservation and buffer areas. Portions may not be master-planned for development at this time.
 2/ Unadjusted room rates for major hotels or condominiums as published by the Hawaii Visitors Bureau, Member Accommodation Guide, 1985.
 3/ Hawaii Real Estate Investor, Multiple Listing Service and discussions with developers or resortors of the respective resorts.

Exhibit III-1
Page 1

HONOLULU
Characteristics of Neighbor Island Resorts, Continued

	Hawaii Resorts			
	Kauai - Hanalei	Maui - Kahului	Molokai - Maui	Molokai - Maui
Site area (acres) 1/	1,149	1,650	750	1,213
Distance from Honolulu airport	20 miles (Hanalei)	15 miles (Kahului)	32 miles (Maui)	28 miles (Maui)
Existing development:				
Hotel rooms	1,000	470	194	290
Condominium units	1,000	200	748	400
Single-family lots	10	140	-	50
Total units	2,010	810	942	740
Vegetation:				
Beach	White sand	White sand	Sandy cove	Rocky ocean cliff, some beach, but no rough waters
Surfline (linear feet)	10,000	7,000	4,500	14,000
Percent usable for swimming	100	100	100	100
Commercial space in shopping centers	Not available	Not available	Not available	Not available
Self-storage facilities	Not available	Not available	Not available	Not available
Tennis courts	Not available	Not available	Not available	Not available
Recreational activities	Deep-sea fishing, water diving, water-skiing, sailing, windsurfing	Water skiing, water-skiing, water-skiing, water-skiing	All water sports	Fishing, horseback riding, hiking, tennis
Hotel development:				
Hotel class	Luxury/first-class/resort	First-class/tourist	Luxury/first-class	First-class
1986 average hotel room rates 2/				
Single	\$17 - \$195	\$65 - \$175	\$140 - \$300	\$60 - \$165
Double/triple	\$5 - \$195	\$7 - \$175	\$60 - \$100	\$60 - \$90
Typical condominium unit sales prices (1984) 3/	\$150,000 - \$290,000	\$150,000 - \$120,000	\$180,000 - \$300,000	\$100,000 - \$240,000
Market appeal	Heavily oriented towards hotels. Planned as an integrated resort whereby all attractions are identified as one.	Mixture of hotel and condominium units at a wide range of prices and orientations. Heavily recreational due to proximity to golf and tennis facilities.	Oriented to mature, luxury hotel and condominium unit development naturally integrated into a steep terrain.	Current development oriented exclusively to condominiums and single-family lots. Resort has a rural appeal with low night-class activities.
Typical visitor profile	About evenly divided between GIT and FIT visitors. Primarily attracts younger, upper middle and middle income travelers from the West Coast and Canada.	Wide variety of visitors including both GIT and FIT guests, typically.	Comes entirely to affluent individual visitors who return annually.	Oriented to upper and middle income travelers and second homebuyers including both GIT and FIT travelers.

1/ Ibid.
 2/ Ibid.
 3/ Ibid.
 Sources: Compiled by John Child & Company, Inc. based on the Hawaii Resort Developer's Conference, Committee of Resort Development, 1985 and other published sources.

Exhibit III-1
Page 2

IV - HOTEL MARKET ASSESSMENT

This section reviews market trends in the hotel industry in the State of Hawaii and the Island of Oahu and assesses the market support for hotel development at Mokuleia in terms of anticipated occupancy and average room rates for the first five years of operation.

VISITOR ACCOMMODATIONS INVENTORY

Almost 96% of Hawaii's visitors stay in hotels or condominium units used as transient visitor accommodations. The inventory of visitor accommodations in Hawaii is described in terms of its current and planned size and composition. Oahu's existing and planned inventory is also discussed.

Current Inventory

Visitor accommodations in the State include hotel rooms and condominium units available for transient use. According to the Hawaii Visitors Bureau (HVB), 65,900 visitor accommodations in 485 visitor facilities exist in Hawaii, as shown in Exhibit IV-A. This inventory represents an increase of 140% since 1970, an increase of about 6% annually. Rooms on Maui grew the fastest at a rate of about 11.6% compounded annually, or about twice the rate experienced by the State as a whole. In comparison, the other counties experienced a visitor room growth of between 5% and 6% compounded annually.

Visitor accommodations on the neighbor islands have been significantly upgraded in recent years, primarily because of the expansion of facilities at existing and emerging master-planned resorts.

Composition of Existing Visitor Accommodations

Condominium units are becoming an increasingly important alternative to hotel rooms as visitor accommodations. Currently, about 21,800 condominium units, or 33% of the State's visitor units, are used by visitors. Molokai and Maui have the highest proportions of their condominium units, about 95% and 87%, respectively, used as visitor accommodations, as shown in Exhibit IV-B.

MOKULEIA
Visitor Rooms, State of Hawaii I/
1970 to 1985

Year	Counties				State
	Honolulu	Hawaii	Kauai	Maui	
1970	19,050	3,182	2,567	2,720	27,519
1975	25,428	5,386	3,145	6,018	39,977
1976	25,773	5,936	3,724	7,378	42,811
1977	27,827	6,051	3,868	8,397	46,143
1978	29,193	6,064	4,097	8,680	48,034
1979	31,411	6,056	4,064	9,654	51,185
1980	34,393	6,260	4,435	10,483	55,571
1981	33,366	6,839	4,832	11,245	56,502
1982	34,766	7,106	5,207	12,278	59,357
1983	34,378	7,368	4,475	12,680	58,901
1984	37,910	7,209	5,501	13,336	63,956
1985	38,600	7,511	5,656	14,152	65,919

Percent of state:
1970 69.2% 11.6% 9.3% 9.9% 100.0%
1985 58.6 11.4 8.6 21.5 100.0

Annually compounded percentage increase -
1970 to 1985 4.8 5.9 5.4 11.6 6.0

I/ Number of visitor units as of June of each year; includes condominium units.
Source: Hawaii Visitors Bureau, Annual Research Report, 1984 and Research Report, December 1985.

Exhibit IV-B

MOKULEIA
Condominium Units Used as
Visitor Accommodations
February 1985

<u>Island</u>	<u>Number of condominium units</u>	<u>Percent of total visitor units</u>
Oahu	9,016	23.42
Hawaii	2,279	30.3
Kauai	2,076	36.7
MauI	7,838	58.0
Molokai	595	94.9
Lanai	--	--
State	<u>21,804</u>	<u>33.12</u>

The rate of growth of condominium units has far exceeded that of hotel units. Over the past 15 years, the number of visitor accommodations has increased at an average annual rate of 4.2%. During the same period condominium units have increased by about 34%, and hotel and apartment units have increased by only about 1%.

The more rapid increase in condominium units in visitor use results from:

- Lower construction costs of condominium projects which typically have less extensive amenities and common areas as compared to hotels.
- Ability to finance condominium projects through the sale of units to individual investors and buyers.
- Tax benefits to individual investors and buyers.
- Increased recognition of the resort condominium as a visitor accommodation alternative.
- Competitive room rates.

Visitor Accommodations on Oahu

As of February 1985, 38,600 visitor units in 170 facilities on Oahu represented about 59% of the State's inventory. About 92% of these units are in the Waikiki and Ala Moana areas, as shown in Exhibit IV-C. This represents about 59% of the State's inventory. In contrast with other visitor regions on the neighbor islands, where visitor units are more widely distributed on the islands, the Honolulu, airport, Leeward and Windward Oahu areas include very few of the islands' visitor units.

In 1975 the Honolulu City Council created the Waikiki Special Design District which limits the number of hotel rooms in Waikiki to 30,000 units. This legislation has curtailed significant new visitor unit development in Waikiki and has given greater impetus to neighbor island development. The only significant addition to hotel units in Waikiki has been the redevelopment of the Halekulani Hotel and the construction of the Tapa Tower at the Hilton Hawaiian Village. Recently, the Council has discussed lifting this limit to encourage redevelopment in Waikiki and to allow additional hotel units to service a convention center.

Source: Hawaii Visitors Bureau, Visitor Plant Inventory, February 1985.

Exhibit IV-C

Planned Developments on Oahu

Excluding Mokualeia, 9,300 to 9,400 hotel and condominium units are currently planned in seven major developments on Oahu, as shown in Exhibit IV-D. About 7,800 units, or 84% of the total planned inventory, would be at Turtle Bay, West Beach, and Makaha resorts. These developments include four first-class or luxury hotels expected to be developed by the end of the decade. They include:

- Kawela Bay Hotel.
- Halekulani Hotel expansion.
- Proposed West Beach hotel.
- Yacht Harbor Plaza.

HISTORICAL OAHU HOTEL MARKET PERFORMANCE

This section reviews the historical market performance of Oahu visitor accommodations in terms of occupancy levels, average room rates and visitor room nights.

Hotel occupancy levels and average daily room rates are surveyed monthly by Pannell, Kerr, Forster (PKF). However, these surveys exclude several major hotel chains (such as Sheraton and Hilton) and, therefore, may distort actual industry averages. However, the PKF survey averages provide an indication of general occupancy levels and room rates.

Occupancy Levels

Occupancy levels on Oahu have continued to improve during the past six years. Occupancy levels increased from about 72% in 1980 to nearly 82% in 1985, as shown in Exhibit IV-E.

Since 1980, occupancy levels on Oahu have exceeded statewide occupancy levels by 3% to 7%. Occupancy levels are slightly higher outside Waikiki, primarily because of the smaller number of visitor units and a more discriminating market.

MOKULEIA
Distribution of Oahu Visitor Units
February 1985

<u>Area</u>	<u>Number</u>	<u>Percent</u>
Waikiki	33,879	87.82
Ala Moana	1,609	4.2
Honolulu	74	.2
Airport	693	1.8
Leeward Oahu	1,468	3.7
Windward Oahu	877	2.3
Total	<u>38,600</u>	<u>100.02</u>

Source: Hawaii Visitors Bureau, Visitor Plant Inventory, February 1985.

Exhibit IV-D

MOKULEIA
Major Proposed Hotel and Condominium Units on Oahu

	Location	Number of rooms	Development status
Turtle Bay Resort:	North Shore		First hotel design underway.
Hotel units		1,450	
Condominium units		2,063	
		3,513	
West Beach Resort:	Ewa	2,000	Construction to begin in late 1986.
Hotel units		2,000	
Condominium units		4,000	
Sheraton Makaha Resort and Country Club	Makaha	300 1/	Potential expansion.
Yacht Harbor Plaza Hotel and condominium units	Ala Moana	550-600	Anticipated to begin late-1986; hotel room configuration dependent upon number of condominiums.
Halekulani Hotel Hotel units	Waikiki	300	Expansion expected to be completed by October 1987.
Aloha Tower Hotel units	Downtown	400	First-class to luxury business hotel.
Laike	North Shore	250 1/	No development plans known.
Total planned units on Oahu		9,313-9,363	

N/A = Not available.

1/ Based on visit or unit limit specified in the special provisions of the development plan for the area.

Sources: Discussions with developers, filed environmental impact statements or other published sources.

Exhibit IV-E

MOKULEIA
Visitor Accommodations Occupancy Levels
State of Hawaii
1980 to 1985

Island	1980	1981	1982	1983	1984	1985
Oahu:						
Waikiki:						
On-beach	73.9%	72.1%	72.7%	74.7%	81.7%	79.3%
Off-beach (w/restaurant)	73.2	73.8	80.6	79.1	85.7	83.7
Off-beach (w/o restaurant)	66.5	76.1	80.1	74.4	73.8	80.4
Total Waikiki	71.7	73.9	77.7	76.6	82.6	N/A
Other Oahu	74.6	75.3	79.4	73.3	85.0	84.5
Total Oahu	72.3	74.1	77.8	75.8	81.2	81.5
Hawaii	51.0	44.9	44.0	44.7	55.6	57.6
Maui	73.0	70.3	73.9	75.2	80.5	78.5
Kauai	69.6	62.7	57.5	57.2	63.0	64.8
State	69.3	68.3	70.4	69.7	76.0	76.1

N/A = Not available.

Note: Data presented excludes several major hotels which are not surveyed.

Source: Parnell, Kerr, Forster. Trends in the Hotel Industry, monthly.

Average Room Rates

Average room rates achieved by Oahu hotels have been 83% to 90% of average statewide room rates since 1980, as shown in the following table:

	Average Daily Room Rates Oahu and State of Hawaii 1980 to 1985		Oahu as a Percent of State
	Oahu	State of Hawaii	
1980	\$42.70	\$47.37	90.1%
1981	43.05	49.73	86.7
1982	44.88	51.87	86.5
1983	46.93	54.78	85.7
1984	49.45	59.25	83.5
1985	58.29	70.24	83.0

Source: Pannell, Kerr, Forster.

The differential between Oahu and statewide daily room rates is increasing. Oahu room rates could be expected to decline even further unless newer and higher-quality visitor facilities are developed.

Average Daily Room Demand

Average daily room demand is estimated based on the occupancy rates experienced by Oahu hotels and the number of visitor units. Since 1982, average daily room demand is estimated to have increased at a rate of about 5.3% per year, from 27,000 room nights in 1982 to 31,500 in 1985, as shown in the following table:

	Visitor Room Nights on Oahu 1982 to 1985			
	1982	1983	1984	1985
Visitor room inventory	34,766	34,378	37,910	38,600
Average annual occupancy rate	77.8%	75.8%	81.2%	81.5
Visitor room nights	27,000	26,100	30,800	31,500

PROJECTED OAHU ROOM REQUIREMENTS

The number of visitor rooms on Oahu which are required to serve as visitor accommodations to island visitors are projected in the following section. The major assumptions used in projecting visitor room demand and unit requirements, shown in Exhibit IV-F, are discussed as follows.

Visitors to Oahu:

Number of westbound and eastbound visitors staying overnight or longer, as shown previously in Section III.

Percent using commercial accommodations:

Proportion of visitors using visitor accommodations, including hotels and condominiums. About 90% of all westbound and 96% of all eastbound visitors are assumed to use visitor accommodations.

Average length of stay:

Visitor stay projected to increase marginally based on historical patterns on Oahu and in the State since 1970. Average stay is assumed to increase to 6.2 days by the year 2005 for westbound visitors and remain about 1.7 days for the shorter staying eastbound visitors.

Average persons per room:

Based on data provided by the HVB regarding average party size. Average party size has increased slightly since 1970 and is assumed to stabilize at 1.9 persons for westbound and 1.7 persons for eastbound visitors.

Based on these assumptions, daily visitor room demand is estimated to increase by nearly 50% between 1985 and 2005 from 31,000 units to 46,000 units, as shown in Exhibit IV-F.

Over the long-term, a stabilized occupancy level between 75% and 80% is considered an appropriate and financially feasible balance between the supply and demand for visitor units. As a result, the total number of visitor units on Oahu required to meet the projected demand is estimated at about 57,500 rooms by 2005 assuming an 80% occupancy level, and 61,300 rooms assuming a 75% occupancy level, as shown in Exhibit IV-G.

HONOLULU
Historical and Projected Visitor Room Demand for Oahu
1980 to 2005

	Westbound					Eastbound 3/					Total daily visitor room demand
	Visitors	Percent using commercial accommodations	Average length of stay 1/	Average persons per room	Average daily visitor room nights 2/	Visitors	Percent using commercial accommodations	Average length of stay	Average persons per room	Average daily visitor room nights 2/	
Historical:											
1980	2,398,740	87.62	6.1	1.8	19,648	884,819	98.42	3.5	1.6	5,218	24,866
1981	2,398,480	88.7	5.7	1.8	18,590	956,953	98.3	3.9	1.6	6,282	24,872
1982	2,589,190	89.4	5.9	1.8	20,834	960,539	97.9	4.1	1.7	6,214	27,048
1983	2,591,635	87.9	5.8	1.8	20,247	967,140	95.6	3.9	1.7	5,811	26,059
1984	2,901,320	88.7	6.1	1.8	24,002	1,128,529	95.6	3.9	1.7	6,781	30,783
1985	2,951,600	89.0	6.0	1.8	24,000	1,155,000	96.0	3.9	1.7	7,000	31,000
Projected:											
1990	3,345,800	90.0	6.1	1.9	26,500	1,573,600	96.0	4.0	1.7	9,700	36,200
1995	3,775,300	90.0	6.2	1.9	30,400	1,767,700	96.0	4.0	1.7	10,900	41,300
2000	4,054,000	90.0	6.2	1.9	32,600	1,910,200	96.0	4.0	1.7	11,800	44,400
2005	4,200,800	90.0	6.2	1.9	33,800	1,964,100	96.0	4.0	1.7	12,200	46,000

1/ Estimated based on historical room nights demand.
 2/ Estimated based on visitor arrivals multiplied by the percent utilizing hotels and average length of stay divided by the average number of persons per room divided by 365 days.
 3/ Historical eastbound visitor characteristics based on characteristics of Japanese visitors to Hawaii as reported by the Hawaii Visitors Bureau.
 Source: John Child & Company, Inc.

Exhibit IV-F

HONOLULU
Projected Visitor Rooms Required on Oahu
1985 to 2005

Year	Total daily visitor room demand	75% Occupancy			80% Occupancy		
		Rooms required	Existing inventory	Quantitative additions required	Rooms required	Existing inventory	Quantitative additions required
1985	31,000	41,300	38,600	2,700	38,800	38,600	200
1990	36,200	48,300	38,600	9,700	45,300	38,600	6,700
1995	41,300	55,100	38,600	16,500	51,600	38,600	13,000
2000	44,400	59,200	38,600	20,600	55,500	38,600	16,900
2005	46,000	61,300	38,600	22,700	57,500	38,600	18,900

Source: John Child & Company, Inc.

Exhibit IV-G

The projections support between 18,900 and 22,700 additional visitor units between 1985 and 2005. These estimates of additional room requirement are in excess of the units currently planned. Assuming successful completion of those additions outlined in Exhibit IV-D, a need for about 9,500 to 13,300 new units is projected by 2005.

MARKET ASSESSMENT FOR HOTEL DEVELOPMENT AT MOKULEIA

This section assesses the potential for hotel development at Mokuleia in terms of factors that could affect hotel development, market support for hotels, and the recommended type, quality, and size of the hotels. In addition, anticipated occupancy and average room rates are projected for the first five years of operations.

Factors Affecting Development

Successful hotel development at Mokuleia is dependent on the hotel's ability to become established as attractive and competitive visitor destinations in the State of Hawaii.

The competitive position of hotel development at Mokuleia can be enhanced through the creation of a planned community. Factors which could differentiate Mokuleia from existing resorts and lead to successful hotel development include:

- Unique Location on Oahu - A community located at Mokuleia would be readily accessible to and from Waikiki, the Honolulu central business district and other population centers around the island. It would be planned to take advantage of the oceanfront and the unique, rural environment of the area.
- Range of Recreational Opportunities - Onsite activities could include golf, hiking, horseback riding, camping and tennis. A polo field could possibly be included among these amenities. Available water sports would be swimming, surfing, windsailing and boating.

Anticipated Market Segments

Hotels at Mokuleia could attract both local residents and off-island visitors because of the following factors:

- Proposed recreational facilities, including a 36-hole golf course, would attract and support visitors who seek a variety of onsite facilities.

- Proximity of the property relative to Waikiki and other major points of interest on the island provides expanded recreational and cultural alternatives not found in similar resorts on the outer islands.

- Its location to shopping, dining and other affordably-priced recreational opportunities in the North Shore area would provide added attractions to the anticipated market segment.

The anticipated market segments for hotel development at Mokuleia are described as follows:

- Free Independent Travelers (FITs) - This segment includes middle-class repeat visitors to the State who seek a quality environment in a new setting that offers extensive recreational facilities and amenities.
- Meeting and Conference Groups - This segment includes small- to medium-sized groups who seek a range of recreational opportunities to complement their business activities. Occupationally, this group could be expected to include mid-level corporate managers, professionals and successful entrepreneurs.
- Island and State Residents - This segment includes local residents who would take advantage of the facilities for short periods of time, especially during weekends and holidays. Given appropriate marketing, this segment may also overlap with the meeting and conference group market described above.

Market Share

The supportable hotel rooms depends on a hotel's market position in relationship to the overall room demand. Achieved market capture rates are related to:

- Market segments attracted.
- Relative size of the visitor room demand.
- Perceived attractiveness of the facility and the quality and range of amenities provided.
- Competitive strength of other established resorts.
- Maturity of the hotel developments and their reputation.

MOKULEIA
Estimated Market Share of Visitor
Room Nights at Selected Hawaii Resorts
1984

	Estimated visitor room nights 1/	Island market share
Oahu:	28,810	93%
Waikiki/Kahala 2/	890	3
West Beach/Leeward 2/	680	2
North Shore/Koolauloa 2/	400	2
Other (airport, downtown, etc.)	30,780	100%
Hawaii:	1,060	26%
Kesuhou Resort	1,450	34
Kailua-Kona	830	20
Mauna Kea/Hauna Lani/Waikoloa 2/	820	20
Hilo/Ka'u/Volcano	4,160	100%
Maui:	4,320	41%
Kaanapali Beach Resort	2,430	23
Napili/Honokowai/Lahaina	220	2
Kapalua	820	8
Wailea	2,270	22
Kihei/Maalaea	400	4
Kahului/Wailuku/Hana/Kula	10,460	100%
Kauai:	530	15%
Princeville	1,060	31
Poipu/Kalaheo/Kokee	1,870	54
Wailua/Kapaa/Lihue	3,460	100%

Visitor room demand on Oahu is dominated by Waikiki hotels and condominium units, estimated to capture about 93% of the market. The market shares of neighbor island resort areas are more evenly distributed. Newest resorts on the Island of Hawaii (primarily Waikoloa, Mauna Lani and Mauna Kea) have been able to achieve 5% to 8% of the market.

Estimated market capture rates for major visitor destination resorts have varied from 2%, as at Kapalua Resort, to 41%, at Kaanapali Beach Resort. Of the total room demand on the neighbor islands, as shown in Exhibit IV-H.

Because future resort development on Oahu will be relatively small compared to the established area of Waikiki, it is likely that the market capture rate for a hotel at Mokuleia will be lower than that for new resort development on the neighbor islands with a less dominant resort area.

Waikiki is expected to continue to dominate the Oahu visitor accommodations industry. However, as master-planned resort developments in areas outside Waikiki emerge, Waikiki's share could be expected to decline from its current level at about 93% to about 75% by 2005. The shift in market share distribution would result from:

- Limited amount and availability of suitable development sites in Waikiki.
- Development and maturation of resort destinations outside Waikiki.
- Trend in visitor preference for recreation-oriented vacation in integrated resort communities.

The North Shore/Koolauloa area currently captures about 22% of the Oahu room demand. Based on the plans for expansion at the Turtle Bay Resort and the proposed development plan for Mokuleia, the North Shore is projected to capture a 12.5% market share of room demand on Oahu, as shown in the following table. This market share would be similar to the market share achieved by the Wailea in comparison to the Kaanapali on Maui.

Potential Market Share Distribution
of Oahu Visitor Units

	1984	1995	2005
Waikiki/Kahala	93.0%	87.5%	75.0%
West Beach/Leeward	3.0	4.5	10.0
North Shore/Koolauloa	2.0	6.0	12.5
Other (airport, downtown, etc.)	2.0	2.0	2.5
	100.0%	100.0%	100.0%

1/ Estimated based on the number of visitor units as reported by the Hawaii Visitors Bureau and the occupancy rate for the areas based on surveys conducted by John Child & Company, Inc. Smaller resorts have been combined with larger regions to preserve confidentiality of occupancy rates of individual facilities.

2/

Supportable Hotel Rooms on Oahu

The anticipated supply and demand relationships for visitor units on Oahu, comprised of hotel rooms and condominium units, were discussed earlier in this section. Based on the analysis, the visitor industry could be expected to require about 18,900 to 22,700 additional rooms by 2005. This represents a requirement of 9,500 to 13,300 rooms in addition to the inventory which is currently being planned for Oahu.

Hotels are expected to continue to account for about 70% of total demand for visitor rooms on Oahu. At the assumed occupancy levels, the number of supportable hotel rooms on Oahu is projected to range between 40,300 to 42,900 rooms by 2005, as shown in Exhibit IV-1.

Supportable Hotel Rooms at Mokuleia

Based on the proposed development concept, Mokuleia could achieve a market capture rate of about 1.5% in 1990, increasing to 5% by 2005. At these estimated market capture rates, the number of supportable hotel rooms at Mokuleia is projected to increase from about 500 units in 1990 to between about 2,000 and 2,200 in 2005, as shown in Exhibit IV-J.

Recommended Hotel Development

The recommended hotel development for Mokuleia would include oceanfront resort-type hotels and possibly a village hotel and conference center hotel. The village hotel and conference center hotel could be mauka of Farrington Highway. They could be planned as follows.

Oceanfront Hotels

Four or five resort-type hotels could be designed to maximize the scenic ocean views and minimize any adverse influences on the neighboring developments. Each hotel could provide between 400 to 500 rooms. The hotels could be activity-oriented and offer a broad range of onsite recreational and entertainment opportunities.

MOKULEIA
Projected Hotel Room Requirement on Oahu

Year	75% Occupancy			80% Occupancy		
	Required visitor units	Hotel room percentage	Required hotel units	Required visitor units	Hotel room percentage	Required hotel units
1990	48,300	70%	33,800	45,300	70%	31,700
1995	55,100	70	38,600	51,600	70	36,100
2000	59,200	70	41,400	55,500	70	38,900
2005	61,300	70	42,900	57,500	70	40,300

Source: John Child & Company, Inc.

Village Hotel

A hotel mauka of Farrington Highway with a thoughtful design could result in a low-density village atmosphere. Extensive interior landscaping and waterways could partially compensate for the lack of ocean frontage and limited ocean views. The hotel could provide a relaxed and slow-paced environment for those visitors seeking a less hectic vacation experience than that of Waikiki.

Conference Center Hotel

The conference center could cater to the small- to medium-sized convention/association meeting groups and corporate incentive groups. The hotel could include meeting and conference rooms, audio/visual and telecommunications facilities, pavilions, and banquet halls in a low-rise configuration. Onsite recreational facilities including swimming pools and jacuzzis, racquet sports, and health center would enhance the facility by providing active alternatives to more business-like meeting rooms.

Year	75% Occupancy			80% Occupancy		
	Required hotel units	Market share	Supportable hotel rooms at Mokuleia	Required hotel units	Market share	Supportable hotel rooms at Mokuleia
1990	33,800	1.5%	510	31,700	1.5%	480
1995	38,600	3.0	1,160	36,100	3.0	1,080
2000	41,400	4.0	1,660	38,900	4.0	1,560
2005	42,900	5.0	2,150	40,300	5.0	2,020

Source: John Child & Company, Inc.

MOKULEIA
Projected Supportable Hotel Rooms

V - CONDOMINIUM APARTMENT MARKET ASSESSMENT

This section reviews development trends in the condominium market. It identifies projects in similar settings on Oahu, Maui, Hawaii, and Kauai and assesses their characteristics and recent market performance, and projects the market support and orientation for condominium development at Mokuleia.

DEVELOPMENT OVERVIEW

The location and recreation orientation of Mokuleia is unlike any existing area in Hawaii. The developments envisioned could incorporate land uses and amenities similar to major resort destination areas on the neighbor islands. However, the Oahu location offers greater accessibility to Oahu residents. In addition, Mokuleia has traditionally been noted for its variety of recreational facilities.

General trends in the condominium market and for specific resort condominium developments are reviewed below.

General Condominium Development

Condominium development in the State experienced significant growth from 1973 to 1975 and between 1979 and 1980, as shown by private multi-family housing authorizations in Exhibit V-A.

New condominium development has been relatively restrained during the past four to five years. The average permit value of private multi-family unit authorizations statewide and on Oahu has declined since 1981, reflecting a shift from the construction of higher-priced condominiums to the construction of lower-priced primary housing.

The market for lower-priced primary housing is expected to remain the most active segment of the condominium market in the near term. Buyers in the market for higher-priced condominium units have become more sophisticated and discriminating. Faced with limited prospects for significant short- or intermediate-term appreciation, these buyers are evaluating properties on the basis of their "value in use" or their capacity to generate income.

MOKULEIA
Private Multi-Family Housing Authorizations
for the State and Oahu
1970 to 1984

Year	State		Oahu	
	Number of units	Average value ^{1/}	Number of units	Average value ^{1/}
1970	5,241	\$20,913	4,172	\$22,537
1971	5,788	17,234	4,087	18,068
1972	9,356	17,834	7,265	18,179
1973	12,374	21,064	10,057	21,077
1974	15,474	25,101	11,534	24,320
1975	7,269	34,083	4,352	35,628
1976	3,560	32,144	3,198	31,630
1977	3,193	36,100	2,473	34,712
1978	4,657	41,357	2,371	39,730
1979	4,989	50,536	1,988	43,375
1980	6,758	73,544	3,411	65,756
1981	3,321	76,797	1,915	70,674
1982	3,070	50,071	2,585	45,231
1983	1,479	66,815	1,280	51,130
1984	1,280	48,938	1,054	39,521

^{1/} Value of permits for new construction in thousands, in current dollars.

Source: Bank of Hawaii, Construction in Hawaii, 1985.

Condominium Apartment Development

Condominium apartment development is a special type of multi-family development and is usually relatively high quality and often located in or near resort areas.

Currently, about 21,800 condominium units, representing about 33% of the State's visitor units, are used as visitor accommodations, as shown in Exhibit V-B.

COMPARABLE PROJECT ANALYSIS

Condominium projects in resort areas on Oahu, Maui, Hawaii and Kauai were selected for review and analysis to assess the market support for condominium development at Mokuleia.

This section first identifies and describes projects considered comparable to those envisioned for Mokuleia, and then analyzes the characteristics and recent market performance of the selected projects as a basis for the condominium market assessment for Mokuleia.

Identification of Comparable Projects

The developments envisioned for Mokuleia could be expected to appeal to residents and visitors seeking an active recreational environment. For purposes of comparison, 30 similar condominium projects were studied. Selection was based on the following criteria:

- Projects in rural locations on Oahu.
- Projects in or near master-planned resort areas on the neighbor islands.

Based on the selection criteria, projects were selected from:

- Kullima, Makaha, Mokuleia, Kasawa, and Punahuu (Oahu).
- Kaanapali, Wailea, Makana, and Kihei (Maui).
- Keauhou (Hawaii).
- Princeville (Kauai).

The selected projects are shown in Exhibit V-C.

HOKULEIA
Condominium Units Used as
Visitor Accommodations
February 1985

	Number	Percent 1/
Oahu	9,016	23.0%
Hawaii	2,279	30.3
Kauai	2,076	36.7
Maui	7,838	58.0
Molokai	595	94.9
Lanai	-	-
State	21,804	33.1%

1/ Condominium units as a percent of total visitor units.
Source: Hawaii Visitors Bureau, Visitor Plant Inventory, February 1985.

Exhibit V-C

HOKULEIA
Development Characteristics of
Selected Condominium Projects

Project name	Site location	Year built	No. of units	Site orientation
Rural Oahu:				
Kuilima:				
Kuilima Estates West	Kuilima	1973	199	Golf-front
Kuilima Estates East	Kuilima	1975	167	Golf-front
Other Oahu:				
Kaawa Village	Kaawa	1974	86	Ocean view
Pat's At Punaluu	Punaluu	1974	142	Oceanfront
Haleiwa Surf	Haleiwa	1973	51	Oceanfront
Korone Kai	Hokuleia	1980	45	Oceanfront
Hokuleia Beach Colony	Hokuleia	1966	52	Oceanfront
Hawaiian Princess At Makaha Beach	Makaha	1980	127	Oceanfront
Subtotal			869	
Island of Maui:				
Kaanapali:				
Kaanapali Alili	Kaanapali	1982	264	Oceanfront
Kaanapali Royal	Kaanapali	1980	105	Golf-front
Masters At Kaanapali, Phase I	Kaanapali	1986	93	Golf-front
Wailea:				
Wailea Ekahi I	Wailea	1975	100	Oceanfront
Wailea Ekahi II	Wailea	1976	90	Oceanfront
Wailea Ekahi III	Wailea	1976	104	Oceanfront
Wailea Ekolu	Wailea	1979	148	Golf-front
Wailea Elua IA	Wailea	1976	54	Oceanfront
Wailea Elua IB	Wailea	1978	32	Oceanfront
Wailea Elua II	Wailea	1980	66	Oceanfront
Other Maui:				
Cascades	Kihel	1986	52	Interior
Makana Surf	Makana	1983	184	Oceanfront
Folo Beach Club	Makana	1982	71	Oceanfront
Subtotal			1,363	
Island of Hawaii:				
Country Club Villas	Keauhou	1979	116	Golf-front
Kanaloa At Keauhou I (Fairway)	Keauhou	1981	62	Golf-front
Kanaloa At Keauhou II (Ocean)	Keauhou	1982	50	Oceanfront
Kanaloa At Keauhou III (Bay)	Keauhou	1982	54	Oceanfront
Keauhou Gardens	Keauhou	1981	112	Golf-front
Keauhou Punahale I	Keauhou	1979	48	Golf-front
Keauhou Punahale II	Keauhou	1980	45	Golf-front
Subtotal			487	
Island of Kauai:				
Cliffs At Princeville	Princeville	1980	202	Oceanfront
Hawalei Bay Villas	Princeville	1974	37	Golf-front
Subtotal			239	
Total			<u>2,958</u>	

Source: Hawaii TRK Service, Condominium Guide, 1980-81, 1980 and John Child & Company, Inc.

Location

Condominium developments are typically located to offer attractive and desirable views and surroundings. These locational attributes are described, in order of desirability, as follows:

- Oceanfront - Ocean frontage is normally the most attractive view location, as it usually provides a highly desired view and access to the ocean and beaches.
- Ocean view - Sites with ocean views normally provide the next most desirable location following ocean frontage.
- Golf-front - Golf-front sites are attractive because they provide an unobstructed view over a well maintained, landscaped area but they are usually less desirable than sites providing ocean frontages or views.
- Interior - Interior locations are the least desirable.

About 46% of the units in the selected projects provide either ocean frontage or ocean views, as shown in Exhibit V-D. In comparison, about 27% of the units have golf course frontage; interior units also account for about 27% of the units considered.

Project Density

Project density is a general indicator of the amount of the open space and privacy available to individual units. The average project density for the selected projects is about 12 units per acre, as shown in Exhibit V-E.

Average densities at the selected projects range from about 8 units per acre at Wailea and Princeville to about 23 units per acre at Makaha, Hokeleia, Punaluu and Kaawa. Selected projects at Kullima, Wailea, and Keauhou typically achieve densities of 10 to 20 units per acre and include low-rise detached buildings in a townhouse configuration.

Unit Mix

The majority of projects primarily include one- and two-bedroom units, as shown in Exhibit V-F. About 47% of the condominium units have one bedroom and about 43% have two bedrooms. Only 32% of the inventory is composed of studio units and the remaining 7% of the units have three or more bedrooms.

The majority of the studio units are located on Oahu while most three-bedroom units are on Maui or in Keauhou, on the island of Hawaii.

MOKULEIA
Development Densities of Selected Projects

	Land area (acres)	Number of units	Units per acre
Rural Oahu:			
Kuilima	32	366	11
Other	21	503	23
Subtotal	53	869	16
Mau:			
Kaanapali	31	462	15
Wailea	75	594	8
Other	21	307	15
Subtotal	127	1,363	11
Hawaii	40	487	12
Kauai	28	239	8
Total	248	2,958	12

Source: Hawaii TRK Service, Condominium Guide 1980-81, 1980 and John Child & Company, Inc.

MOKULEIA
View Orientation of Selected Projects

Number of Units	Ocean- front	Ocean view	Golf- front	Interior	Total
Rural Oahu:					
Kuilima	0	0	290	76	366
Other	372	126	0	36	535
Total	372	126	290	112	901
Mau:					
Kaanapali	40	164	135	123	462
Wailea	36	81	73	400	594
Other	151	92	0	64	307
Total	227	337	208	587	1,363
Keauhou	44	95	280	69	487
Princeville	64	84	37	54	239

Percent of Units	Ocean- front	Ocean view	Golf- front	Interior	Total
Rural Oahu	41%	14%	32%	13%	100%
Mau	17%	25%	15%	43%	100%
Keauhou	9%	20%	58%	13%	100%
Princeville	27%	35%	16%	22%	100%
Total	24%	22%	27%	27%	100%

Source: Hawaii TRK Service.

Exhibit V-F

MOKULEIA
Unit Mix of Selected Projects

	Studio	One-bedroom	Two-bedroom	Three-bedroom	Total
Rural Oahu:					
Kuilima	44	252	56	16	368
Other	30	408	85	6	529
Subtotal	74	660	141	22	897
Maui:					
Kaanapali	0	130	281	51	462
Hailea	22	291	244	16	573
Other	0	24	257	26	307
Subtotal	22	445	782	93	1,342
Keauhou	0	96	318	73	487
Princeville	0	194	37	8	239
Total	96	1,395	1,278	196	2,965

Unit Size

Unit sizes for one- and two-bedroom units at the projects considered typically range from 500⁺ to 1,800⁺, as shown in Exhibit V-G. The average unit size for studio units range from 400⁺ to 600⁺ while units with three or more bedrooms range in size from about 1,200⁺ to 2,300⁺.

The larger units are generally found in the higher-quality projects such as Kaanapali Alili, Mailea Elua, Keauhou Gardens, and Kanaloa At Keauhou. Such projects are targeted at a segment of the market that prefers spaciouly-designed units in high-quality settings.

Project Amenities

The projects generally offer a recreation center and at least one swimming pool or front along a beach suitable for swimming. Other amenities provided at these projects include whirlpools, saunas, tennis courts, barbecue areas, and extensive landscaping.

MARKET PERFORMANCE OF COMPARABLE PROJECTS

This section reviews the recent market performance of the selected condominiums in terms of sales absorption, prices, buyer profiles, and buyer motivation.

Sales Absorption

Sales and resales of units in the condominium projects studied were surveyed over a seven-year period from 1979 through 1985. Sales rates during this period, particularly between 1980 and 1983, were significantly affected by national and international economic conditions and atypically high mortgage rates. During this period, about 1,900 units in the selected projects were sold and/or resold, as shown in Exhibit V-H.

The nine selected projects in rural Oahu have averaged 86 sales and/or resales per year since 1979. Kuilima Estates East and West have accounted for nearly 40% of the sales activity.

Nearly 3,500 units in 31 condominium projects are in rural Oahu, including nine projects considered most comparable to those envisioned for Mokuleia. Since 1979, these 31 projects have averaged 300 sales per year, as shown in Exhibit V-I. The nine selected projects account for about 29% of total sales in all 31 condominium projects in rural Oahu.

Source: Hawaii TRK Service, Condominium Guide 1980-81, 1980 and John Child & Company, Inc.

Exhibit V-C

MOKULEIA
Typical Apartment Sizes of Selected Projects
(in Net Interior Area)

Project name	Studio		One-Bedroom		Two-Bedroom		Three-Bedroom	
	Low	High	Low	High	Low	High	Low	High
Oahu:								
Haleiwa Surt			660	660	837	917		
Hawaiian Princess At Makaha Beach			535	880			1,245	1,245
Konane Kai			893	893	1,199	1,546		
Kuiliua Estates East	542	599	658	738	1,072	1,072		
Kuiliua Estates West	459	459	658	738	1,072	1,152	1,394	1,394
Makua Village	381	381	519	519	757	757		
Mokuleia Beach Colony			792	792				
Pat's At Punahou			378	901	1,230	3,600	1,620	1,772
Sunset Shores					860	981		
Mau:								
Cascades			572	572	852	1,085		
Kaanapali A111			1,173	1,459	1,523	1,678	1,636	1,643
Kaanapali Royal					1,462	1,580		
Makana Surf					1,038	1,627	1,640	1,640
Platters At Kaanapali, Phase I			956	1,150	1,325	1,825	2,281	2,281
Folo Beach Club					1,186	1,321		
Mailea Ekahi I	484	484	792	991	1,172	1,575		
Mailea Ekahi II			792	991	1,001	1,133	1,575	
Mailea Ekahi III	484	484	792	991	1,172	1,575		
Mailea Ekolu			866	869	1,060	1,489		
Mailea Elua IA			891	891	1,259	1,416	1,609	1,749
Mailea Elua IB			740	955	1,269	1,269	1,568	1,569
Mailea Elua II			997	1,041	1,347	1,536	1,701	1,701
Keauhou:								
Country Club Villas					1,000	1,271		
Kanaloa At Keauhou I (Fairway)			1,016	1,104	1,282	1,500	1,537	1,537
Kanaloa At Keauhou II (Ocean)			1,016	1,104	1,486	1,571	1,696	1,696
Kanaloa At Keauhou III (Bay)			1,016	1,104	1,486	1,500	1,696	1,696
Keauhou Gardens			1,401	1,101	1,527	1,527	1,953	1,953
Keauhou Parabele I					1,197	1,242	1,192	1,242
Keauhou Parabele II					1,197	1,242	1,197	1,242
Princeville:								
Cliffs At Princeville, The			917	963			1,864	1,864
Lanalei Bay Villas					960	1,248		

Source: Hawaii TRK Service, Condominium Guide, 1980-81, 1980 and John Child & Company, Inc.

Exhibit V-H

MOKULEIA
Annual Sales in Selected Condominium Developments
1979-1985

Project	Total sold	Average Annual Sales	
		1979-1985	1981-1985
Rural Oahu:			
Kuiliua	223	32	22
Other	376	54	32
Subtotal	599	86	55
Mau:			
Kaanapali	304	51	39
Mailea	501	72	51
Other	93	31	31
Keauhou	197	28	24
Princeville	216	31	25
Subtotal	1,311	187	158
Total	1,910	273	212

Source: Hawaii TRK Service and John Child & Company, Inc.

Exhibit V-I

HOKULEIA
Total Annual Condominium Sales in Rural Oahu
1979-1985

	<u>Projects</u>	<u>Units</u>	<u>Total Sales</u>	<u>Average Annual Sales</u>	
				<u>1979-1985</u>	<u>1981-1985</u>
Koolauloa	7	801	459	66	42
North Shore	12	402	272	39	27
Makaha	12	2,291	1,366	195	119
Total	31	3,494	2,097	300	188

The recent decline in mortgage rates is anticipated to benefit the real estate market through increased affordability. Locations, Inc. has estimated that the number of households who can now qualify to purchase the average priced Oahu property has nearly doubled over the past year, increasing from 40,000 households in 1985 to 70,000 in 1986. 1/ As a result, future absorption rates are expected to be greater than experienced over the past three to four years.

The absorption rate for new sales and resales differ because of differences in the level and intensity of the respective marketing approaches. Projects in an initial marketing phase typically have a coordinated marketing program targeted at specific buying groups. Individual unit owners typically lack or are unwilling to provide the resources to compete on a marketing level with the newer projects.

Exhibit V-J illustrates the initial marketing period for selected projects offered for sale between 1975 and 1985.

The shortest marketing periods and the greatest number of units sold occurred in 1975 and 1979, when selected projects achieved annual sales of 100 to 200 units. Since 1980, sales rates have declined, currently averaging between 20 and 35 units per year.

Initial annual sales rates in rural Oahu and the selected neighbor island resort areas range from 30 to 93 units per year, and average about 50 units per year, as shown in Exhibit V-K.

Sales by View Orientation

View orientation has significantly affected the sales absorption of condominium units. The average marketing period and average annual sales of an expanded list of resort condominium projects by view orientation is presented in Exhibit V-L. Effects of real estate sales cycles and the timing of the projects' first offering on the market are excluded from this analysis.

As shown in the exhibit, oceanfront condominium units have experienced the fastest sales, with an average absorption of 92 units annually. Ocean view projects, many of which also have golf course frontage (particularly those at Kapalua and Wailea Resorts), had the second highest average annual sales with 64 units. Golf course and interior lots had average annual sales rates of 51 and 58 units, respectively.

Source: Hawaii TRK Service and John Child & Company, Inc.

1/ Locations, Inc. Special Report, March 1986.

Exhibit V-J

HOKULEIA
Market Time for Selected Condominium Projects

Year first offered	Project	Number of units sold	Marketing period (years)	Average annual sales
1975	Wailea Ekahi I	100	1.0	100
	Wailea Ekahi II	90	0.5	180
1976	Wailea Ekahi III	104	1.0	104
	Wailea Elua I	34	1.5	36
1977	Wailea Elua IB	32	1.5	22
1978	Wailea Ekolu	148	2.0	74
	Country Club Villas I & II	116	1.0	116
	Keauhou Punahete	48	0.5	96
1979	Hawaiian Princess At Hakaha	127	1.0	127
	Wailea Elua II	65	4.0	17
	Kaanapali Royal	105	0.5	210
	Kanaloa At Keauhou, Phase I	62	0.5	124
1980	Konane Kai	44	2.0	22
	Kaanapali Allii	120	6.0	20
1982	Makena Surf, Phase I	86	2.5	34
1985	Cascades	20	1.0	20

Source: Discussions with realtors or representatives of the respective projects.

Exhibit V-K

HOKULEIA
Market Time by Location of Selected Condominium Projects

Project	Units sold	Marketing period (years)	Average annual sales
Rural Oahu	171	3.0	57
Neighbor Island Resorts:			
Wailea	593	11.5	52
Kaanapali	225	6.5	35
Other Maui	106	3.5	30
Keauhou	326	3.5	93
Total	1,250	25.0	50

Source: John Child & Company, Inc.

Exhibit V-L

MOKULEIA
Sales Absorption by View Orientation
at Selected Resort Condominium Projects

Project	Number of units sold	Marketing period (years)	Average annual sales
Oceanfront projects:			
Kaanapali:			
Whaler at Kaanapali	360	0.5	720
Kaanapali Alili	120	6.0	20
Kapalua:			
Bay Villas	141	0.5	282
Ironwoods	40	0.5	80
Wailea:			
Wailea Ekahi I	100	1.0	100
Wailea Elua IA	34	1.5	36
Hana Lani:			
Hana Lani Terrace	79	3.0	27
Hana Lani Point	16	1.0 1/2	16
Total or average	1,054	14.0	75
Ocean view projects:			
Kaanapali:			
Kaanapali Plantation	61	3.0	20
Kapalua:			
Golf Villas	186	0.5	372
The Ridge	161	0.5	322
Wailea:			
Wailea Ekahi II	90	0.5	180
Wailea Ekahi III	104	1.0	104
Wailea Elua IB	32	1.5	22
Wailea Elua II	65	4.0	17
Wailea Point	34	1.0 1/2	34
Total or average	733	12.0	61
Golf-front projects:			
Kaanapali:			
International Colony Club I	22	1.0	22
International Colony Club II	22	1.5	15
Hana Eldorado I	44	0.5	88
Hana Eldorado II	162	4.5	36
Kaanapali Royal	105	0.5	210
Wailea Ekolu	148	2.0	74
Total or average	503	10.0	50

1/ Units sold over a ten-month period.
 Source: Discussions with realtors or representatives of the respective projects.

Sales Prices

Statewide condominium unit sales prices escalated dramatically from 1979 to 1981 as investment speculation increased. Prices declined in 1982 and 1983 as interest rates soared and national and international economic conditions worsened. Prices have readjusted and have remained stable since 1984.

Exhibit V-M illustrates a price mix of all units sold in the selected condominium projects since 1979. The units on Oahu were the least expensive, with nearly 92% of the units sold priced below \$150,000. By contrast, the apartments in Makana Surf and those at Kaanapali were the most expensive, with about 75% to 85% of the units sold priced above \$300,000.

Price variations primarily result from differences in:

- Location.
- Frontage (ocean/golf course/interior).
- Unit size.
- Quality and design characteristics.
- Age and condition.
- Land tenure.

Apartment prices currently average between \$100 and \$300 per square foot of interior area, shown as follows.

Location	Average Sales Prices per Square Foot 1/ 1984-1985
Rural Oahu	\$110 to \$120
Hana	
Kaanapali	250 to 300
Wailea	230 to 250
Other	200 to 300
Keauhou Resort	140 to 150
Princeville	100 to 130

1/ Hawaii TRK Service and John Child & Company, Inc.

Exhibit V-M

MOKULEIA
Distribution of Condominium Unit
Sales Prices at Selected Projects
1979-1986

Apartment sales prices:	Under \$100,000	\$100,000 - \$149,000	\$150,000 - \$199,000	\$200,000 - \$299,000	\$300,000 - \$399,000	Over \$400,000	Total
Resorts:							
Kuilima	712	252	42	02	02	02	1002
Kaanapali	0	1	3	23	11	63	100
Wailea	1	8	24	42	16	9	100
Keauhou	1	16	35	45	3	0	100
Princeville	4	49	39	7	3	0	100
Resort sales	16	19	21	24	7	14	100
Nonresorts:							
Oahu	63	21	11	6	0	0	100
Hauai	0	0	0	17	44	40	100
Nonresort sales	49	17	8	8	9	8	100
All sales	26	18	17	19	8	12	100

Buyer Characteristics

The characteristics of the typical buyers are discussed as follows:

- Purchase motivation - Purchase motivations vary significantly depending on quality and price levels. Higher-priced units are typically purchased by individuals seeking vacations or retirement homes in Hawaii. In contrast, lower-priced units are typically purchased by individuals motivated by investment opportunities, and are likely to keep the units in rental pools.
- Typical age - The typical age of purchasers ranges from about 40 to 65 years old, with an average age of 45 to 50.
- Occupation - The condominium purchaser for the projects studied is typically a professional, corporate officer or an entrepreneur.
- Household income - Average household incomes for all buyers ranged from about \$75,000 to over \$250,000. Buyer incomes are typically higher at the more luxurious properties.
- Use of units - 2% to 6% of all apartments in the selected projects are used as primary residences, as shown in Exhibit V-N.
- Place of origin - Buyers are typically from the western United States, especially from California, Washington, Oregon and Alaska.
 In Wailea, Kaanapali, and Keauhou, buyers are most frequently from the western United States, as shown in Exhibit V-O. In contrast, nearly 50% of those purchasing condominiums in rural Oahu and Princeville are from Hawaii. Buyers from within the State tend to be attracted to units in resort or quasi-resort areas perceived to have a lower degree of tourist activity.

CONDOMINIUM MARKET ASSESSMENT

The potential for condominium development at Mokuleia is assessed in terms of the market support for condominium apartment units and the development concepts under consideration.

Source: Hawaii TRK Service and John Child & Company, Inc.

Exhibit V-N

MOKULEIA
Percentage of Apartments at Selected
Condominium Projects with Home Exemptions

	<u>All units</u>	<u>Units sold since 1979</u>
Rural Oahu:		
Kuilima	62	22
Other	6	3
Total	<u>68</u>	<u>25</u>
Mau:		
Kaanapali	3	3
Wailea	2	8
Other	0	0
Total	<u>5</u>	<u>11</u>
Keauhou	4	4
Princeville	1	0

Source: Hawaii TRK Service and John Child & Company, Inc.

Exhibit V-O

MOKULEIA
Distribution of Buyers by Residence

	<u>Hawaii</u>	<u>Far West</u>	<u>Other Mainland</u>	<u>Inter-national</u>	<u>Total</u>
Rural Oahu:					
Kuilima	472	312	182	42	1002
Other	49	39	10	2	100
Total	<u>521</u>	<u>351</u>	<u>192</u>	<u>44</u>	<u>1108</u>
Mau:					
Kaanapali	21	41	29	9	100
Wailea	18	42	27	13	100
Other	7	64	23	6	100
Total	<u>46</u>	<u>107</u>	<u>79</u>	<u>28</u>	<u>260</u>
Keauhou	27	53	18	2	100
Princeville	52	40	7	1	100

Source: Hawaii TRK Service and John Child & Company, Inc.

Prospective Market Segments

Initially, the condominium buyers could be expected to be Oahu residents and visitors who return frequently.

The demographic characteristics of the identified markets are expected to be similar to those of comparable first-class projects in the State; however, supported to a larger extent by island residents. Buyers are expected to be composed primarily of married couples from Hawaii and the western United States aged 35 to 60, who are physically active and seeking a recreation-oriented environment.

Market Support for Condominium Development

The market support for condominium units at Mokuleia is dependent on the community's ability to emerge as a major recreational development. As a result, demand is largely a function of Mokuleia's ability to attract a large base of repeat visitors and local residents from which condominium buyers may emerge.

The market support of condominium units at Mokuleia is projected based on historical and projected new condominium sales trends.

The sales absorption has ranged from 20 to 210 units per year since 1975, as previously shown in Exhibits V-J through V-L. These projects have achieved an average of about 50 unit sales per year, with oceanfront developments achieving about 95 units per year.

At Mokuleia, sales absorption for oceanfront condominiums are projected to increase from 70 units per year beginning in 1990 to 80 units per year by 2000. Similarly, the sales absorption for condominiums on the mauka portion of Mokuleia are projected to increase from 45 units per year beginning in 1990 to a stabilized rate of 55 units per year by 2000. The projected sales absorption results in support for about 1,725 units, shown as follows.

Condominium sites	Projected Market Support for Condominium Development			
	1986-1990	1991-1995	1996-2000	2001-2005
Makai	---	350	350	300 1/2
Mauka	---	225	225	275
Total	---	575	575	575
				<u>1,725</u>

Development limited to about 1,000 units due to physical constraints. Sellout projected to occur in mid-2004.

While the market supports potential development of over 1,700 condominium units, the current development concepts envision only about 1,200 condominium units.

Alternative Development Sites

The current development concepts for Mokuleia center on sites suitable for condominium development. The sites are grouped based on their views and ocean and golf course frontages.

- Oceanfront Sites - These sites offer views and private beachfronts. Density could average about 25 units per acre, and total about 1,000 units. The unit mix could be predominantly one-bedroom units, with secondary emphasis on studio and two-bedroom units. Units would be efficiently designed. The oceanfront sites are physically removed from the remainder of the community. Thus, it will be important to either minimize perceived distances or to create a self-contained environment with complete facilities and amenities and an orientation to the ocean.
- Golf Course Frontage Sites - The golf-frontage sites could be attractive to residents and repeat visitors to attract Oahu buyers. Development density could average between 10 and 15 units per acre. These developments should include swimming pools, recreation centers, and other amenities as well. The unit mix could offer a greater number of two-bedroom units to be attractive to local families and investment huls.

VI - RESIDENTIAL MARKET ASSESSMENT

Market demand would likely exist for various products permitted in the residential land use category. This chapter assesses the market support for residential development at Mokuleia and reviews the development trends, characteristics and sales performance of residential subdivisions at selected areas in Hawaii.

SELECTION OF COMPARABLE RESIDENTIAL SUBDIVISIONS

The location, preliminary development concepts and recreation orientation of Mokuleia is unlike any existing area in Hawaii.

Residential development in Mokuleia could share similarities with residential developments in major planned resort communities on the neighbor islands (community lots) and lots of one acre or more available on Oahu (acreage lots).

Community Lots

Community lots are within a master-planned resort community. These lots are typically planned to include neighborhood and view characteristics attractive to residents and visitors. In addition, the resort facilities provide a concentration of recreational activities.

Acreage Lots

Acreage lots are typically about an acre and are in rural locations. These lots provide greater privacy between homes, and the neighborhood has a quieter "country" environment. Small-scale farming may be possible on some of the larger lots.

Mokuleia offers a unique environment compatible to both community and acreage lots. The trends affecting the development and projected market support for these types of residential developments are discussed in the following sections.

COMMUNITY LOTS

The historical development, existing and planned inventory, physical characteristics and market performance of community lots are discussed as follows.

Historical Development

Except for Waikoloa Village and Princeville Resorts, resort areas in Hawaii have primarily focused on the development of hotels, resort condominiums and commercial facilities rather than on residential subdivisions.

To date, no community lots have been developed on Oahu. Lots have been developed in five neighbor island resorts. These resorts are located as follows:

Island	Resort
Maui	Kaanapali Wailea
Hawaii	Waikoloa Village Keauhou
Kauai	Princeville

Community lot development began in 1971 with the completion of 108 lots at Princeville and 24 lots at Keauhou. About 70% of the total lots developed at the selected projects had been completed by 1975. No further lots were developed until the peak of real estate activity in 1979 and 1980.

Currently, about 2,149 community lots are located in the five selected resorts. The majority of these lots are at Waikoloa Village and Princeville which include 968 and 673 lots, respectively, as shown in Exhibit VI-A. This represents 45% and 31%, respectively, of the total inventory sampled at these first-class resort communities.

Planned Development

Over the next two decades, about 6,900 lots are proposed at the selected projects on the neighbor islands, as shown in Exhibit VI-B. About 6% are planned for development before 1990.

The greatest potential development is at Waikoloa Village, where about 4,830 additional lots could be developed. Significant lot development is also planned at Keauhou, Wailea, and Kaanapali Beach, which account for about 1,560 additional lots.

Current development plans at Turtle Bay and West Beach on Oahu do not include residential lots. Thus, the community lots at Mokuleia would not face any competition from projects on Oahu.

HOKULEIA
Planned and Proposed Single-Family Residential
Development at Selected Hawaii Resort Communities

	Number of Lots		
	Planned, 1986- 1990	Proposed, after 1990	Total
Hauai:			
Wailea	160	222	382
Kaanapali	-	504	504
Subtotal	160	726	886
Hawaii:			
South Kohala	26	270	296
Waikoloa Village	200	4,630	4,830
Keauhou	50	830	880
Subtotal	276	5,730	6,006
Total	436	6,456	6,892

Source: Discussions with developers of the respective projects, public documents filed with the State Land Use Commission and other public sources.

The Kaunohou community also includes the 25-lot Kaunohou Bay subdivision which was developed in the 1950's by Stanop Escapes. Source: Developers or representatives of the respective projects.

Subdivision	Year of completion	Total lots	1971-1972	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Waikoloa Village	968	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kaunohou:																		
Kaunohou subdivision 1/	1971	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	1971	85	85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wailea:																		
Fairway Homesites	1975	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wailea Golf Escapes I	1980	100	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1982	59	59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	1982	190	190	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kaanapali Beach:																		
Kaanapali Vista	1972	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Royal Kaunapali Escapes	1972	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kaanapali Hillside I	1983	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kaanapali Hillside II	1983	73	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kaanapali Hillside IIB	1983	67	67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	1983	209	209	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Princetonville:																		
Unit IV	1971	108	108	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit III	1971	95	95	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit II	1973	131	131	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit I	1973	216	216	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	1973	550	550	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	1973	673	673	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1973	2,149	2,149	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escapes:																		
Unit I	1981	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit II	1981	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Street Drive	1980	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit III	1979	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	1981	123	123	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	1981	203	203	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1981	1,018	1,018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Annual Lot Completions																		
1971																		
1972																		
1973																		
1974																		
1975																		
1976																		
1977																		
1978																		
1979																		
1980																		
1981																		
1982																		
1983																		
1984																		
1985																		

HOKULEIA
Historical Residential Lot Development
at Selected Hawaii Resort Communities
1971 to 1985

HOKULEIA
Historical Residential Lot Development
at Selected Hawaii Resort Communities
1971 to 1985

Subdivision	Total existing lots	Year of completion	Annual Lot Completions														
			1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Waikoloa Village	968	1971-1972	-	968	-	-	-	-	-	-	-	-	-	-	-	-	-
Kaunohou:																	
Kaunohou subdivision 1/ Kaunohou Estates I	26 85	1971 1985	24 -	- -	85												
Subtotal	109		24	-	-	-	-	-	-	-	-	-	-	-	-	-	85
Wailea:																	
Fairway Homesites	31	1975	-	-	-	-	31	-	-	-	-	-	-	-	-	-	-
Wailea Kai Homesites	100	1980	-	-	-	-	-	-	-	-	100	-	-	-	-	-	-
Wailea Golf Estates I	59	1982	-	-	-	-	-	-	-	-	-	-	59	-	-	-	-
Subtotal	190		-	-	-	-	31	-	-	-	100	-	59	-	-	-	-
Kaanapali Beach:																	
Kaanapali Vista	35	1972	-	35	-	-	-	-	-	-	-	-	-	-	-	-	-
Royal Kaanapali Estates	15	1972	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-
Kaanapali Hillside I	24	1983	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kaanapali Hillside 11A	73	1984	-	-	-	-	-	-	-	-	-	-	-	-	-	24	73
Kaanapali Hillside 11B	62	1985	-	-	-	-	-	-	-	-	-	-	-	-	-	-	62
Subtotal	209		-	50	-	-	-	-	-	-	-	-	-	-	24	73	62
Princeville:																	
Increment I:																	
Unit IV	108	1971	108	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit III	95	1971	95	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit II	131	1973	-	-	131	-	-	-	-	-	-	-	-	-	-	-	-
Unit I	216	1975	-	-	-	216	-	-	-	-	-	-	-	-	-	-	-
Increment II, Unit III	34	1979	-	-	-	-	-	-	-	-	34	-	-	-	-	-	-
Sunset Drive	26	1980	-	-	-	-	-	-	-	-	-	26	-	-	-	-	-
Increment II, Unit II	36	1981	-	-	-	-	-	-	-	-	-	-	36	-	-	-	-
Increment II, Unit I	27	1981	-	-	-	-	-	-	-	-	-	-	27	-	-	-	-
Subtotal	673		203	-	131	216	-	-	-	-	34	26	63	-	-	-	-
Total	2,149		227	1,018	131	216	31	-	-	-	34	126	63	59	24	73	167

1/ The Kaunohou Resort community also includes the 25-lot Kaunohou Bay subdivision which was developed in the 1950's by Bishop Estate. Source: Developers or representatives of the respective projects.

Exhibit VI-A

HOKULEIA
Planned and Proposed Single-Family Residential
Development at Selected Hawaii Resort Communities

	Number of Lots		
	Planned, 1986-1990	Proposed, after 1990	Total
Hawaii:			
Wailea	160	222	382
Kaanapali	-	504	504
Subtotal	160	726	886
Hawaii:			
South Kohala	26	270	296
Waikoloa Village	200	4,630	4,830
Kaunohou	50	830	880
Subtotal	276	5,730	6,006
Total	436	6,456	6,892

Exhibit VI-B

Source: Discussions with developers of the respective projects, public documents filed with the State Land Use Commission and other public sources.

HONOLULU
Location and View Orientation of
Residential Lots at Selected Hawaii Resort Communities

Subdivision	Year of completion/expected completion	Primary view orientation	Loc Type			Total lots
			Ocean-front	Golf course	Hillside ocean view/valley view	
Waipahoehoe Village	1971-1972	Interior	-	N/A	N/A	969
Kaunaloa:						
Kauaioua subdivision I/	1971	Golf course	-	8	-	24
Kauaioua Estates I	1985	Hillside ocean view	-	22	63	85
Kauaioua Estates II	1987-1988	Hillside ocean view	-	-	50	50
Wailea:						
Fairway Homesites	1973	Golf course	-	31	-	31
Wailea Kai Homesites	1980	Interior	-	-	-	100
Wailea Golf Estates I	1982	Golf course	-	35	26	59
Wailea Kialoa	1986	Hillside ocean view	-	-	86	102
Wailea Golf Estates II	N/A	Golf course	-	32	26	58
Kaunapali Beach:						
Kaunapali Vista	1972	Golf course	-	35	-	35
Royal Kaunapali Estates	1972	Golf course	-	15	-	15
Kaunapali Hillside I	1983	Hillside ocean view	-	-	24	24
Kaunapali Hillside IIA	1984	Hillside ocean view	-	-	73	73
Kaunapali Hillside IIB	1985	Hillside ocean view	-	-	67	67
Princeville:						
Increment I:						
Unit IV	1971	Interior	7	32	25	44
Unit III	1971	Interior	14	16	9	39
Unit II	1973	Valley view	19	15	50	84
Unit I	1975	Interior	-	83	-	83
Increment II, Unit III	1979	Interior	-	-	11	11
Sunset Drive	1980	Golf course	-	15	-	15
Increment II, Unit II	1981	Interior	-	-	16	16
Increment II, Unit I	1981	Interior	-	-	22	22
Kaunapali Park	1985	Interior	-	-	68	68
Lot 5	N/A	Interior	-	-	5	5
Total lots			40	337 2/3	517 2/3	2,432
Percent 2/			2.8%	23.0%	35.3%	100.0%

N/A = Not available.
 1/ Leasehold.
 2/ Excluding those for which data are not available.
 Source: Developers or representatives of the respective projects.

Characteristics of Selected Developments

This section describes the lots in major subdivisions at the selected Hawaii resort communities in terms of subdivision lot characteristics and amenities.

Lot Type

Community lot types are differentiated by their location with respect to the following amenities:

- Oceanfront
- Golf course
- Hillside, offering ocean or valley views
- Other interior lots.

The majority of the existing and planned (near-term) community lots are either hillside lots with ocean and/or valley views or interior lots, as shown in Exhibit VI-C. Lot developments that about golf course fairways are the next most common type while oceanfront lots represent only about 3% of lots developed or planned at the selected resorts.

Lot View

View orientations are a major consideration. Ocean or mountain views may compensate for the locational disadvantages of a community lot or contribute to its desirability. For example, many interior lots at Wailea and Princeville command ocean or mountain views which compensate for their lack of fairway or ocean frontage. The primary view orientations of lots at the selected comparable subdivisions are also noted in Exhibit VI-C.

Lot Size

Typical lots at the selected projects range from 9,500: to 20,000: . The lots average about 10,000: to 14,000: . The higher-priced golf course lots are generally larger than the interior or hillside view lots because purchasers of golf-front lots are more willing to pay for the additional land.

Amenities

Private recreational facilities and security are major features of successful community lot developments on the mainland U.S. These features have generally not been incorporated in the existing first-class subdivisions in Hawaii. Instead, most of the subdivisions offer short-term, complimentary or voluntary memberships at golf or tennis facilities.

The inclusion of extensive subdivision amenities is not supported in Hawaii because buyers are reluctant to pay for the maintenance of such facilities until they are in a position to make use of them. Since most community lots are not developed immediately, the buyers would face several years of maintenance fees until they can actually make use of the facilities.

The Sunset Drive subdivision in Princeville is the only existing resort subdivision which has private recreational facilities for its residents. The 26-lot subdivision has a recreation center with a private pool, tennis court and pavilion.

Private security has not been a significant feature of the existing subdivisions in Hawaii. However, security is a major selling point of the new Keaunou Estates I subdivision where access will be controlled by a gated entry during the day and manned security at night.

Market Performance of Community Lots

This section examines the market performance of the selected subdivisions. Market performance is examined in terms of historical sales and price trends, buyer profile and purchase motivations.

Historical Sales

On the average, a total of about 63 lots in the selected developments have been sold annually since 1971, as shown in Exhibit VI-D. Annual sales rates have fluctuated with general real estate cycles. Annual lots sales were relatively brisk between 1971 and 1974 when about 60 to 100 lots were sold annually. In 1975 and 1976, lot sales decreased to 24 and 33 lots, respectively, coinciding with the slump in the economy and real estate activity. Lot sales increased again in 1977 and 1981 and as new inventory was offered at Princeville and Wailea, respectively.

The community lot market was relatively weak between 1982 and 1983, with annual sales of 6 to 48 lots per year, as shown in the exhibit. This decline is primarily because of the high interest rates and the economic slump of 1981 to 1983. More recently, sales have increased again and real estate values have stabilized. Lots that have sold since 1982 have typically been either lower-priced lots or those which were offered at discounted sales prices or with attractive financing terms.

Among the individual subdivision projects, about 1 lot was sold every 20 days for an average sales rate of 18 lots per year, as shown in Exhibit VI-E.

EXHIBIT VI-D
Annual New Sales of Residential Lots
in Selected Hawaii Resort Communities
1971 to 1985

Subdivision	Total lots offered	Annual Lot Sales														Total lots sold	
		1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984		1985
Wailea:																	
Fairway Homesites	31					2	11	18					77	4	4	10	31
Wailea Kai Homesites	100														12	13	26
Wailea Golf Estates I	59														1	1	26
Subtotal	190					2	11	18					77	5	21	23	26
Kaanapali Beach:																	
Kaanapali Hillside I	24														23	1	24
Kaanapali Hillside IIA and IIB	135															26	30
Subtotal	159														23	27	30
Keaunou:																	
Keaunou subdivision	24	24															24
Keaunou Estates I	85																13
Subtotal	109	24															37
Princeville:																	
Increment I:																	
Unit IV	108	17	48	53													108
Unit III	95	19	40	33													95
Unit II	131			23	28	3	3	13	17	31							131
Unit I	216					19	19	57	117								216
Increment II, Unit III	34																34
Sunset Drive	26									1							26
Increment II, Unit II	36										1						36
Increment II, Unit I	27																27
Subtotal	673	36	88	96	90	22	22	71	149	30	11	11	88	4	23	2	644
Total	1,131	60	88	96	90	24	33	89	169	30	11	11	88	9	23	26	944
Average lot sales:																	
1971 to 1983																	63
1981 to 1985																	91

Source: Hawaii ORK Service and John Child & Company, Inc.

Exhibit VI-D

MOKULEIA
Average Annualized Sales of
Residential Lots at Selected Hawaii Resort Communities
as of December 1985

Subdivision	Date offered	Months on market to date or sellout	Lots			Average annualized sales per year
			Available for sale	Sold	Unsold	
Keauhou - Keauhou subdivision	1971	0.5	24	24	-	365
Kaanapali Beach:						
Kaanapali Vista	1970-1971	N/A	35	35	-	N/A
Royal Kaanapali Estates	1970-1971	N/A	15	15	-	N/A
Princeville:						
Increment I, Unit IV	March 1971	33.0	108	108	-	41
Increment I, Unit III	March 1971	36.0	95	95	-	30
Increment I, Unit II	October 1973	60.0	131	131	-	26
Increment I, Unit I	May 1975	55.0	216	216	-	45
Wailea - Fairway Homesites	June 1975	27.0	31	31	-	14
Princeville:						
Sunset Drive	July 1978	84.0	26	25	1	4
Increment II, Unit III	July 1979	72.0	34	32	2	5
Increment II, Unit II	February 1980	71.0	36	19	17	3
Increment II, Unit I	September 1980	65.0	27	18	9	3
Wailea:						
Wailea Kai Homesites	November 1980	50.0	100	100	-	24
Wailea Golf Estates I	June 1982	43.0	59	52	7	15
Kaanapali Beach:						
Kaanapali Hillside I	January 1983	8.0	24	24	-	37
Kaanapali Hillside IIA and IIB	June 1984	19.0	135	56	79	35
Keauhou Resort - Keauhou Estates I	August 1984	16.0	85	13	72	18
Total or weighted average 1/			<u>1,181</u>	<u>994</u>	<u>187</u>	18

N/A = Not available.

1/ Excludes lots at Kaanapali where market period is not available.

Source: Hawaii TRK Service and John Child & Company, Inc.

Exhibit VI-E

Among individual projects, the variation in average annual sales per year ranged from as high as 365 lots per year at the Keauhou subdivision, with 24 lots sold in two weeks, to a low of only 3 lots per year at Units I and II of Princeville's Increment II subdivision. The low sales rate is attributed to a combination of factors including a downturn in visitor arrivals to Kauai following Hurricane Iwa, the economic recession and the relatively low quality and variety of lots available for sale.

Subdivisions with high average annualized lot sales include Kaanapali Hillside I and the first four phases of Princeville's Increment I development. At Kaanapali Hillside, about 12 of the 24 lots were sold to speculative builders for home construction and immediate resale. Of the remaining lots, the majority of the relatively lower-priced lots were thought to be purchased for intended use as a primary residence rather than for part-time or vacation use.

At Princeville's Increment I, the low initial sales prices and discounts offered for employee purchases contributed to the sales of an average of between 26 and 45 lots per year, most of which sold between 1971 and 1978.

Prices

Community lots currently being offered for sale range from \$55,000 for interior lots at Princeville to \$350,000 for ocean view fairway lots at the Wailea Golf Estates, as shown in Exhibit IV-F. The prices of community lots are primarily related to lot type, lot size and the quality of the development.

Buyer Profile

The buyers of community lots are described in terms of their occupation, age, income, residence and other characteristics as follows:

- **Occupation** - Occupational profiles vary according to the quality and price of the subdivision. Purchasers of higher-priced lots were typically professionals, business executives or self-employed entrepreneurs and small businessmen.
- Purchasers of the lower-priced lots additionally include mainland and local contractors or financial institutions and are often investor-builders who purchase and develop lower-priced lots in areas which are residential-oriented.
- **Age** - Buyers are typically 40 to 55 years of age.

MOKULEIA
Average Annualized Sales of
Residential Lots at Selected Hawaii Resort Communities
as of December 1985

Subdivision	Date offered	Months on market to date or sellout	Lots			Average annualized sales per year
			Available for sale	Sold	Unsold	
Keauhou - Keauhou subdivision	1971	0.5	24	24	-	365
Kaanapali Beach:						N/A
Kaanapali Vista	1970-1971	N/A	35	35	-	N/A
Royal Kaanapali Estates	1970-1971	N/A	15	15	-	N/A
Princeville:						41
Increment I, Unit IV	March 1971	33.0	108	108	-	30
Increment I, Unit III	March 1971	36.0	95	95	-	26
Increment I, Unit II	October 1973	60.0	131	131	-	45
Increment I, Unit I	May 1975	55.0	216	216	-	14
Wailea - Fairway Homesites	June 1975	27.0	31	31	-	
Princeville:						4
Sunset Drive	July 1978	84.0	26	25	1	5
Increment II, Unit III	July 1979	72.0	34	32	2	3
Increment II, Unit II	February 1980	71.0	36	19	17	3
Increment II, Unit I	September 1980	65.0	27	18	9	
Wailea:						24
Wailea Kai Homesites	November 1980	50.0	100	100	-	15
Wailea Golf Estates I	June 1982	43.0	59	52	7	
Kaanapali Beach:						37
Kaanapali Hillside I	January 1983	8.0	24	24	-	35
Kaanapali Hillside IIA and IIB	June 1984	19.0	135	56	79	10
Keauhou Resort - Keauhou Estates I	August 1984	16.0	85	13	72	
			<u>1,181</u>	<u>994</u>	<u>187</u>	18
Total or weighted average 1/						

N/A = Not available.

1/ Excludes lots at Kaanapali where market period is not available.

Source: Hawaii DM Service and John Child & Company, Inc.

Exhibit VI-E

Among individual projects, the variation in average annual sales per year ranged from as high as 365 lots per year at the Keauhou subdivision, with 24 lots sold in two weeks, to a low of only 1 lot per year at Units I and II of Princeville's Increment II subdivision. The low sales rate is attributed to a combination of factors including a downturn in visitor arrivals to Kauai following Hurricane Iwa, the economic recession and the relatively lower quality and variety of lots available for sale.

Subdivisions with high average annualized lot sales include Kaanapali Hillside I and the first four phases of Princeville's Increment I development. At Kaanapali Hillside, about 12 of the 24 lots were sold to speculative builders for home construction and immediate resale. Of the remaining lots, the majority of the relatively lower-priced lots were thought to be purchased for intended use as a primary residence rather than for part-time or vacation use.

Prices

At Princeville's Increment I, the low initial sales prices and discounts offered for employee purchases contributed to the sales of an average of between 26 and 45 lots per year, most of which sold between 1971 and 1978.

Buyer Profile

Community lots currently being offered for sale range from \$55,000 for interior lots at Princeville to \$350,000 for ocean view fairway lots at the Wailea Golf Estates, as shown in Exhibit IV-F. The prices of community lots are primarily related to lot type, lot size and the quality of the development.

- Occupation - Occupational profiles vary according to the quality and price of the subdivision. Purchasers of higher-priced lots were typically professionals, business executives or self-employed entrepreneurs and small businessmen.
- Purchasers of the lower-priced lots additionally include mainland and local contractors or financial institutions and are often investor-builders who purchase and develop lower-priced lots in areas which are residential-oriented.
- Age - Buyers are typically 40 to 55 years of age.

MOKULEIA
Percent Distribution of Principal Residence of
Residential Lot Buyers at Selected Hawaii Resort Communities

Subdivision	Mainland United States			State of Hawaii		
	California	Other west coast and Alaska	Other mainland United States	Island residents	Other State residents	Foreign
Muana Kea - Fairways at Muana Kea North	50%	10%	30%	10%	-	-
Wailea:						
Wailea Kai Homesites	-----31-----		10	52	5%	2%
Wailea Golf Estates I	-----49-----		27	20	4	-
Keauhou:						
Keauhou subdivision	-----20-----			56	20	4
Keauhou Estates	24	-	6	52	18	-
Kaanapali Beach:						
Kaanapali Hillside I	-----71-----		4	25	-	-
Kaanapali Hillside IIA	-----54-----		19	27	-	-
Waikoloa Village	-----38-----			32	30	-
Princeville - All developments, by year of initial lot sale:						
1971-1973	16	3	22	23	34	2
1974-1978	17	4	15	29	17	18
1979-1982	47	3	30	11	6	3
1983-June 1985	33	-	7	26	34	-

N/A = Not available.

Source: Developers or representatives of the respective developments and TMK Service.

Exhibit VI-G

During the last three to five years, there has been a significant reduction in the number of investor lot purchases due to the stabilization of real estate values, high interest rates and the higher quality and prices of more recently marketed subdivisions. Hawaii is beginning to follow a California trend in the emergence of an upscale primary home market for planned resort communities. In Hawaii, the Wailea Fairway subdivision has the highest percentage of full-time residents with about 25% claiming a primary home exemption.

ACREAGE LOTS

The historical development, existing and planned inventory, physical characteristics and market performance of acreage lots are discussed as follows.

Historical Development

Acreage lot development has primarily occurred in rural areas in the State. The number of lots in these subdivisions range from only three or five to in excess of 200.

Acreage lot subdivisions on Oahu are typically in Kahaluu, Pupukea, Mokuleia, and Hakaha. Most of the subdivisions include less than 25 lots, such as Hapele, Ahuluanu Road and Country Gentlemen Estates subdivisions. None are truly comparable to the acreage lots being considered at this Mokuleia site.

On the neighbor islands, successful lot development has occurred in:

- Hana, Hakawao, Kula and Kihel on Maui.
- Kamuela, Kohala, Waikoloa, and Kona on Hawaii.
- Kawela and Papohaku on Molokai.
- Princeville, Kilauea and Koloa on Kauai.

Planned Development

The 129-lot Hauna Olu Subdivision is the only subdivision on Oahu which is planned to be marketed in the near term. Located near the Sheraton Hakaha Hotel, the one-acre lots have views through Hakaha Valley towards the ocean and/or golf course frontage. The lots have been completed but have not yet been marketed because of water hookup and pending litigation.

We are not aware of any other significant addition to the inventory of acreage lots on Oahu in the near future; however, it is likely that small-scale development will continue.

Characteristics of Comparable Developments

Because of the variations in the size, number and physical characteristics of acreage lot subdivisions, six subdivisions on Oahu, Maui, and Molokai have been selected for analysis. The include:

Island	Subdivision
Oahu	Pupukea Mokuleia Agricultural Subdivision
Maui	Pau Hana Estates Maui Uplands
Molokai	Papohaku Ranchlands Kawela Plantations

The six subdivisions contain a total of 1,059 lots, and have generally been developed during the past 10 years.

This section describes the selected acreage subdivisions in terms of lot characteristics and amenities.

Lot Type and Views

About 54% of the lots in the selected subdivisions are considered view lots, 42% are interior lots, and the remaining 4% located in Papohaku Ranchlands, are oceanfront lots, as shown in Exhibit VI-H.

The lots in all but the Mokuleia Agricultural Subdivision and portions of Pupukea are hillside lots. Hillside lots characteristically have sloping topography which generally enhances view planes.

View lots generally have ocean views of varying quality and/or views of attractive land masses, such as Mount Haleakala and the West Maui mountains on Maui.

Lot Size

Typical lots at the selected subdivisions range between 0.5 and 7.0 acres, as shown in Exhibit VI-I. Individual lot sizes do not vary substantially within each of the selected subdivisions.

Amenities

None of the selected subdivisions provide any common amenities or security features. Maui Uplands and Papohaku Ranchlands include underground utilities.

MOKULEIA
Percent Distribution by View Characteristics

Subdivision	Number of Lots	Ocean-front	Golf course front	View lot I/	Interior
Pupukea	293	--	--	39%	61%
Mokuleia Agricultural Subdivision	65	--	--	--	100
Pau Hana Estates	105	--	--	38	62
Maui Uplands	189	--	--	28	72
Papohaku Ranchlands	221	17%	--	83	--
Kawela Plantations	186	--	--	100	--
Total or average	1,059	4%	--	54%	42%

I/ Includes lots without ocean or golf course frontage but with ocean, golf course, valley, or other qualitatively superior views.
Source: John Child & Company, Inc.

Exhibit VI-I

**NOKULEIA
Lot Sizes**

<u>Subdivision</u>	<u>Lot size (in acres)</u>
Pupukea	1.0
Mokuleia Agricultural Subdivision	2.0
Pau Hana Estates	2.0
Maui Uplands	0.5
Papohaku Ranchlands	5.0 - 7.0
Kawela Plantations	2.0

Market Performance

This section examines the market performance of the selected subdivisions. Market performance is examined in terms of historical sales and price trends, buyer profile and purchase motivations.

Historical Sales

On average, lot sales in the six selected subdivisions have averaged about eight lots per year since 1978, as shown in Exhibit VI-J. This average excludes the atypical sales rate at Maui Uplands in 1985.

The sales rates are a function of marketing and advertising. Sales rates are generally the highest in the initial years as an effective marketing plan is implemented. Excluding sales at Pupukea, the average sales rate during the first two full years of marketing is about 17 lots per year.

Prices

Acreage lots in the selected subdivisions have been successfully sold at prices between \$40,000 and \$200,000, as shown in Exhibit VI-K. Size, location, and view characteristics primarily account for price differentials between the lots at the selected subdivisions.

Buyer Profile

The acreage lot buyer is similar to the community lot buyer, except that the former prefers a higher degree of privacy and a less active environment.

Between 75% and 100% of the buyers of the acreage lots in subdivisions on Maui and Oahu are typically from within the State, as shown in Exhibit VI-L. The remaining buyers at these subdivisions are from the mainland United States.

By contrast, Hawaii residents make up one-quarter to one-third of the buyers at Papohaku Ranchlands and Kawela Plantations on Holokai. Nearly 60% of the buyers are from the mainland United States, while up to 10% are from international locations.

Source: John Child & Company, Inc.

Exhibit VI-J

MOKULEIA
Historical Sales Activity

Subdivision	1978	1979	1980	1981	1982	1983	1984	1985	Total	Average
Pupukea	2	0	2	1	6	7	5	9	32	4.0
Mokuleia Agricultural Subdivision	--	--	--	1	14	8	4	5	32	6.4
Pau Hana Estates	5	13	25	5	2	4	6	11	71	8.9
Hau Uplands	--	--	--	7	1	8	5	99	120	24.0
Papohaku Ranchlands	--	--	--	3	34	5	1	4	47	9.4
Kaveia Plantations	--	--	--	44	25	3	7	4	83	16.6
Weighted average 1/										8.2

Exhibit VI-K

MOKULEIA
Typical Lot Prices

Subdivision	Total	Per Acre
Pupukea	\$ 95,000-\$110,000	\$2.20-\$2.50
Mokuleia Agricultural Subdivision	120,000- 150,000	1.40- 1.70
Pau Hana Estates	75,000- 100,000	0.90- 1.15
Hau Uplands	40,000- 60,000	1.80- 2.75
Papohaku Ranchlands	120,000- 200,000	0.50- 0.80
Kaveia Plantations	80,000- 100,000	0.90- 1.20

1/ Excluding Hau Uplands sales in 1985; these lots were sold at auction and reflect an atypical sales rate.

Source: Hawaii TRK Service and John Child & Company, Inc.

Source: Hawaii TRK Service and John Child & Company, Inc.

Exhibit VI-L

HOKULEIA
Percent Distribution of
Principal Residence of Acreage Lot Buyers 1/

Subdivision	State of Hawaii			Mainland United States	Foreign
	Same Island	Neighbor Island	17		
Pupukea	852	17	132	17	17
Hokuleia Agricultural Subdivision	100	0	0	0	0
Pau Hana Estates	69	16	15	0	0
Maui Uplands	61	16	21	2	2
Papohaku Ranchlands	2	34	62	2	2
Kawela Plantations	11	16	62	11	11

Purchase Motivations

The purchase motivations for acreage lots are similar to those observed for community lots. Buyers are generally motivated to buy for future improvement as a vacation or retirement home or investment.

Being the oldest of the selected subdivisions, Pupukea has the highest proportion of improved lots and owner-occupants of those examined, as shown in Exhibit VI-M. The majority of the lots in the remaining subdivisions are vacant. Those lots which are improved are typically not occupied by the owner.

MARKET ASSESSMENT
FOR HOKULEIA

This section assesses the market support for residential lot development at Hokuleia. The marketing of lots is assumed to begin in the 1991 to 1995 period and will be more successful as hotel and condominium development proceeds. Primary buyer market segments, projected lot sales absorption and recommendations for the type and phasing of residential lot development are discussed.

Primary Buyer Market Segments

The primary buyer market for residential lot development at Hokuleia is expected to be persons seeking:

- Primary residence.
- Vacation or retirement home.

These market segments are characterized as follows:

Primary Home

Hokuleia could offer a unique environment for primary residents as urban growth expands towards Ewa and Central Oahu. The primary home market is expected to include Hawaii residents employed in the North Shore and Central Oahu areas. Such buyers could be expected to come from younger age groups, have lower incomes and greater household sizes as compared to vacation or retirement home group.

1/ For lots sold since 1979.
Source: Hawaii THK Service and John Child & Company, Inc.

Exhibit VI-H

MOKULEIA
Improvement Status and Occupancy

Subdivision	Total lots	Percent of Total	
		Improved	Owner-occupant
Pupukea	325	51%	38%
Mokuleia Agricultural Subdivision	65	6	0
Pau Hana Estates	105	7	9
Maui Uplands	282	2	1
Papohaku Ranchlands	221	1	0
Kawela Plantations	186	0	0
Total	1,059		

Vacation or Retirement Home

The vacation or retirement home market is expected to primarily include persons who reside in the western United States and Hawaii residents. The typical buyer is expected to be married, between 40 and 55 years of age and the head of a two- to four-person household. The buyers could be expected to be successful entrepreneurs, professionals or corporate executives.

Secondary Buyer Market Segments

A smaller, secondary market could include the speculative builder and investor markets. Together, these two components could account for between 5% and 10% of total sales.

Projected Sales Absorption

A review of historical sales in the selected community lot developments indicates that annualized sales have ranged from about 13 to 63 lots, as shown in the following table:

	Lots sold	Period	Average
			annualized lot sales
Kaanapali	80	1983-1985	27
Wailea	31	1975-1977	14
	152	1980-1985	29
Princeville	550	1971-1979 1/	63
	94	1978-1985 2/	13

Sales at Selected Hawaii Resort Communities

The rate of residential sales has been related to facility development and the maturity of the project as a visitor destination because many buyers are repeat visitors who acquire the property while staying at the resort.

Historical lot sales in selected acreage lot developments indicate annualized lot sales of between 8 and 17 lots, depending on the level of marketing, as previously shown in Exhibit VI-J.

Source: Hawaii TRK Service and John Child & Company, Inc.

1/ Increment I.
2/ Increment II and Sunset Drive.

Lot sales at Mokuleia are projected to increase with the opening of the proposed hotels and condominiums. Community and acreage lot sales are anticipated to benefit from the large resident population on Oahu and the scope of facilities envisioned at Mokuleia. These lots will provide a unique opportunity on Oahu for single-family residency in a quality recreation-oriented community.

Annual community lot sales are projected at 30 lots between 1991 and 1995, 40 lots per year between 1996 and 2000, and 50 lots per year between 2001 and 2005.

Annual acreage lot sales are projected at 10 lots between 1991 and 1995, 15 lots per year between 1996 and 2000, and 20 lots per year between 2001 and 2005.

The projected sales rates for community and acreage lots result in an absorption of 825 lots by year-end 2005, as shown in Exhibit VI-H.

While the market supports potential development of 825 residential lots, the current development concepts include only 700 lots.

Proposed Development Guidelines

Residential lot development at Mokuleia could be oriented around the golf course fairways on the lowlying areas and hillside lots at the base of the Waianae mountains. Subdivision design could maximize the number of golf course frontage and view units.

Based on the physical characteristics of the proposed sites, golf-front units could have views across adjoining fairways and water hazards, while hillside units could have views across the community towards the ocean. Subdivisions on Oahu and the neighbor islands have demonstrated strong market acceptance for these types of units.

Guidelines for the planning and development of community and acreage lots in terms of project phasing, lot sizes, sales prices and other considerations are outlined as follows:

- Project phasing and product segmentation - Development should be phased to provide an adequate supply of both types of lots at any point in time, but should minimize the competition between similar lot types.
- Sizes - There should be sufficient area to permit a reasonable number of house placements and designs. Frontage along golf course fairways will promote a sense of openness as sites will be perceived to continue out onto the Greens.

MOKULEIA
Projected Market Support

	1991- 1995	1996- 2000	2001- 2005
Community lots:			
Annual sales	30	40	50
Total sales per period	150	200	250
Cumulative sales	150	350	600
Acreage lots:			
Annual sales	10	15	20
Total sales per period	50	75	100
Cumulative sales	50	125	225
Community and acreage lots:			
Annual sales	40	55	70
Total sales per period	200	275	350
Cumulative sales	200	475	825

Source: John Chiu & Company, Inc.

VII - COMMERCIAL/RECREATIONAL FACILITIES AND AMENITIES

- Sales prices - To be competitive, all units should be priced relative to their alternatives in similar settings on Oahu and the neighbor islands.
- Facility and amenity development - Inclusion of any amenities should be weighed against the associated carrying and maintenance cost to be paid by the purchasers.
- Other marketing considerations - Buyers are expected to be motivated by the range of recreational opportunities offered in this environment.

This section assesses the market for support facilities which would complement the residences and visitor facilities at Mokuleia. The following sections address the market for a retail shopping center, golf course and other recreational facilities and amenities.

RETAIL MARKET ASSESSMENT

This section describes the market support for a retail shopping center at Mokuleia. The following subsections describe the potential retail market segments, project the anticipated expenditures generated by these markets, and estimate the supportable retail space.

Retail Market Segments

The market support for retail space at Mokuleia is expected to result from shopping needs of:

- Onsite visitors.
- Onsite residents.
- Off-resort visitors.
- North Shore residents.

These four retail market segments are discussed as follows:

Onsite Residents and Guests

The market support from onsite residents and guests is estimated based on the envisioned development of hotel and condominium units and single-family homes at Mokuleia. About 4,000 units are under consideration, to be developed over a 15-year period, as shown in Exhibit VII-A.

The average daily population is estimated based on assumptions as to the type of units, occupancy rates, and size of average resident group. These assumptions are shown in Exhibit VII-B.

The key assumptions are summarized as follows:

- The average annual occupancy rate for Mokuleia's hotels is estimated at about 65% over the first 5-year period from 1991 to 1995, and increase to 75% as a whole, over the following 10 years as the hotels mature.

Exhibit VII-A

HOKULEIA
Proposed Development Phasing Guidelines
1990 to 2005

	1990	1991-1995	1996-2000	2001-2005
Hotel units	500	1,100	1,600	2,100
Condominium units	0	575	1,150	1,200
Single-family lots: Lots improved 1/ Lots vacant	0	10 190	74 401	204 496
Subtotal	0	200	475	700
Total units	500	1,875	3,225	4,000

1/ Construction on lots projected at 5% of all sold lots within 5 years following lot sale; 30% between 6 and 10 years of sale; 60% between 11 and 15 years.
Source: John Child & Company, Inc.

Exhibit VII-B

HOKULEIA
Assumptions for Population Projection

Type of unit	% Distribution 1/	Occupancy percent	Average size of group occupying 2/	Population projection factor
Hotel units:				
1990	100%	65%	1.8	1.17
1995	100	65	1.8	1.17
2000	100	70	1.8	1.26
2005	100	75	1.8	1.35
Condominium units:				
Full-time residents	20	95	2.8	0.53
Part-time residents	30	25	2.1	0.16
Visitors	50	50	2.1	0.53
Single-family units:				
Full-time residents	40	95	3.3	1.25
Part-time residents	60	25	2.1	0.29

1/1A = Not available.

1/ Distribution of uses within each facility type.

2/ Occupied units only.

Source: Based on interviews with resort operators and brokers at similar resort communities and Hawaii Visitors Bureau, 1985, Profile: The Resort Condominium Market and Profile: The Resort Hotel Market.

Household sizes for full-time condominium, single-family, adult community and starter home residents are determined based on the household size estimates reported for the year 2005 by the Department of General Planning, Land Supply Review: Population Implications of Development Plans, August 1984.

HOKULEIA
Projected Average Daily Population
1990-2005

Population type and residence	1990	1995	2000	2005
Visitors:				
Hotel units	590	1,290	2,070	2,840
Condominium units	0	300	610	640
Single-family units	0	0	0	0
Subtotal - Visitors	590	1,590	2,630	3,480
Residents:				
Condominium units:				
Full-time	0	330	660	680
Part-time	0	90	180	190
Subtotal	0	420	840	870
Single-family:				
Full-time	0	10	90	260
Part-time	0	0	20	70
Subtotal	0	10	110	330
Subtotal - Residents	0	430	950	1,200
Total population	590	2,020	3,580	4,680

Source: Projected by John Child & Company, Inc. based on assumptions as set forth in Exhibit VII-B.

- About 50% of Mokuleia's condominiums are assumed to be available for visitor use, 30% would be used part-time as vacation homes, and 20% would be used as full-time residences. Occupancy rates for each of these uses is assumed to vary based on the past experience of comparable properties.

Based on these assumptions, the average daily population of Mokuleia is estimated to increase from about 590 persons in 1990 to about 4,680 persons by 2005, as shown in Exhibit VII-C. Of this number, about 80% are expected to be visitors and part-time residents and 20% are expected to be residents.

Offsite Visitors

Visitors to Oahu who do not stay at Mokuleia could be expected to provide additional demand for retail space as they tour the island and visit the area. Because of existing traffic patterns, most of the Oahu's circle island visitors are not expected to stop at Mokuleia. However, visitors from the Turtle Bay Resort could be expected to patronize the community and enjoy the full range of recreational accommodations in the region.

Offsite visitors are expected to represent a nominal increase in visitor expenditures at Mokuleia and are expected to add another 22 to its visitor population. This is roughly equivalent to about 30 offsite visitors per day by the end of 1995 and 70 offsite visitors per day by the end of 2005.

North Shore Residents

Currently, about 14,000 persons reside in the North Shore region. The resident population of the North Shore region is expected to increase to about 15,000 persons in 1995 and to 15,600 persons by 2005, as projected by the Department of General Planning. If Area residents are expected to provide limited market support for the commercial complex because of the range of alternative commercial facilities in Haleiwa and Laie. However, area residents could be expected to provide some market support for restaurants and other eating facilities.

17 Refer to City and County of Honolulu Department of General Planning, Residential Development Implications of the Development Plans, August 1985, Table A-1.

MOKULEIA
Proposed Development Phasing Guidelines
1990 to 2005

	1990	1991-1995	1996-2000	2001-2005
Hotel units	500	1,100	1,600	2,100
Condominium units	0	575	1,150	1,200
Single-family lots: Lots improved 1/ Lots vacant	0	10 190	74 401	204 496
Subtotal	0	200	475	700
Total units	500	1,875	3,225	4,000

1/ Construction on lots projected at 5% of all sold lots within 5 years following lot sale; 30% between 6 and 10 years of sale; 60% between 11 and 15 years.
Source: John Child & Company, Inc.

MOKULEIA
Assumptions for Population Projection

Type of unit	Z Distribution 1/	Occupancy percent	Average size of group occupying 2/	Population projection factor
Hotel units:				
1990	100Z	65Z	1.8	1.17
1995	100	65	1.8	1.17
2000	100	70	1.8	1.26
2005	100	75	1.8	1.35
Condominium units:				
Full-time residents	20	95	2.8	0.53
Part-time residents	30	25	2.1	0.16
Visitors	50	50	2.1	0.53
Single-family units:				
Full-time residents	40	95	3.3	1.25
Part-time residents	60	25	2.1	0.29

1/1A - Not available.

1/ Distribution of uses within each facility type.

2/ Occupied units only.

Source: Based on interviews with resort operators and brokers at similar resort communities and Hawaii Visitors Bureau, 1985, Profile: The Resort Condominium Market and Profile: The Resort Hotel Market.

Household sizes for full-time condominium, single-family, adult community and starter home residents are determined based on the household size estimates reported for the year 2005 by the Department of General Planning, Land Supply Review: Population Implications of Development Plans, August 1984.

HOKULEI'A
Possible Annual Retail Expenditures
1990-2005

	1986 Dollars		
	1990	1995	2005
From onsite:			
Visitors:			
Total daily visitors	590	1,590	2,480
Daily retail expenditures ^{1/}	\$45,700	\$45,100	\$45,000
Capture rate	45%	45%	45%
Subtotal (millions)	\$26.1	\$71.3	\$111.2
Residents:			
Full-time condominium and single-family residents	0	340	750
Average household income ^{2/}	\$40,000	\$40,000	\$40,000
Persons per household	3.0	3.0	3.0
Percent of income spent on selected retail items ^{3/}	10.0%	10.0%	10.0%
Capture rate	40%	40%	40%
Subtotal (millions)	\$0.0	\$50.7	\$100.5
Part-time condominium and single-family residents	0	90	260
Average household income ^{4/}	\$40,000	\$40,000	\$40,000
Persons per household	2.1	2.1	2.1
Percent of income spent on selected retail items ^{3/}	10.0%	10.0%	10.0%
Capture rate	40%	40%	40%
Subtotal (millions)	\$0.0	\$12.1	\$26.6
Total onsite (millions)	\$26.1	\$122.1	\$237.3
From offsite:			
Visitors ^{5/}	\$ 0.1	\$ 0.2	\$ 0.4
Regional residents:			
Total regional residents ^{6/}	14,600	15,000	15,400
Median household income ^{7/}	\$23,000	\$23,000	\$23,000
Persons per household	3.2	3.2	3.2
Percent of income spent on selected retail items ^{3/}	10.0%	10.0%	10.0%
Capture rate	5%	5%	5%
Subtotal (millions)	\$0.3	\$0.5	\$0.6
Total offsite (millions)	\$ 0.4	\$ 0.7	\$ 1.0
Total (millions)	\$ 30.5	\$ 122.8	\$ 238.3

^{1/} Retail Visitors Bureau, Annual Research Report, 1984.
^{2/} Estimated by John Child & Company, Inc. based on the median household income of single-family home purchasers as reported in 1983 by the U.S. League of Savings Institutions, "Homeownership: Celebrating the American Dream", 1984.
^{3/} U.S. Bureau of Labor Statistics, Autumn 1981 Urban Family Budgets and Comparative Indexes for Selected Urban Areas, 1982.
^{4/} Based on discussions with resort operators and realtors at Turtle Bay and other Hawaii resorts.
^{5/} Estimated at 2% of total onsite visitor expenditures.
^{6/} Population on the North Shore projected by the Department of Planning and Economic Development to increase by 0.4% annually.
^{7/} U.S. Bureau of the Census, Census of Population and Housing, 1980. Adjusted to 1986 dollars by using consumer price index for Honolulu.

Projected Retail Expenditures

This section projects retail expenditures generated by the four identified market segments. Visitor expenditures from each market segment were projected based on the estimated populations of the four retail markets and their expenditure patterns for retail goods. Expenditures by market segment are presented in Exhibit VII-D and are discussed in the following subsections.

Onsite Visitors

Visitors staying onsite at the hotels, condominiums, and single-family homes are estimated to spend a total of about \$91 per day based on surveys conducted by the Hawaii Visitors Bureau. Of this amount, about \$45 are estimated to be spent on retail goods. About 45% of the onsite visitors' retail expenditures are projected to be captured at Mokuleia. Thus, these visitors could generate about \$4.4 million in retail expenditures (in 1986 dollars) at Mokuleia in 1990 and \$25.7 million by 2005, in current 1986 dollars, as shown in Exhibit VII-D.

Onsite Residents

Mokuleia's residents could be expected to purchase convenience goods items and patronize food and beverage establishments. Full- and part-time residents of the condominiums and single-family homes are estimated to spend about 10% of their household incomes on retail and food items such as could be found at a shopping center. About 35% to 40% of these expenditures could be spent at Mokuleia. Thus, resident expenditures could be projected to amount to \$0.3 million by 1995 and \$0.9 million by 2005.

Offsite Visitors

Day visitors to Mokuleia could be expected to provide secondary market support for a shopping facility. Offsite visitors could generate an additional 2% of the onsite visitor expenditures, resulting in about \$0.1 million in visitor expenditures in 1990 and \$0.5 million in 2005.

North Shore Region Residents

Residents from the surrounding North Shore communities could provide limited market support for a shopping facility; however, this group would be attracted by food and beverage facilities. Thus, Mokuleia could capture about 5% of the area resident's expenditures on retail goods or a total of \$0.5 million in expenditures in 1990 and \$0.6 million in 2005.

Total annual retail sales which could be generated by a shopping complex can be estimated to amount to about \$5.0 million in 1990 and to increase to about \$27.7 million by the year 2005, as shown in Exhibit VII-E. Visitors could be expected to account for the majority of total expenditures (about 93%) by 2009. Mokuleia residents could be estimated to account for about 3% of total expenditures, while offsite visitors and North Shore residents could be expected to contribute about 4% of total expenditures.

Projected Supportable Retail Space

Projections of supportable retail space demand are based on retail expenditures as estimated in the previous section and a desirable level of sales per square foot of retail space.

A survey of four comparable shopping facilities was conducted. These facilities achieved average annual sales of \$265 to \$700 per square foot in 1985. A reasonable sales level for a shopping facility at Mokuleia could be estimated at \$275 per square foot. Thus, the retail market could be estimated to generate a demand for a total of about 18,200^{sq} by the end of 1990 and increase to about 100,700^{sq} by the end of 2005, as shown in Exhibit VII-F.

The demand for retail facilities is estimated less the amount of retail space which could be built at the hotels envisioned. About 15% of retail space per hotel unit could be assumed to be built at the hotels envisioned. No other proposed shopping centers in the Mokuleia area are known at this time.

Thus, the net demand for retail space could be expected to support about 10,700^{sq} of freestanding retail space by 1990 and 69,200^{sq} by 2005, as also shown in Exhibit VII-F. In comparison, by the year 2005, a retail center could be similar in size to the existing Princeville Shopping Center and the Coconut Plantation Market Place which are 66,153^{sq} and 63,600^{sq}, respectively, but significantly smaller than the Whaler's Village Shopping Center which is about 90,000^{sq}.

Development Concept

The shopping facility could be designed to take advantage of the adjoining inland waterway by including wide, landscaped promenades equipped with benches and tables which could encourage outdoor eating and leisurely walks.

The majority of the leasable retail area of the proposed shopping center could contain apparel, sundry, gift, craft or jewelry stores or restaurants and eating facilities.

Office, hardware, grocery, and other resident-oriented establishments are not expected to receive market support.

MOKULEIA
Summary of Retail Expenditures
1990-2005

	1986 dollars (in millions)				Percent of total
	1990	1995	2000	2005	
From onsite:					
Visitors	\$4.4	11.8	19.4	25.7	93%
Residents	0.0	0.3	0.7	0.9	3
Subtotal	4.4	12.1	20.1	26.6	96
From offsite:					
Visitors	0.1	0.2	0.4	0.5	2
Regional residents	0.5	0.5	0.6	0.6	2
Subtotal	0.6	0.7	1.0	1.1	4
Total	\$5.0	12.8	21.1	27.7	100%

Source: John Child & Company, Inc.

Exhibit VII-F

HOKULEIA
Projected Supportable Retail Space
1990-2005

	<u>1990</u>	<u>1995</u>	<u>2000</u>	<u>2005</u>
Projected annual expenditures (millions in 1986 dollars)	\$ 5.0	\$ 12.8	\$ 21.1	\$ 27.7
Sales per square foot ^{1/}	\$ 275	\$ 275	\$ 275	\$ 275
Projected retail space demand (P) ^{2/}	18,200	46,700	76,700	100,700
Less: Projected hotel retail space (H) ^{3/}	<u>7,500</u>	<u>16,500</u>	<u>24,000</u>	<u>31,500</u>
Net retail demand (N)	<u>10,700</u>	<u>30,200</u>	<u>52,700</u>	<u>69,200</u>

Retail facilities that could potentially attract offsite visitors consist mainly of widely recognized and highly visible restaurant and food establishments and, to a significantly lesser extent, other retail shops.

Alternative Commercial Uses

Hokuleia development concepts could also include unique facilities, consistent with the recreation orientation of the community, which could enhance the overall community environment. Potential uses being considered are discussed as follows:

Multi-Media Complex

A multi-media complex could include facilities for theatrical, cinematic and musical performances, forums and demonstrations. It could also be used for public functions, operating as a meeting hall. The complex could also include an open-air amphitheater for outdoor performances. The complex could have the potential of providing a diverse range of entertainment opportunities which could benefit the North Shore community as a whole.

Interactive Sports Museum

A sports museum could showcase the diverse variety of recreational activities which are associated with Hawaii, and describe, through display, demonstration and narration, the history of these activities in Hawaii. In addition, a museum could offer opportunities for participation in the activities. The museum could feature:

- Surfing.
- Paniolo rodeo.
- Hang gliding.
- Polo.
- Ancient Hawaiian games.
- Canoe racing.

A museum could be involved in organizing and sponsoring sporting competitions such as polo matches, rodeos, and makahikis.

RECREATIONAL FACILITIES
MARKET ASSESSMENT

Residents and repeat visitors are typically seeking new experiences and are attracted to master-planned destinations. Such self-contained communities offer a wide variety of recreation facilities. Communities of this type do not presently exist on Oahu.

^{1/} Equal to median sales level of selected shopping centers surveyed.
^{2/} Gross leasable square feet.
^{3/} Projected retail lobby shops can be estimated at about 15: per hotel unit.

The market for golf course and other recreational facilities are discussed in the following section.

Golf Course Market Assessment

This section reviews the existing golf courses in the vicinity of Mokualeia and assesses the demand for championship golf courses at Mokualeia from 1990 to 2005.

Existing Golf Courses

Oahu currently has 28 golf courses, 5 of which are public courses, 12 are private-member clubs, 9 are military courses and 2 are resort courses.

In the Mokualeia area, there are four non-military golf courses within about a 30-minute drive. These include the championship 18-hole Turtle Bay Hilton Country Club, the 9-hole Kahuku golf course, the 18-hole Mililani golf course, and the 18-hole private Hawaii Country Club in Kunia. In addition, a second 18-hole championship course and clubhouse is planned to be completed at the Turtle Bay Resort by about 1989.

Championship Golf Courses

Oahu's championship courses includes the Sheraton Makaha Resort and the Turtle Bay Resort. In comparison, Maui has seven courses; Hawaii, six courses; and Kauai, one 18-hole and one 27-hole course.

The obvious benefit of a championship golf course is its use as a recreational facility by guests and the general public. A well designed course is able to draw visitors to the area based on its reputation for being challenging and exciting.

A golf course also enhances the image of the community. It offers the intangible benefits of open space, tranquility and aesthetic value to the area. A golf course lowers the overall density of the area and gives a feeling of openness to the community. In providing the area with these intangible benefits, a course also enhances the land values of the surrounding areas.

Golf courses are characterized as being "championship" courses if they feature extensive landscaping and challenging, but forgiving play.

The number of average daily rounds of golf played on golf courses on the neighbor islands ranged from about 90 to 200 rounds per day and averaged about 130 rounds per day, based on a survey of nine courses in 1985. In contrast to the actual number of rounds per day experienced at the selected courses, the desired level of play attempts to balance the maximum number of daily golfers which a course can handle while maintaining course upkeep, a leisurely playing pace and golfer satisfaction. The desired level of play at the selected courses ranged from about 170 rounds to 220 rounds, and averaged about 200 rounds.

Projected Golf Demand

The demand for golf has been projected based on estimated rounds of play. Rounds are estimated based on projected average daily populations and golf utilization rates. The average daily rounds of golf has been estimated as follows:

- Hotel guest golf demand is based on the projected average daily hotel population and a level of play of about five golf rounds for every 100 hotel visitors. This level of play is based on the experience of the Wailea and Keauhou-Kona Resorts.
- Condominium and single-family guest golf demand is based on the projected average daily population and a level of play of about four rounds per condominium or single-family visitor/resident. This is comparable to the level of play experienced at the Princeville and Kaanapali Beach Resorts.
- Off-resort golf demand can be expected to be relatively high due to the size of Oahu's resident and visitor golfing population. A golf course at Mokualeia could be expected to be patronized by tour groups and local golf groups seeking a higher-quality golfing experience than is available at other public courses. The off-resort golf demand is projected to range between about 60 and 120 rounds per day in 1990 and is projected to increase by about 4% per year thereafter.

The annual rounds of golf at Mokualeia has been estimated based on the projected average daily population and the golf play assumptions as discussed above. The number of rounds of golf are projected to increase from between 167 and 240 rounds per day by the end of 1995 to between 320 and 430 rounds per day by the end of 2005, as shown in Exhibit VII-G.

Exhibit VII-G

HOKULEIA
Projected Annual Rounds of Golf
1990-2005

	<u>1990</u>	<u>1991- 1995</u>	<u>1996- 2000</u>	<u>2001- 2005</u>
<u>Onsite Demand:</u>				
Hotel guest golf demand:				
Average daily hotel population	590	1,290	2,020	2,840
Estimated rounds per 100 guests	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>
Annual golf rounds by hotel guests	10,800	23,500	36,900	51,800
Condominium and single-family golf demand:				
Average daily condominium and single-family population	0	730	1,560	1,840
Estimated rounds per 100 guests	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>
Golf rounds by condominium and single-family guests	0	10,700	22,800	26,900
<u>Offsite Demand:</u>				
Low - 60 rounds per day	21,900	26,400	32,400	39,400
High - 120 rounds per day	43,800	53,000	64,900	79,000
<u>Total Demand:</u>				
Low	32,700	60,800	92,100	118,100
High	54,600	87,500	124,600	157,700
<u>Average Daily Demand:</u>				
Low	90	167	252	323
High	150	240	341	432
<u>Supportable 18-Hole Courses: 1/</u>				
Low	0.5	0.9	1.4	1.8
High	0.8	1.3	1.9	2.4

1/ At 180 rounds per day.

Projected Supportable Golf Holes

Resort golf courses are often developed prior to the completion of other visitor and community facilities to enable the course to mature and to attract potential visitors to the area by its beauty and reputation for play. The first golf course should be developed for completion concurrently with its first major hotel facility.

The market support for golf courses at Mokuleia is based on the projected average daily golf rounds and the desired level of play at the courses. Assuming a desired level of play of about 180 rounds of golf for an 18-hole course, from a market standpoint, one golf course could be fully utilized by 1992 or 1993, warranting the development of the second 18-hole course by the end of 1995.

Other Recreational Facilities

Mokuleia has the opportunity to establish itself as an active recreation-oriented alternative on Oahu by taking advantage of its diverse physical characteristics and providing other recreational amenities not typically found on Oahu or competitive destinations on the neighbor islands. Alternative recreational facilities include:

- Polo Club and Stables - Mokuleia has long been known for its polo field. The seasonal matches are well attended by local residents. Polo matches could provide a unique passive recreational alternative not found elsewhere in Hawaii.

Development concepts could include a polo club and stables surrounded by condominiums and golf fairways. This would enhance the rural ranch-like atmosphere of the community.

During the off-season, the polo facilities could be used for rodeos and equestrian purposes which could become seasonal focal points.

- Hiking Trails - Several existing trails lead from the Mokuleia lowlands to a plateau of the Waianae Mountains known as Peacock Flat. These and other similar trails and nature walks could be developed, offering visitors an opportunity to experience the rugged, natural beauty of the region. Variations in length and degree of difficulty could appeal to both the novice and seasoned hiker.

- Horseback Riding - Horseback rides along mountain trails could provide a unique aspect to the recreation facilities at Mokuleia.

- Camping Areas - Developed in conjunction with the hiking trails, camp grounds could augment the recreational facilities and appeal of the community.

- Sports Center - A sports center could include a pavilion and outdoor track and field. The pavilion could include basketball and volleyball courts which could be adapted for boxing, wrestling, gymnastics and other indoor sporting activities, locker rooms and shower facilities. Outdoor activities could include a wide range of track and field events, soccer, rugby, and football.

- Tennis Ranch - A tennis ranch could include courts suitable for tournament play and provide ancillary facilities such as locker rooms, showers, pro shop and a restaurant. With the proper design and approach, a tennis ranch could accommodate several tennis tournaments each year.

QUALIFICATIONS OF JOHN CHILD & COMPANY, INC.

John Child & Company, Inc. is a professional real estate service corporation which specializes in real estate appraisal and consulting. Founded in 1937, John Child & Company, Inc. is one of the largest and oldest real estate appraisal and consulting companies in Hawaii.

PROFESSIONAL STAFF

The Company's professional staff has a wide range of real estate experience and hold designations earned from the major professional organizations. 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
 Darlene Arloia, Research Assistant
 Cheryl Emery, Research Assistant

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
- Arbitration.

Our studies cover a variety of real estate properties and interests 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.

We have assisted both private and public clients in Hawaii, the mainland states, Guam, American Samoa, and Singapore.

Our professional services are used to assist clients in internal management and decision making, negotiations with other parties, and for obtaining financing.

TYPICAL CLIENTS

Our clients include both private and public organizations. Typical clients are:

Amfac Financial Corp.
Amfac, Inc.
Bank of America
Bank of Hawaii
B.P. Bishop Estate
Estate of James Campbell
Castle & Cooke, Inc.
Hililani 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
Hawaiian Electric
Hawaiian Telephone
Honolulu Federal Savings and Loan Association
KACOR Development Company
Loyalty Development
Loyalty Finance Co.
Pacific Construction Co., Ltd.
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

KAREN CHAR, MAI 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).
- 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-elect and 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).

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 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 RHIs who meet the minimum standards of this program are awarded periodic educational certification. Karen Char, MAI is certified under this program.

APPENDIX B

Economic and Fiscal Impacts of
MOKULEIA
Mokuleia, Oahu, Hawaii

Prepared for
Mokuleia Development Corporation

July 1986

REAL ESTATE APPRAISERS & CONSULTANTS



Empire Plaza
17th Floor
1701 Kalia Road
Suite 1000
Honolulu, Hawaii 96813
(808) 531-2941

Economic and Fiscal Impacts of
MOKULEIA

Mokuleia, Oahu, Hawaii

Prepared for
Mokuleia Development Corporation

July 1986

July 22, 1986

Mr. K. Tim Yee
Chairman
Mokuleia Development Corporation
1001 Bishop Street, Suite 979
Honolulu, Hawaii 96813

Dear Mr. Yee:

At your request, we have completed our analyses of the economic and fiscal impacts of the proposed Mokuleia community. The accompanying report presents the findings and conclusions regarding our assessments.

BACKGROUND

Mokuleia Development Corporation (MDC) proposes to develop a master-planned recreation-oriented community on about 1,000 acres in Mokuleia. For the purpose of this report, the development is referred to as Mokuleia. Preliminary plans include development of hotels, condominiums, single-family units, and supportive commercial and recreational facilities and amenities.

MDC is preparing general plan and development plan amendments to permit development at the site. MDC has asked John Child & Company, Inc. to assess the economic and fiscal impacts of the proposed development.

OBJECTIVES

The objectives of our assistance are to:

1. Project the direct, indirect and induced economic impacts of the proposed development in terms of:

- Expenditures
- Employment
- Resident income.

2. Project the direct, indirect and induced fiscal impacts of the proposed development in terms of:
 - State and County government revenues
 - State and County government expenditures.

REPORT ORGANIZATION

The report is organized into five chapters as follows:

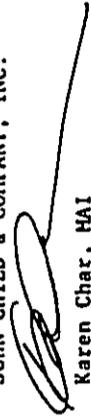
- I. Executive Summary - presents the background and objectives of our impact assessment and summarizes the major findings and conclusions.
- II. Project Description and Regional Overview - describes the immediate and general environs of Hokualeia, and the geographic and economic setting of the North Shore region and the State of Hawaii.
- III. Population Projections - describes the assumptions and analyses used to project the onsite population associated with Hokualeia.
- IV. Economic Impacts - assess the economic impacts of the proposed development in terms of expenditures, employment and resident income.
- V. Fiscal Impacts - assesses the fiscal impacts of the proposed development in terms of State and County government revenues and expenditures.

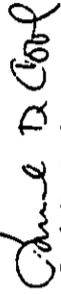
* * * * *

We appreciate the opportunity to assist you in the planning of this unique master-planned community.

Very truly yours,

JOHN CHILD & COMPANY, INC.


Karen Char, HAI
Executive Vice President


Paul D. Cool
Appraiser

Economic and Fiscal Impacts of

MOKULEIA

Mokuleia, Oahu, Hawaii

Prepared for

Mokuleia Development Corporation
1001 Bishop Street, Suite 979
Honolulu, Hawaii 96813

July 1986

**john
child**

CONSULTANTS INC.

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I - EXECUTIVE SUMMARY

Mokuleia Development Corporation (MDC) has engaged John Child & Company, Inc. (John Child) to prepare assessments of the economic and fiscal impacts of the proposed Mokuleia development. This section presents the background and objectives of the assignment and reviews the major findings and conclusions of our study.

BACKGROUND

MDC proposes to develop a master-planned recreation-oriented community on about 1,000 acres in Mokuleia. For the purpose of this report, the development is referred to as Mokuleia. Preliminary plans include development of hotels, condominiums, single-family units, and supportive commercial and recreational facilities and amenities.

MDC is preparing general plan and development plan amendments to permit development at the site. HDC has asked John Child to assess the economic and fiscal impacts of the proposed development.

OBJECTIVES

The objectives of our assistance are to:

1. Project the direct, indirect and induced economic impacts of the proposed development in terms of:
 - Expenditures
 - Employment
 - Resident income.
2. Project the direct, indirect and induced fiscal impacts of the proposed development in terms of:
 - State and County government revenues
 - State and County government expenditures.

MOKULEIA

The following section presents a brief description of Mokuleia's location, physical characteristics, and proposed development.

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Qualifications of John Child & Company, Inc.
 Qualifications of Karen Char
 Qualifications of Paul D. Cool

Location

The Mokuleia site is on the North Shore of Oahu, about six miles west of Haleiwa. The North Shore region is typically rural, with economic activity evolving from sugar and pineapple cultivation.

The North Shore is known for its scenic coastlines and beaches, many being notable surfing areas, and has long been an area frequented on the weekends by families with "beach houses".

The North Shore is unique because of its close ties with the land and ocean and shares many similarities to communities on the neighbor islands.

Site Characteristics

The 2,900-acre site has diverse physical characteristics. The property is divided by Farrington Highway, the major traffic artery in the area.

The makai (oceanside) portion of the site consists of four non-contiguous parcels totaling about 120 acres. These sites have about 1.5 miles of ocean frontage along white sand beaches.

The mauka (mountainside) portion of the site includes about 2,780 acres. The site slopes gently from sea level to about 300 feet over a distance of about a mile to the base of the Waianae mountain. From this point to the top of the mountain range, the topography becomes steep and rugged, with vegetation shifting from typical ranch scrub to more lush foliage.

Proposed Development Types

Mokuleia is planned as a self-contained recreation-oriented community. Through careful planning, it will offer a unique vacation experience in a relaxed rural environment which had previously only been found on the neighbor islands. The proposed land use plan includes:

- Hotel and condominium development - About 3,300 hotel rooms and condominium units are proposed for development. Hotel development would include a range of guest services including food and beverage facilities, retail shops, and recreational amenities. Condominium development would be oriented to the repeat mainland visitors to Mokuleia and island residents desiring to live in a recreation-oriented environment.

- Residential development - Single-family development will provide housing opportunities for those individuals making a long-term commitment to the community and who prefer a greater sense of privacy than might be offered in condominium living. The proposed development plan includes 700 residential units.
- Commercial complex - A commercial complex is planned to include retail shopping, dining and entertainment facilities to support the community and serve residents of Waiatua, Haleiwa and other North Shore people.
- Recreational facilities - Aside from the recreational amenities found at each hotel and condominium project, Mokuleia will include 36 holes of golf course and, possibly, a polo field, hiking trails, camping areas, sports center, and a tennis ranch.

The proposed development plan results in a self-contained community with a variety of transient and permanent accommodations, commercial facilities, recreational activities and related amenities to appeal to the island resident and the repeat visitor. Its proximity to Waikiki and other visitor attractions on Oahu enhances Mokuleia's desirability and gives it a competitive edge over neighbor island resort destinations.

Market Support

Recognizing the time requirements for necessary land use amendments and approvals, market assessments have been made for a 15-year period beginning in 1990. The level and timing of the market support for the proposed land uses are projected in Exhibit I-A.

ECONOMIC IMPACTS

This section summarizes the expected direct, indirect, induced and total impacts of Mokuleia on expenditures, employment and resident income in the State.

Expenditures

Mokuleia will generate direct, indirect and induced expenditures in Hawaii from the visitors and residents. This group will make direct expenditures for food, accommodations, recreational activities and other goods and services. These direct expenditures will, in turn, generate indirect and induced expenditures throughout the State through multiplier effects.

MOKULEIA
Proposed Development
1990 to 2005

	1990	1991- 1995	1996- 2000	2001- 2005
Supportable units:				
Hotel	500	1,100	1,600	2,100
Condominium	0	575	1,150	1,200
Residential	0	200	475	700
Total	500	1,875	3,225	4,000
Supportable commercial area (±):				
Freestanding	10,700	30,200	52,700	69,200
Within hotels	7,500	16,500	24,000	31,500
Total	18,200	46,700	76,700	100,700

Visitor Expenditures

Direct expenditures are projected based on the expected average daily visitor population and visitor expenditure patterns observed in the State.

Direct expenditures attributable to the visitors at Mokuleia could be expected to increase from about \$18.3 million in 1990 to \$106.8 million by 2005, in 1986 dollars.

Based on the multipliers estimated by the Hawaii State Department of Planning and Economic Development (DPED), the direct visitor expenditures could be expected to generate indirect and induced expenditures amounting to about \$17.0 million in 1990 and \$99.3 million by 2005, in 1986 dollars.

Including direct, indirect and induced effects, expenditures in the State attributable to Mokuleia's visitors are projected to increase from \$35.3 million in 1990 to \$206.1 million by 2005, in 1986 dollars.

Resident Expenditures

This analysis addresses the expenditures attributable to the resident population at Mokuleia. The relationship between direct expenditures and indirect and induced expenditures associated with resident spending in the State has not been quantified.

Based on the average daily population and expenditure estimates, annual expenditures by full-time and part-time residents at Mokuleia could increase from \$0 in 1990 to \$13.4 million by 2005, in 1986 dollars.

Employment

The planned developments at Mokuleia will generate short-term employment during the construction of new facilities and long-term employment in the operation and maintenance of those facilities. Similar to expenditures, employment effects may also be classified as being direct, indirect or induced.

Construction Employment

Direct construction employment is that which would be supported directly by the construction of the various facilities at Mokuleia. The direct needs for construction employees are estimated based on the employment experiences of similar facility construction projects in the State. Construction could begin in 1988 and proceed through 2005.

Source: Mokuleia Development Corporation.

The employment impacts in particular years during the projection period will depend on the construction timing of the various facilities, but could average about 210 full-time equivalent jobs per year between 1988 and 2005. Total construction employment, including direct, indirect, and induced employment, could average 490 full-time equivalent jobs per year during the same period.

Operational Employment

Based on the development and employment characteristics, Mokuleia is projected to generate about 600 full-time equivalent direct operational employment positions by 1990 and about 2,700 by 2005. The majority of these jobs would be associated with the hotel operations at Mokuleia.

Through indirect and induced effects, the direct operational positions created would generate additional employment elsewhere in the State. According to recent studies on the economic impacts of tourism by the DPED, development as proposed at Mokuleia could be expected to support about 470 full-time equivalent positions in 1990 and 2,160 by 2005.

Based on these estimates, total operational employment island-wide resulting from the Mokuleia development is projected to increase from nearly 1,100 positions in 1990 to nearly 4,900 positions by 2005.

Resident Income

Mokuleia could be expected to have a significant impact on personal and household income for residents of the island and the State. Mokuleia would generate resident income through employee wages, salaries and fringe benefits and as income to proprietors.

Personal Income

Personal income is defined as the wages and salaries paid to the direct construction and operational employees of Mokuleia. Personal income is projected on the basis of average industry wages and salaries and the expected future levels of employment demand.

Annual personal income paid to Hawaii residents in the form of wages and salaries earned directly from establishments at Mokuleia or from its visitors may be expected to increase from \$30.3 million in 1990 to \$42.3 million by 2005, in 1986 dollars.

Household Income

Estimation of total household income effects based on visitor expenditures permits a perspective on the net benefits to statewide household income that would result from the development at Mokuleia.

Total household income generated by visitor expenditures at Mokuleia would include the fringe benefits and proprietor's income paid by establishments that sell goods and services directly to visitors as well as the wages and salaries noted previously. In addition, household income includes income generated through the multiplier effects of indirect and induced expenditures.

It is projected that Mokuleia could annually contribute about \$12.8 million to total household income in 1990 and about \$74.8 million by 2005, in 1986 dollars.

FISCAL IMPACTS

This section describes the net fiscal impacts of the proposed developments in terms of revenues and expenditures to the County and State governments resulting from the visitor and resident population at Mokuleia.

Revenues

Development at Mokuleia would bring tax revenues to the County and State governments. County government revenues would be in the form of real property taxes on the new facilities. Revenues to the State government would be principally of unemployment taxes, excise taxes, gross income tax and personal income taxes.

County

Based on current real property tax rates in the County, the proposed development at Mokuleia could be expected to generate about \$0.7 million in additional real property taxes in 1990 and \$4.5 million by 2005, in 1986 dollars.

State

State government revenues are estimated as a residual of total revenues less County government revenues. The tax revenues to the State government attributable to activity at Mokuleia are projected to increase from \$1.5 million in 1990 to \$8.3 million in 2005, in 1986 dollars.

Thus, total tax revenues to the State and County governments are estimated at \$2.2 million in 1990 and \$12.8 million by 2005, in 1986 dollars.

Expenditures

The visitors and residents at Mokuleia would necessitate expenditures of public resources.

County

Annual County public expenditures on behalf of Mokuleia's visitors and residents could be expected to total \$0.2 million in 1990 and \$1.7 million by 2005, in 1986 dollars.

State

Annual State public expenditures on behalf of Mokuleia's visitors and residents could be expected to total \$0.2 million in 1990 and \$3.3 million by 2005, in 1986 dollars.

Revenue/Expenditure Analysis

The net fiscal impacts of Mokuleia's development to the County and State governments are estimated by comparison in the following sections.

County

Comparison of projected public revenues and expenditures indicates the County government may expect to net about \$0.5 million in additional annual revenues in 1990 and \$2.8 million by 2005, in 1986 dollars.

The analysis also indicates that additional County government revenues generated by Mokuleia would be about 2.6 to 3.1 times the additional expenditures incurred by the County government, as also shown in the exhibit.

State

Comparison of the revenues and expenditures, as projected, indicate the State government could be expected to net about \$1.1 million in 1990 and \$3.9 million by 2005, in 1986 dollars. This indicates a revenue/expenditure ratio averaging about 2.3:1 during the forecast period, as also shown in the exhibit.

II - REGIONAL SETTING

This section presents a regional overview of the State of Hawaii, the Island of Oahu, the North Shore region and describes the proposed Mokuleia community in terms of its location, master plan, and characteristics.

STATE OF HAWAII

In 1984 the resident population of the State of Hawaii was estimated to be 1,038,700, including 57,300 members of the military and 67,100 of their dependents. The estimated de facto population of the State, which includes visitors present and excludes residents absent, was about 1,140,600.

The visitor industry is the largest industry in the State, surpassing the two historical bases of Hawaii's economy, sugar and pineapple. In 1984 nearly 4.9 million visitors brought in about \$4.6 billion in visitor expenditures to the State.

Oahu has historically been the primary visitor destination. More recently the visitor industry has expanded on the neighbor islands. New resort complexes along with their supporting industries and services have been established on Maui, Kauai, Hawaii and Molokai.

ISLAND OF OAHU

Mokuleia is in the North Shore region on Oahu. Oahu, with 618 square miles, is the fourth largest island in the State. The relationship between Mokuleia and the major towns and cities of Oahu are shown in Exhibit II-A.

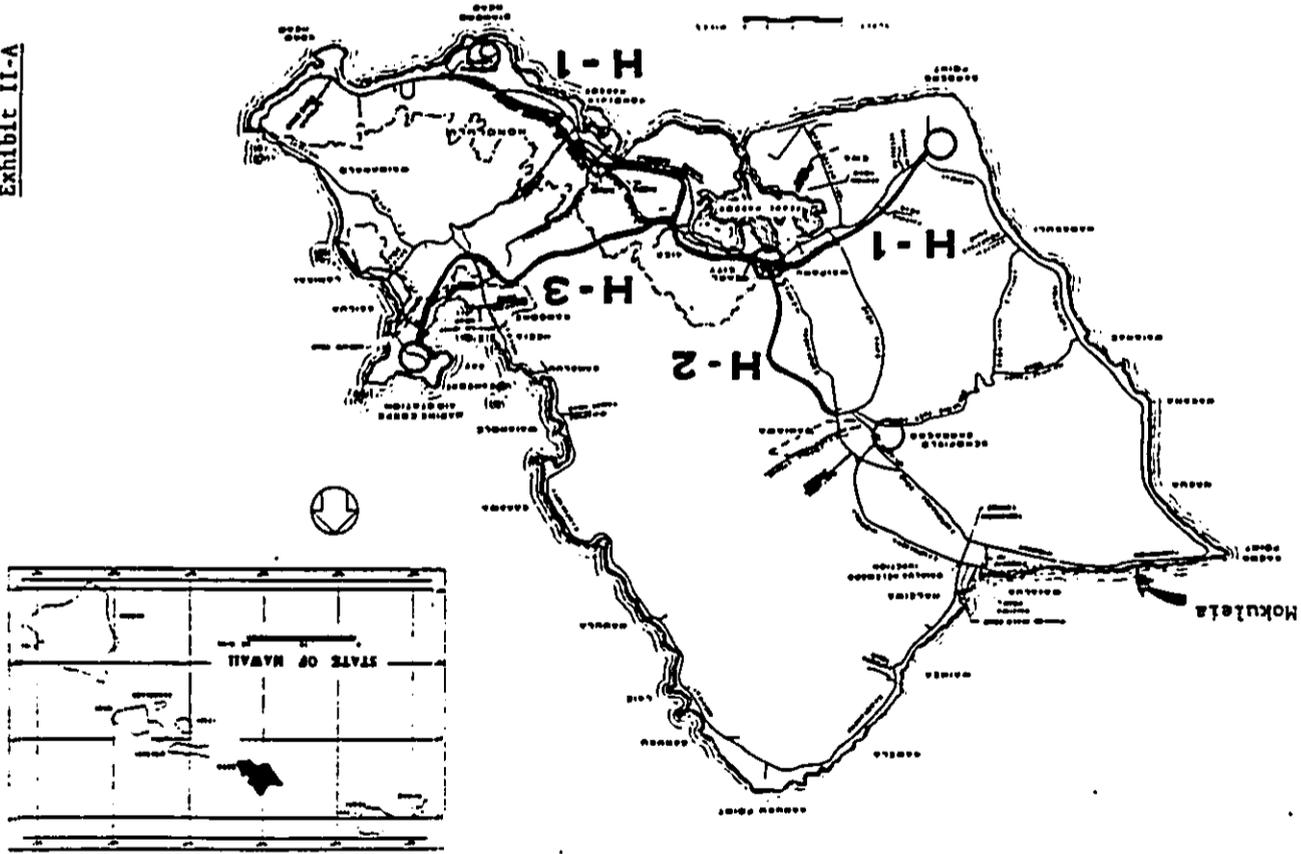
This section reviews the demographic characteristics of Oahu.

Population

In 1984 Oahu housed about 76% of Hawaii's resident population and included only about 10% of the State's land area. Oahu's population was estimated at 865,200, including military personnel. Military personnel and dependents on Oahu are estimated at 127,100 residents, and represent about 15% of the total Oahu population. Oahu includes a sizable visitor population, mostly centered in Waikiki. The daily census averaged 67,370 visitors.

Resident population growth is projected by the Department of Planning and Economic Development (DPED) to decline from the 1.8% rate of growth experienced between 1970 and 1984, to 1.1% per annum between 1985 and 1990 and 0.7% through 2005.

Exhibit II-A



MOKULEIA
Location on Oahu

Age Distribution

In 1980 the median age of Oahu residents was 28.0 years compared with 30.0 years nationally. However, the population of Oahu is maturing and the median age has increased from 24.6 years in 1970 to 28.0 years in 1980. By 2005, the median age is projected at 34.7 years.

Household Size

Oahu households averaged 3.15 persons in 1980 and continue to be significantly larger than the national average of 2.76 persons. However, the average Oahu household size has decreased from an average of 3.6 persons per household in 1970 to 3.15 persons in 1980. This trend is expected to continue.

Employment

Labor force participation on Oahu is higher than national averages. On Oahu, 69.2% of the eligible population over 16 years of age were in the work force in 1980 compared to 63.8% nationally. Labor force participation in Hawaii has also increased by more than 2% from a decade earlier.

Female labor force participation rates on Oahu have increased by almost 9% over the last decade. These rates are significantly higher than national averages. In 1980, 58.3% of the working age female population of Oahu participated in the labor force compared to 51.5% for the United States as a whole. These higher participation rates for women are partially attributed to the relatively higher cost of living and housing in Hawaii.

NORTH SHORE REGION

Mokuleia is located within the northwesterly end of Oahu. This area is described by the City and County of Honolulu as the North Shore development plan area and is the primary impact region of the development.

The North Shore region includes the northwest portion of the island, extending from Kahuku Point to Kaena Point. Residential developments on the North Shore include Sunset Beach, Waimea, Pupukea, Haleiwa and Waialua.

The North Shore region is rural in character. It consists mainly of primary residences within a few blocks of Farrington and Kamehameha Highways, interspersed with freestanding commercial buildings.

MOKULEIA

Mokuleia is a proposed recreation-oriented community. Upon completion, Mokuleia would include:

- Hotels.
- Condominium units.
- Residential units.
- Commercial facilities.
- Golf course.
- Related recreational facilities and amenities.

The following sections describe Mokuleia in terms of the project concept, location and description, master plan, access, and area attractions.

Project Concept

Mokuleia is a master-planned community oriented around a diverse range of recreational facilities. This community would be attractive to island residents and visitors seeking an environment conducive to an active life style but one which can be quiet and relaxed.

Planned to be self-contained, Mokuleia would offer a variety of facilities and services to meet the majority of its residents' and guests' needs for lodging, dining, recreation, entertainment and relaxation.

The location, master plan and recreation orientation of Mokuleia is unlike any existing area in Hawaii. The master plan incorporates land uses and amenities similar to major resort destination areas on the neighbor islands. However, the Oahu location offers greater accessibility to Oahu residents. In addition, Mokuleia has traditionally been noted for its variety of recreational facilities.

Location and Description

Mokuleia is located near the northeasterly point of Oahu. The 2,900-acre property is divided by Farrington Highway, the major traffic artery in the area.

The makai (oceanside) portion of the site consists of four non-contiguous parcels totalling about 120 acres. While relatively narrow, the sites have about 1.5 miles of ocean frontage along white sand beaches.

The mauka (mountainside) portion of the site contains about 2,780 acres. About 890 of these acres are on a low-lying plane that

slopes gently from sea level to about 300 feet over a distance of about a mile. Beyond, as the property ascends towards the Waianae Mountain range, the vegetation shifts from the typical ranch scrub foliage and becomes more lush. In addition, excellent ocean views are afforded towards the coastline.

An access easement in favor of Castle and Cooke, Inc. extends across a portion of the mauka site.

The Mokuleia site is bounded to the east by lands cultivated in sugar, to the west by the Dillingham Air Field, to the south by the Waianae Mountain range, and to the north by the Pacific Ocean.

The Waialua Sugar Company is adjacent to the site and has maintained a climatological research station for a number of years. The records reveal:

- Average annual temperature has been 73.5°F with the average monthly temperature never dropping below 70°F.
- Rainfall at the station averages about 30 inches a year. As for most of Hawaii, rainfall is higher in the upper elevations, providing a consistent source of ground water. The coastal areas are predominantly sunny and dry.
- The prevailing breezes are tradewinds from the east-northeast. During the evenings, the wind pattern changes direction and blows from off the Koolau and Waianae Mountain ranges.

Proposed Master Plan

Mokuleia is master-planned to include 4,000 hotel and residential units and ancillary recreational facilities and amenities. The major components of the community are listed in Exhibit 11-B.

The proposed master plan is shown on the land use plan in Exhibit 11-C and the conceptual plan in Exhibit 11-D. Sites have been configured to optimize ocean views, golf course frontage, and harmony between neighboring land uses. As presently planned, Mokuleia has a low development density with about 2,300 acres or about 80% of the total land area devoted to open or greenbelt areas. The proposed plan complements and maintains the rural environment in the North Shore area.

The actual development schedule of the components at Mokuleia has not yet been determined. For the purposes of this study, we have assumed the development phasing shown in Exhibit 11-E.

Exhibit II-B

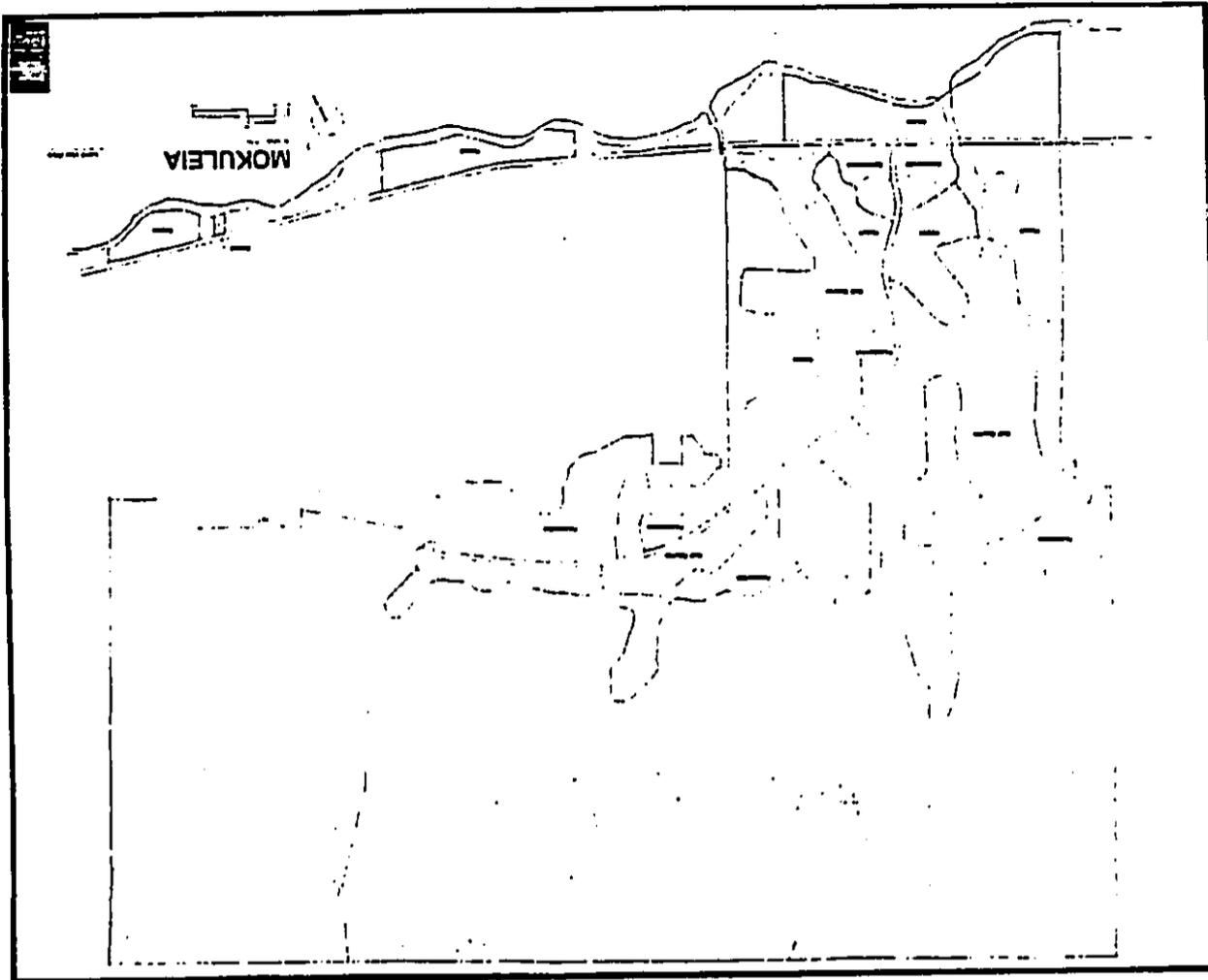
MOKULEIA
Proposed Master Plan Units and Area
at Completion

	<u>Units</u>	<u>Acres</u> 1/
Principal land uses:		
Hotels	2,100)	
Condominium units	1,200)	313 2/
Residential units	<u>700</u>	<u>331</u>
Total	<u>4,000</u>	<u>644</u>
Other land uses:		
Commercial complex	33	
Two 18-hole golf courses with clubhouse	342	
Potential land uses:		
Polo field	--	
Hiking trails	--	
Camping areas	--	
Sports center	--	
Tennis ranch	--	

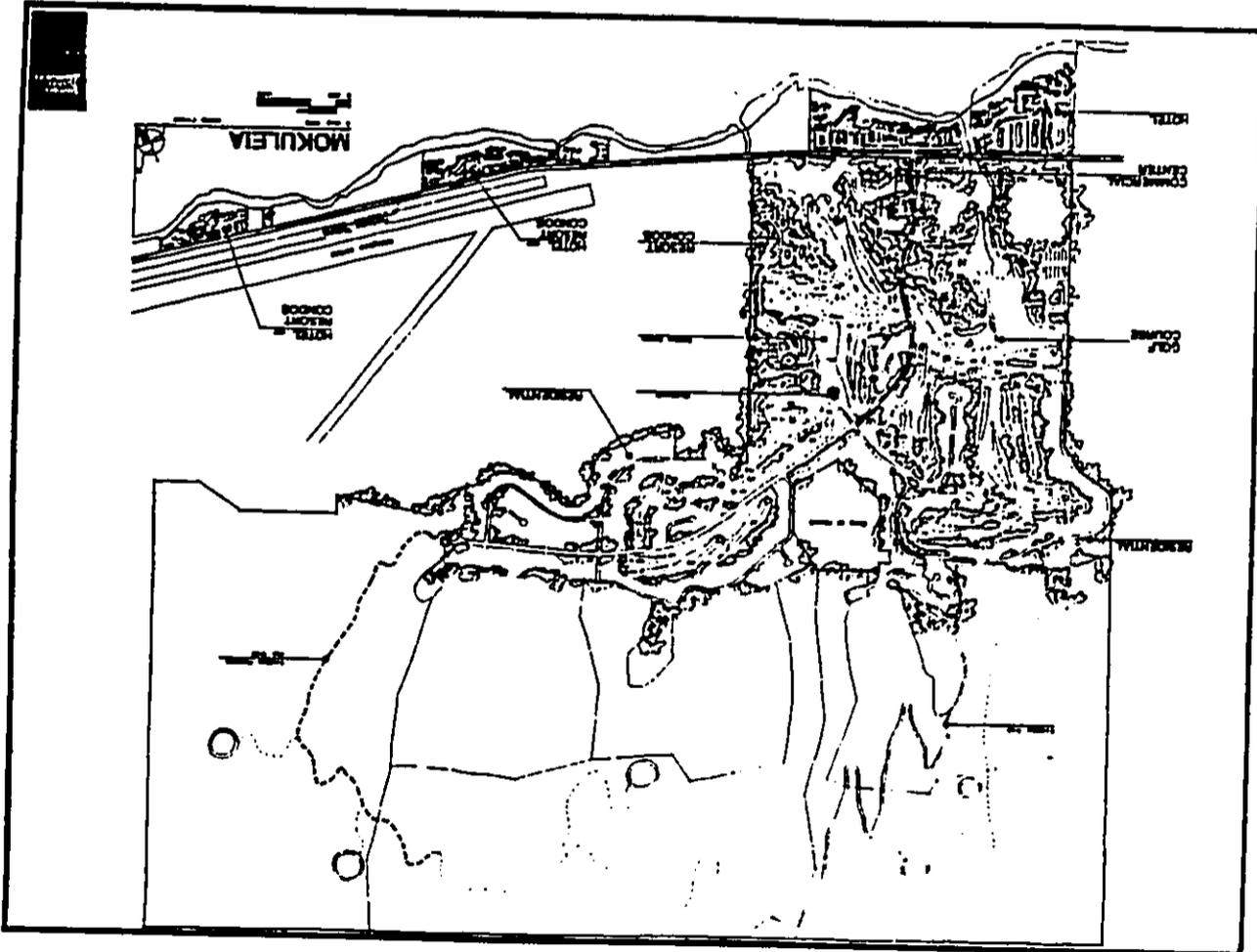
1/ Preliminary.
2/ Combined acreage.
Source: Mokuleia Development Corporation.

Exhibit II-C

MOKULEIA
Tentative Land Use Plan



MOKULEIA
Conceptual Plan



MOKULEIA
Development Phasing
(in Units, Unless Otherwise Noted)

Type of development	1990	1991-1995	1996-2000	2001-2005	Total
Hotel	500	600	500	500	2,100
Condominium	0	575	575	50	1,200
Single-family:					
Vacant lots	0	200	275	225	700
Building Improvements	0	10	64	130	204
Commercial (i;)	18,200	28,500	30,000	24,000	100,700
Golf course (holes)	18	18	0	0	36
Infrastructure (\$millions)	24.0	6.4	1.6	0.0	32.0

Access

Primary access between Mokuleia and Honolulu is provided via the H-2 Freeway and Kamehameha and Farrington Highways, the only arterials to the area.

Kamehameha Highway is a two-lane highway which extends from the H-2 Freeway and passes through Wahiawa, Haleiwa, and along the Windward coastline.

Farrington Highway extends from a point south of Weed Junction, paralleling the ocean, and terminates about six miles west of Mokuleia.

The airport is about 28 miles from Mokuleia, or 30 to 40 minutes by car. By comparison, the Waikiki, Kaanapali, Kapalua, and Turtle Bay resort areas are located 10, 28, 32, and 36 miles, respectively, from the nearest major airports.

III - POPULATION PROJECTIONS

The economic and fiscal impacts associated with the proposed Mokuleia development are influenced by the planned community's onsite resident and visitor population. This section describes the assumptions and analyses used to project the population associated with Mokuleia.

POPULATION ASSUMPTIONS

The average daily onsite population expected to reside in the hotels, condominiums and single-family units will consist of visitors and part-time and full-time residents. The projected daily population is based on assumptions about usage of the units, occupancy rates, and average household or party size developed from:

- Interviews with resort operators and brokers.
- Data compiled by the Hawaii Visitors Bureau.
- Estimates prepared by the Department of General Planning.

These assumptions about the characteristics of the projected population are summarized in Exhibit III-A.

RESIDENCY CHARACTERISTICS

The visitor, part-time and full-time population at Mokuleia will be comprised of people already residing in the State as well as out-of-state residents.

Local residents currently account for between 15% and 30% of total room-nights at selected hotels in Rural Oahu and on the neighbor islands. The presence of local residents visiting condominiums is significantly less, reported between 5% and 15% of total room-nights, because the minimum length of stay is typically four to five nights. Generally longer than the local resident's typical length of stay.

Local residents desiring to make a greater commitment to Mokuleia are more likely to be full-time rather than part-time use, and are anticipated to represent a nominal amount of the part-time residents at Mokuleia. This is consistent with residency patterns observed at selected condominiums on the neighbor islands.

The assumptions relating to the residency characteristics of the population at Mokuleia are summarized in Exhibit III-B.

HOKULEIA
Population Projection Assumptions

Type of unit	Distribution 1/	Occupancy rate	Average party size 2/
Hotel:			
1990	100%	65%	1.8
1995	100	65	1.8
2000	100	70	1.8
2005	100	75	1.8
Condominium:			
Full-time residents	20	95	3.0
Part-time residents	30	25	2.1
Visitors	50	50	2.1
Single-family:			
Full-time residents	40	95	3.3
Part-time residents	60	25	2.1
Visitors	NA	NA	NA

NA - Not applicable.
 1/ Distribution of uses within each facility type.
 2/ Occupied units only.
 Source: Based on interviews with resort operators and brokers at similar first-class resort developments and Hawaii Visitors Bureau, Profile: The Resort Condominium Market and Profile: The Resort Hotel Market, 1985. Household sizes for full-time condominium and single-family residents based on the household size projected by the Department of General Planning, Land Supply Review: Population Implications of Development Plans, August 1984.

HOKULEIA
Residency Assumptions

	Local resident	Out-of-state resident	Total
Visitor:			
Hotel	302	702	1002
Condominium	15	85	100
Part-time resident:			
Condominium	5	95	100
Single-family	5	95	100
Full-time resident:			
Condominium	100	0	100
Single-family	100	0	100

POPULATION PROJECTION

Based on the proposed development plan in Exhibit II-E and the population and residency characteristics outlined above, the average daily population at the proposed development is anticipated to increase from 590 persons in 1990 to 4,680 persons by 2005, as shown in Exhibit III-C.

Visitors from Oahu and the neighbor islands are projected to increase from about 180 persons in 1990 to 950 persons by 2005, as shown in Exhibit III-D. Out-of-state residents visiting the hotel and condominium facilities are projected to increase from 410 persons in 1990 to 2,530 by 2005.

The majority of the part-time residents are projected to be out-of-state residents while all of the full-time residents are projected as residents of the State, as also shown in the exhibit.

HOKULEIA
Projected Average Daily Population

Population type and residence	1990	1995	2000	2005
Visitors:				
Hotel units	590	1,290	2,020	2,840
Condominium units	0	300	610	640
Single-family units	0	0	0	0
Subtotal - visitors	590	1,590	2,630	3,480
Residents:				
Condominium units-	0	330	660	680
Full-time	0	90	180	190
Part-time	0	420	840	870
Subtotal	0	840	1,680	1,740
Single-family-	0	10	90	260
Full-time	0	0	20	70
Part-time	0	10	110	330
Subtotal	0	20	120	360
Subtotal - residents	0	430	950	1,200
Total population	590	2,020	3,580	4,680

Source: John Child & Company, Inc.

Exhibit III-D

HOKULEIA
Projected Population by Residence
1990 to 2005

Population type and residence	1990	1995	2000	2005
Visitors:				
State residents-				
Hotel	180	390	610	850
Condominium	0	50	90	100
Subtotal	<u>180</u>	<u>440</u>	<u>700</u>	<u>950</u>
Out-of-state residents-				
Hotel	410	900	1,410	1,990
Condominium	0	260	520	560
Subtotal	<u>410</u>	<u>1,160</u>	<u>1,930</u>	<u>2,550</u>
Total	<u>590</u>	<u>1,600</u>	<u>2,630</u>	<u>3,480</u>
Part-time residents:				
State residents-				
Condominium	0	0	10	10
Single-family	0	0	0	0
Subtotal	<u>0</u>	<u>0</u>	<u>10</u>	<u>10</u>
Out-of-state residents-				
Condominium	0	90	170	180
Single-family	0	0	20	70
Subtotal	<u>0</u>	<u>90</u>	<u>190</u>	<u>250</u>
Total	<u>0</u>	<u>90</u>	<u>200</u>	<u>260</u>
Full-time residents:				
Condominium	0	330	660	680
Single-family	0	10	90	260
Total	<u>0</u>	<u>340</u>	<u>750</u>	<u>940</u>

IV - ECONOMIC IMPACTS

This section describes the expected direct, indirect and induced impacts of Mokuleia on expenditures, employment and resident income and resident housing in the State.

POPULATION

Based on the analysis in Section III, the average daily visitor population at Mokuleia is projected to increase from 590 persons in 1990 to 3,480 in 2005, as shown in Exhibit IV-A.

The full- and part-time resident population at Mokuleia is projected to increase from 0 in 1990 to 1,200 persons by 2005, as also shown in the exhibit.

EXPENDITURES

Mokuleia will generate direct, indirect and induced expenditures in Hawaii from visitors and full-time and part-time residents. These visitors and residents will make direct expenditures for food, accommodations, recreational activities and other goods and services.

These direct expenditures will, in turn, require those establishments servicing the direct demands to purchase goods and services from other vendors in the State. The latter expenditures are an indirect effect of the direct expenditures. Induced expenditures are those made by employees and proprietors with income derived from the establishments serving the direct and indirect demands.

Visitor Expenditures

The direct, indirect and induced expenditures associated with the projected visitors at Mokuleia are discussed under the following sub-headings.

Direct Expenditures

Direct expenditures are projected based on the expected average daily visitor population and observed visitor expenditure patterns observed in the State.

The Hawaii Visitors Bureau (HVB) reports that in 1983, the average westbound visitor staying in hotel accommodations spent about \$87 per day while the same visitor staying in condominium accommodations spent an average of about \$80 per day. Trended to 1986 dollars, this represents average daily expenditures of about \$97 and \$90 for hotel and condominium visitors, respectively.

Exhibit IV-A

MOKULEIA
Projected Average Daily Population

Population type and residence	1990	1995	2000	2005
Visitors:				
Hotel units	590	1,290	2,020	2,840
Condominium units	0	300	610	640
Single-family units	0	0	0	0
Subtotal - Visitors	590	1,590	2,630	3,480
Residents:				
Condominium units-				
Full-time	0	330	660	680
Part-time	0	90	180	190
Subtotal	0	420	840	870
Single-family-				
Full-time	0	10	90	260
Part-time	0	0	20	70
Subtotal	0	10	110	330
Subtotal - Residents	0	430	950	1,200
Total population	590	2,020	3,580	4,680

State residents visiting the facilities at Mokuleia are expected to spend less than the westbound visitors to the State, because of the availability of lower-cost hotel "kamaaina" packages, and their propensity to spend less on transportation, clothing, gifts and souvenirs, which represents about 30% of westbound visitor expenditures.

State residents visiting the hotel and condominium facilities are anticipated to spend about \$50 and \$45 per day, respectively.

Based on the average daily population and expenditure estimates, visitors at Mokuleia could be expected to spend about \$18.3 million in 1990 and \$106.8 million by 2005, in 1986 dollars, as shown in Exhibit IV-B.

Indirect and Induced Expenditures

Based on multipliers estimated by the Hawaii State Department of Planning and Economic Development's (DPEd's) State Input/Output Model, the direct expenditures by visitors at Mokuleia could be expected to generate indirect and induced expenditures amounting to about \$17.0 million in 1990 and \$99.3 million by 2005, in 1986 dollars, as also shown in Exhibit IV-B.

Total Visitor Expenditures

Including direct, indirect and induced effects, expenditures in the State attributable to Mokuleia's visitors are projected to increase from \$35.3 million in 1990 to \$206.1 million by 2005, in 1986 dollars.

Resident Expenditures

This analysis addresses the total expenditures attributable to the resident population at Mokuleia. The relationship between direct, indirect and induced expenditures associated with full-time and part-time residents has not been quantified.

Residents of the State spent an average of \$8,100 in 1983, based on personal consumption expenditures and resident population estimates compiled by the DPEd. If trended, this represents an average daily expenditure of about \$25 per person in 1986 dollars.

Part-time resident expenditures are anticipated to be between those observed for visitors and full-time residents. For the purposes of this analysis, part-time resident expenditures are estimated at about \$50 per day, in 1986 dollars.

1/ Hawaii State Department of Planning and Economic Development, Hawaii's Income & Expenditure Accounts: 1958 to 1983, October, 1985 and The Population of Hawaii, 1970-1984: Technical Supplement, May 1985.

Exhibit IV-B

MOKULEIA
Projected Annual Visitor Expenditures
(1986 dollars; in millions)

Type of expenditure and place of stay	1990	1995	2000	2005
Direct:				
Hotel 1/	\$18.3	\$40.0	\$ 62.7	\$ 88.1
Condominium 2/	0.0	8.8	17.8	18.7
Subtotal - Direct	18.3	48.8	80.5	106.8
Indirect and induced	17.0	45.4	74.9	99.3
Total visitor expenditures 3/	\$35.3	\$94.2	\$155.4	\$206.1

Based on the average daily population and expenditure estimates, total annual expenditures by full-time and part-time residents at Mokuleia could be expected to increase from \$0 in 1990 to \$13.4 million by 2005, in 1986 dollars, as shown in Exhibit IV-C.

EMPLOYMENT

The planned developments at Mokuleia will generate short-term employment during the construction of new facilities and long-term employment in the operation and maintenance of those facilities.

Like expenditures, employment effects may also be classified as being direct, indirect or induced. Direct effects are those directly supported by all visitor and resident expenditures or construction requirements. Direct employment would generally be located on Oahu, both within and outside Mokuleia.

Indirect effects occur when directly affected establishments purchase goods or services from other businesses in order to fill new resident or visitor demand. Induced effects are those supported by employees or proprietors associated with the development and/or operation of activity at Mokuleia.

Direct Construction Employment

Direct construction employment is that which would be supported directly by the construction of the facilities proposed at Mokuleia. Such employment would include onsite laborers, operatives and craftsmen, as well as professional, managerial, sales and clerical workers whose places of employment may be elsewhere in the State.

Construction sequencing could begin as early as 1988 and proceed through 2005.

1/ Based on the average daily expenditure by visitors using hotel accommodations in the State in 1983, as reported by the Hawaii Visitors Bureau, 1983 Visitor Expenditure Survey, trended to 1986, and adjusted for spending habits of local residents staying at the hotels.

2/ Based on the average daily expenditure by visitors using condominium accommodations in the State in 1983, as reported by the Hawaii Visitors Bureau, 1983 Visitor Expenditure Survey, trended to 1986, and adjusted for spending habits of local residents staying at the condominium.

3/ Based on unpublished 1984 data from the State of Hawaii, Department of Planning and Economic Development and projected at \$1.93 per \$1.00 of direct expenditures.

Exhibit IV-C

MOKULEIA
Projected Annual Direct Resident Expenditures
(1986 dollars; in millions)

Type of expenditure and place of stay	1990	1995	2000	2005
Full-time residents:				
Condominium	\$0.0	\$3.0	\$ 6.0	\$ 6.2
Single-family	0.0	0.1	0.8	2.4
Subtotal	0.0	3.1	6.8	8.6
Part-time resident:				
Condominium	0.0	1.6	3.3	3.5
Single-family	0.0	0.0	0.4	1.3
Subtotal	0.0	1.6	3.7	4.8
Total	\$0.0	\$4.7	\$10.5	\$13.4

The direct needs for construction employees are based on the employment experiences of comparable developments and are summarized as follows.

Direct Construction Employment

Type of development	Full-time jobs per year per unit
Hotel	0.8
Condominium	0.9
Single-family-	
Vacant lots	0.2
Building improvements	1.4
Commercial	0.6 1/
Golf course	80 2/
Infrastructure	25 3/

The employment impacts in particular years within the periods shown will depend on the construction timing of the proposed hotel, condominium, single-family, and commercial development, but could average about 210 full-time equivalent jobs per year between 1988 and 2005, as shown in Exhibit IV-D.

Indirect and Induced Construction Employment

Because of the relatively high rates of pay in the construction industry and the interrelationships of establishments within the construction industry in Hawaii, the DPED estimates that a total of 2.4 full-time equivalent employees are supported in the State for each full-time equivalent direct construction employee. 4/

Based on this multiplier, the direct employment, as projected, implies a total demand during the development of Mokuleia of an average of about 490 full-time equivalent jobs per year between 1988 and 2005, as shown in Exhibit IV-D.

1/ Per 1,000: of commercial area.
 2/ Per 18-hole course.
 3/ Per \$1.0 million of construction cost, in 1972 dollars.
 4/ Hawaii State Department of Planning and Economic Development, Hawaii Construction Model: Further Developments, 1982.

Exhibit IV-D

MOKULEIA
Construction Employment
(Average Full-Time Equivalent Jobs per Year)

	1988- 1990	1991- 1995	1996- 2000	2001- 2005	Total
Direct construction employment	230	240	220	140	210
Total construction employment	560	580	530	330	490

Direct Operational Employment

Direct operation employment includes those jobs directly associated with the hotels, condominiums, commercial facilities, golf course and development administration.

The majority of direct operational employees would be employed in the proposed hotels. Hotels with similar characteristics to those planned for development at Mokuleia are found to employ between 0.6 and 1.6 full-time equivalent direct employees per hotel unit. The overall direct hotel operational employment at Mokuleia is projected at 0.9 full-time equivalent employees per unit.

Direct operational employment associated with the condominium projects are based on staffing requirements for similar properties, recognizing the level of employment resulting from the operation of vacation rental pools. Direct operational employment for the condominium projects at Mokuleia is estimated at 0.2 full-time equivalent employees per unit.

Based on a review of employment patterns for commercial facilities, 0.5 full-time equivalent jobs are projected to result from each 100% of commercial area at Mokuleia.

Employment at the golf course at Mokuleia is anticipated to increase from about 30 full-time equivalent employees for the initial 18-hole course to 50 full-time equivalent employees upon completion of the second 18-hole course.

Property administration includes employment associated with the broad operations of Mokuleia as a whole and includes maintenance, clerical, advertising, managerial, accounting and sales. Full-time equivalent employment is estimated to average about 50 jobs per year during the 15-year projection period.

Based on the development and employment characteristics, Mokuleia is projected to generate about 600 full-time equivalent direct operational employment positions by 1990 and about 2,700 by 2005, as shown in Exhibit IV-E.

IV includes direct, indirect and induced construction employment.
 Source: John Child & Company, Inc.

Exhibit IV-E

MOKULEIA
Projected Direct Operational Employment

<u>Type of development</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>	<u>2005</u>
Hotel	450	990	1,440	1,890
Condominium	0	120	230	240
Commercial	90	230	380	500
Golf course	30	50	50	50
Property administration	50	50	50	50
Total	620	1,440	2,150	2,730

Indirect and Induced Operational Employment

The direct operational positions created would also generate additional employment elsewhere in the State. Based on recent studies of the economic impacts of tourism by the DPED, the relationship between direct employment and indirect and induced employment is projected at the rates shown as follows. 1/

<u>Location of direct employment</u>	<u>Multiplier per direct employee</u>
Hotel and property administration	0.90
Condominium rental pool	0.50
Commercial facilities	0.60
Other (including golf course)	0.02 2/

Indirect and Induced Employment Multipliers

Based on these relationships, indirect and induced operational employment is projected to increase from 470 full-time equivalent positions in 1990 to 2,160 by 2005, as shown in Exhibit IV-F. Total operational employment resulting from the Mokuleia development is projected to increase from nearly 1,100 positions in 1990 to nearly 4,900 positions by 2005, as also shown in the exhibit.

RESIDENT INCOME

Mokuleia could be expected to have a significant impact on personal and household income for residents of the island and the State. Mokuleia would generate resident income through employee wages, salaries and fringe benefits and as income to proprietors.

Personal Income

Personal income is defined as the wages and salaries paid to the direct construction and operational employees of Mokuleia. Personal income is projected on the basis of average industry wages and salaries and the expected future levels of employment demand.

1/ Hawaii State Department of Planning and Economic Development, The Economic Impact of Tourism in Hawaii: 1970-1980, 1982.
2/ Expressed as a percent of total indirect and induced employment.

Exhibit IV-F

MOKULEIA
Projected Indirect and Induced
Operational Employment

Type of development	1990	1995	2000	2005
Hotel and property administration	410	890	1,300	1,700
Condominium	0	60	120	120
Commercial	50	140	230	300
Other	10	20	30	40
Total	470	1,110	1,680	2,160

Estimated annual wage levels for 1986 are based on the 1984 average annual wages for each industry, as reported in the Hawaii State Department of Labor and Industrial Relations, 1984 Employment and Payrolls in Hawaii, 1985 and trended by the five-year compound growth rate in wages for the specific industry or based on wages observed at comparable facilities. Personal income for 1986 by employment type, is shown as follows.

	Estimated Annual Personal Income I/ (1986)
Construction	\$30,800
Hotel and property management	14,500
Condominium	14,500
Commercial operations	11,500
Golf course	12,600

Annual personal income paid to Hawaii residents in the form of wages and salaries earned directly from establishments at Mokuleia or from its visitors may be expected to increase from \$30.3 million in 1990 to \$42.3 million by 2005, in 1986 dollars, as shown in Exhibit IV-G.

Household Income

Estimation of total household income effects based on the visitor expenditures permits a perspective on the benefits to statewide income associated with the development at Mokuleia.

Total household income generated by the expenditures from visitors at Mokuleia would include the fringe benefits and proprietor's income paid by establishments that sell goods and services directly to the visitors, as well as the wages and salaries noted previously. In addition, household income includes income generated through the multiplier effects of indirect and induced visitor expenditures.

The DPED reports the multiplier effects of visitor expenditures throughout the community have declined in recent years, but each \$1.00 spent by visitors to the State in 1983 was estimated to have generated \$0.70 in total income to households in the State.

Assuming a similar multiplier effect for the expected expenditures of visitors to Mokuleia, it is projected that Mokuleia could annually contribute an additional \$12.8 million to total household income in 1990 and about \$74.6 million by 2005, as also shown in Exhibit IV-G.

Source: John Child & Company, Inc.

I/ Excludes tips, where applicable.

Exhibit IV-G

V - FISCAL IMPACTS

HOKULEIA
Projected Average Annual
Personal and Household Income
(1986 dollars; in millions)

Type of employment	1990	1995	2000	2005
Personal income:				
Construction	\$21.6	\$ 7.5	\$ 6.8	\$ 4.3
Hotel and resort operation	7.3	15.1	21.6	28.1
Condominium	0.0	1.7	3.3	3.5
Commercial operations	1.0	2.6	4.4	5.8
Golf course	0.4	0.6	0.6	0.6
Total personal income	\$30.3	\$27.5	\$36.7	\$42.3
Total State household income supported by direct visitor expenditures	\$12.8	\$34.2	\$56.4	\$74.8

The net fiscal impacts of Mokuleia's proposed developments may be evaluated by comparing the tax revenues and expenditures that could be expected to be incurred.

This section describes the expected fiscal impacts of the proposed developments in terms of revenues and expenditures to the City & County of Honolulu and the State of Hawaii.

REVENUES

Development at Mokuleia would bring tax revenues to the County and State governments. County government revenues would be in the form of additional real property taxes from the new facilities planned for development. Revenues to the State government would be composed primarily of unemployment taxes, excise taxes, Gross income taxes and personal income taxes.

The following sections project the revenues that could be generated for the County and State governments as a result of development at Mokuleia.

County

Real property taxes in the County are currently \$10.00, \$9.00 and \$6.75 per \$1,000 of total assessed value for hotel and resort, commercial and golf course, and residential uses, respectively.

Development plans at Mokuleia are conceptual. Plans and specifications outlining design and quality characteristics for the various components of the development are not available. It is impossible to accurately estimate the component values without such information. However, based on broad price levels observed for similar facilities on Oahu and the neighbor islands, possible value ranges are shown as follows.

Possible Value Estimates
 (1986 dollars per square foot unless otherwise noted)

Hotel	\$200	- \$250
Condominium	150	- 200
Single-family:		
vacant lot	2	- 7.50
improved property	75	- 125 <u>1/</u>
Commercial (per square foot)	200	- 300
Golf course (per hole)	120,000	- 150,000

1/ Price per square foot of building area.

Based on current tax rates and the foregoing value ranges, and allowing for current real property taxes of \$0.03 million, the planned facilities at Mokuleia could be expected to generate about \$0.7 million in net real property taxes in 1990 and \$4.5 million by 2005, in 1986 dollars, as shown in Exhibit V-A.

The majority of these revenues would be attributable to the property values of the hotel and condominium developments.

Additional property tax revenues would be generated by the alternative recreational facilities, but they have not been estimated due to the lack of information relating to their size and scale of development.

State

The tax revenue to the State government is estimated as a residual of total State and County government revenues less County government revenue as estimated in the previous section.

Results of the State of Hawaii Department of Planning and Economic Development's (DPED's) Input/Output Model indicate that the ratio of total tax revenues to direct visitor expenditures in Hawaii has ranged from 0.119 to 0.122 in recent years. These ratios indicate that for each \$1.00 spent by visitors to the State, \$0.12 was generated in the form of State and County government taxes.

At the anticipated future ratio of \$0.12 total revenues per visitor dollar, total State and County tax revenues attributable to the development and operations of facilities at Mokuleia would amount to \$2.2 million in 1990 and increase to \$12.8 million by 2005, in 1986 dollars, as shown in Exhibit V-B.

Of this total, tax revenues to the State government are projected to increase from \$1.5 million in 1990 to \$8.3 million in 2005, in 1986 dollars, also shown in Exhibit V-B.

EXPENDITURES

The visitors and residents at Mokuleia would necessitate expenditures of public resources in terms of:

- Public safety (such as increased needs for police and fire protection).
- Development and upkeep of highways, recreational facilities and natural resources.
- Health and sanitation measures.
- Cash capital improvements.

MOKULEIA
Projected Development Impact on County Tax Revenue
(1986 Dollars; in Millions, Annual)

Type of development	1990	1995	2000	2005
Hotel	\$0.63	\$1.38	\$2.00	\$2.63
Condominium	0.00	0.54	1.09	1.13
Single-family lots:				
Vacant	0.00	0.10	0.20	0.25
Improved	0.00	0.01	0.07	0.21
Commercial	0.04	0.11	0.17	0.23
Golf course	0.02	0.04	0.04	0.04
Projected real property tax revenue	0.69	2.18	3.57	4.49
Less current real property tax revenue	0.03	0.03	0.03	0.03
Net real property tax revenue, rounded	\$0.70	\$2.20	\$3.50	\$4.50

Exhibit V-B

MOKULEIA
Development Impact on State Tax Revenues
(1986 Dollars; in Millions, Annual)

	<u>1990</u>	<u>1995</u>	<u>2000</u>	<u>2005</u>
Direct visitor expenditures	\$18.3	\$48.8	\$80.5	\$106.8
State and County tax revenue multiplier	<u>0.12</u>	<u>0.12</u>	<u>0.12</u>	<u>0.12</u>
State and County tax revenues	2.2	5.9	9.7	12.8
Less net County tax revenues	<u>(0.7)</u>	<u>(2.2)</u>	<u>(3.5)</u>	<u>(4.5)</u>
Total State tax revenues	<u>\$ 1.5</u>	<u>\$ 3.7</u>	<u>\$ 6.2</u>	<u>\$ 8.3</u>

Residents necessitate public costs in all the aforementioned areas, and also in education, retirement and pension funds, public welfare and other government functions.

County

The various County government expenditures for fiscal year 1984 were analyzed with respect to the relevant service population for each government function. This analysis indicates that County government expenditures in 1984 totaled about \$480 per resident and \$290 per visitor, as shown in Exhibit V-C. These expenditures are projected to have increased by about 7% between 1984 and 1986.

Based on the trended County government outlays, public expenditures by the County government on behalf of Mokuleia's visitors and residents could be expected to total about \$0.2 million in 1990 and \$1.7 million by 2005, in 1986 dollars, as shown in Exhibit V-D.

State

A similar analysis of State government expenditures and the relevant populations for the various services indicates that expenditures in 1984 totaled about \$1,940 per resident and \$330 per visitor, as shown in Exhibit V-E. These expenditures are projected to have increased by about 7% between 1984 and 1986.

Based on this analysis, State government public expenditures on behalf of Mokuleia's visitors and residents are projected to total \$0.2 million in 1990 and \$3.3 million by 2005, in 1986 dollars, as shown in Exhibit V-F.

REVENUE/EXPENDITURE ANALYSIS

The net fiscal impacts of Mokuleia's development to the County and State governments are estimated by comparison in the following sections.

County

Comparison of projected public revenues and expenditures indicates the County government may expect to net about \$0.5 million in additional annual revenues in 1990 and \$2.8 million by 2005, in 1986 dollars, as shown in Exhibit V-G.

The analysis also indicates that additional County government revenues generated by Mokuleia would be about 2.6 to 3.1 times the additional expenditures incurred by the County government, as also shown in the exhibit.

HOKULEIA
Development Impact on County Government Expenditures
(1986 Dollars, in Millions)

Population or expenditure type	1990	1995	2000	2005
Population:				
Residents	0	340	750	940
Visitors and part-time residents	590	1,680	2,830	3,740
Total	590	2,020	3,580	4,680
Government expenditures:				
Residents 1/	\$0.0	\$ 0.2	\$ 0.4	\$ 0.5
Visitors and part-time residents 2/	0.2	0.5	0.9	1.2
Total	\$0.2	\$ 0.7	\$ 1.3	\$ 1.7

1/ Government expenditures for residents estimated at \$480 per capita and trended to 1986.
2/ Government expenditures for visitors and part-time residents estimated at \$290 per capita and trended to 1986.

HOKULEIA
Honolulu County per Capita Government Expenditures
1984

	Operating expenditure (000s) 1/	Population base 2/	Annual Expenditure	
			Resident	Visitor
General government	\$ 50,236	798,800	\$ 62.90	\$ --
Public safety	97,801	854,700	114.40	114.40
Highways	15,410	854,700	18.00	18.00
Health and sanitation	37,351	854,700	43.70	43.70
Public welfare	--	798,800	--	--
Public schools	--	798,800	--	--
Recreation	28,635	854,700	33.50	33.50
Interest	15,219	798,800	19.10	--
Bond redemption	16,611	798,800	20.80	--
Pension and retirement	33,241	798,800	41.60	--
Economic/urban development	21,568	798,800	27.00	--
Mass transit	37,180	854,700	43.50	43.50
Miscellaneous	13,586	798,800	17.00	--
Cash capital improvements	35,579	854,700	41.60	41.60
Total	\$402,417		\$483.10	\$294.70

1/ For fiscal year ending June 30, 1984.
2/ Resident or de facto population estimates for Honolulu County as of January 1, 1984.
Source: Tax Foundation of Hawaii, Government in Hawaii, 1985, 1985 and State of Hawaii, Department of Planning and Economic Development, The State of Hawaii Data Book, 1985.

Exhibit V-E

HOKULEIA
State per Capita Government Expenditures
1984

	Operating expenditure (000s) 1/	Population base 2/	Annual Expenditure	
			Resident	Visitor
General government	\$ 128,131	1,028,400	\$ 124.60	\$ --
Public safety	73,344	1,128,000	65.00	65.00
Highways	49,041	1,128,000	43.50	43.50
Natural resources	17,172	1,128,000	15.20	15.20
Health and sanitation	72,631	1,128,000	64.40	64.40
Hospitals and institutions	114,557	1,028,400	111.40	--
Public welfare	328,400	1,028,400	319.30	--
Education	696,257	1,028,400	677.00	--
Recreation	13,827	1,128,000	12.30	12.30
Utilities and other enterprises	76,990	1,128,000	68.30	68.30
Debt service 3/	213,293	1,028,400	177.30	30.10
Pension and retirement 3/	126,006	1,028,400	104.70	17.80
Employees' health and hospital insurance 3/	24,856	1,028,400	20.70	3.50
Unemployment compensation	78,278	1,028,400	76.10	--
Grants-in-aid to counties	18,173	1,028,400	17.70	--
Urban redevelopment and housing	11,619	1,028,400	11.30	--
Miscellaneous	25,111	1,128,000	22.30	--
Cash capital improvements	9,967	1,028,400	9.70	9.70
Total	\$2,077,673		\$1,940.80	\$329.80

- 1/ For fiscal year ending June 30, 1984.
2/ Resident or de facto population estimates for the State as of January 1, 1984.
3/ Expenditures allocated to residents and visitors in proportion to total per capita expenditures.

Exhibit V-F

HOKULEIA
Projected Development Impact on
State Government Expenditures
(1986 Dollars; in Millions)

Population or expenditure type	1990	1995	2000	2005
Population:				
Residents	0	340	750	960
Visitors and part-time residents	590	1,680	2,830	3,740
Total	590	2,020	3,580	4,680
Government expenditures:				
Residents 1/	\$0.0	\$ 0.7	\$ 1.6	\$ 2.0
Visitors and part-time residents 2/	0.2	0.6	1.0	1.3
Total	\$0.2	\$ 1.3	\$ 2.6	\$ 3.3

- 1/ Government expenditures for residents estimated at \$1,940 per capita and trended to 1986.
2/ Government expenditures for visitors and part-time residents estimated at \$330 per capita and trended to 1986.

Exhibit V-G

HOKULEIA
Projected State and County
Revenues and Expenditures

	1990	1995	2000	2005
County:				
New revenues	\$0.7	\$2.2	\$3.5	\$4.5
New expenditures	<u>0.2</u>	<u>0.7</u>	<u>1.3</u>	<u>1.7</u>
Net additional revenues	<u>\$0.5</u>	<u>\$1.5</u>	<u>\$2.2</u>	<u>\$2.8</u>
Revenue/expenditure ratio	3.5:1	3.1:1	2.7:1	2.6:1
State:				
New revenues	\$1.3	\$3.2	\$5.4	\$7.2
New expenditures	<u>0.2</u>	<u>1.3</u>	<u>2.6</u>	<u>3.3</u>
Net additional revenues	<u>\$1.1</u>	<u>\$1.9</u>	<u>\$2.8</u>	<u>\$3.9</u>
Revenue/expenditure ratio	6.5:1	2.5:1	2.1:1	2.2:1

State

Comparison of the revenues and expenditures as projected indicate the State government could be expected to net about \$1.1 million in 1990 and \$3.9 million by 2005, in 1986 dollars, as shown in Exhibit V-G. This indicates a revenue/expenditure ratio averaging about 2.3:1 during the forecast period, as also shown in the exhibit.

QUALIFICATIONS OF JOHN CHILD & COMPANY, INC.

John Child & Company, Inc. is a professional real estate service corporation which specializes in real estate appraisal and consulting. Founded in 1937, John Child & Company, Inc. is one of the largest and oldest real estate appraisal and consulting companies in Hawaii.

PROFESSIONAL STAFF

The Company's professional staff has a wide range of real estate experience and hold designations earned from the major professional organizations. 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
Darlene Ariola, Research Assistant
Cheryl Emery, Research Assistant

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
- Arbitration.

Our studies cover a variety of real estate properties and interests 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.

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Our professional services are used to assist clients in internal management and decision making, negotiations with other parties, and for obtaining financing.

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Our clients include both private and public organizations. Typical clients are:

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Amfac, Inc.
Bank of America
Bank of Hawaii
B.P. Bishop Estate
Estate of James Campbell
Castle & Cooke, Inc.
Mililani 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
Hawaiian Electric
Honolulu Telephone
Honolulu Federal Savings and Loan Association
KACOR Development Company
Loyalty Development
Loyalty Enterprises
Loyalty Finance Co.
Pacific Construction Co., Ltd.
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

KAREN CHAR, MAI
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).
 - 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-elect and 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).

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 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.

PAUL D. COOL
Appraiser

Education

B.B.A. Business Economics And Quantitative Methods, University of Hawaii, 1980.

Various courses, workshops, and seminars by the American Institute of Real Estate Appraisers, International Society of Real Estate Appraisers, and the American Society of Appraisers including:

- Society of Real Estate Appraisers, Course 101, "An Introduction to Appraising Real Property".
- Society of Real Estate Appraisers, Course 201, "Principles of Income Property Valuation".
- Society of Real Estate Appraisers, Course 202, "Applied Income Property Valuation".

Professional Experience

Appraiser, John Child & Company, Inc. (1980 to present).

Court Testimony

Qualified as an expert witness in the valuation of real property in the Courts of the State of Hawaii.

APPENDIX C

Final Social Impact Assessment
For Proposed Mokuleia Recreational/Resort Community
Mokuleia, Oahu, Hawaii

Prepared for
Mokuleia Development Corporation

Prepared by
Community Resources, Inc.

July 1986

COMMUNITY RESOURCES, INC.

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**FINAL SOCIAL IMPACT ASSESSMENT
FOR PROPOSED HOKULEIA RECREATIONAL/RESORT COMMUNITY**

-- June 1986

Prepared for:
Hokuleia Development Co.

Prepared by:
Community Resources, Inc.
Honolulu, Hawaii

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1.0 INTRODUCTION

1.1 Background and Purpose

Mokuleia Development Corp., a subsidiary of Northshore National Life Insurance Company, is seeking Government approval for a proposed Mokuleia recreational community (with resort components) on 1018.75 acres -- including 34 acres of waterway. Not included in the requested approvals are approximately 2,000 additional acres of hills and valleys mauka of the proposed recreational community; this mauka property may, however, present hiking and camping opportunities which could complement the resort and recreational/residential development factors.

The bulk of the 1,018.75 acres consists of 816 contiguous acres mauka of Farrington Highway. The remaining 122.75 acres are distributed over four noncontiguous beachfront parcels mauka of the highway.

Upon completion, the development would include 3,300 hotel and resort condominium units; 700 residential lots; a 33-acre retail commercial complex; and 36 holes of golf. Other potential recreational uses still under study include substantial equestrian activities, tennis facilities, a track-and-field sports center, a multi-media complex within the commercial complex, and the previously mentioned possible hiking and/or camping opportunities on the adjacent mauka property.

The proposed project would require a number of Government land use approvals, including several which would trigger requirements for an Environmental Impact Statement (EIS). The purpose of this report is to assess social impacts of the project in conjunction with the larger EIS effort. The full report is intended as an appendix to the EIS, with summaries of findings to be included in appropriate sections of the full EIS text.

1.2 Comments on Methods and Assumptions

Social impact assessment requires a variety of methods, from relatively firm forecasts of quantifiable impacts (e.g., population) to highly speculative discussion of less tangible potential impacts (e.g., lifestyle or social structure).

Principal methodological techniques used include: (1) statistical analysis of both existing and proposed populations; (2) qualitative input obtained from interviewing knowledgeable community and government agency "key informants"; and (3) analysis of social outcomes of similar resort development in comparable rural Hawaii areas.

Several important assumptions affect the overall thrust of this report:

- (1) While there may be some islandwide impacts in terms of economies of North Shore recreational activities which

2.0 EXISTING SOCIO-ECONOMIC CONDITIONS

2.1 Introductory Comments

The purpose of this section is to provide an overview of the geography, history, and socio-economic character of the area immediately adjacent to the project site and the surrounding region. This region is divided into a "primary," "secondary," and "tertiary" study area, as shown on Figure 2.1 (which also shows the project location on Oahu) and described below:

- o The "Primary Study Area" consists of the U.S. Census Department's "Maui Division" census tracts 99.01, 99.02, and 100, although this area will generally be referred to as the "North Shore" to differentiate it from the community of Maunaloa.

It should be noted that the City's North Shore Development Plan Area (and North Shore Neighborhood Board boundaries) extends to include a portion of census tract 101, in the Koolauloa Division. This additional area shown in Figure 2.2 -- includes the areas known as Sunset Beach, Maione, and Pupukea. These communities will sometimes be included with the "Primary Study Area" for narrative purposes, but some discussions of overall census figures would not include them.

- o The "Secondary Study Area" includes the two census divisions bordering the North Shore to the east (Koolauloa Division, consisting of tracts 101, 102.01, and 102.02) and the south (Maunaloa Division, consisting of tracts 90 through 95.05). The Maunaloa Division, also to the south of the Primary Study Area, is not included because of the lack of paved transportation linkages between Maunaloa and Waianae.
- o The "Tertiary Study Area" includes the Central Oahu communities of Milliken, Waipahu, and surrounding subdivisions (tracts 87.01 through 89.03)

Most discussion in this document will focus on the Primary Study Area (particularly the communities closest to the project site -- Hukuleia, Maunaloa, and Haleiwa). The Secondary and Tertiary study areas are noted here because they are potential sources of labor supply.

2.2 Project Site

Figure 2.3 indicates both the project site and nearby land uses along Farrington Highway. (Not included on Figure 2.3, however, are the approximately 2,000 manka acres south of the project site.)

The small parcel marked "State of Hawaii" in the middle of the project site is a former military weapons storage site.

attract persons from outside the region, the primary impact area will be Oahu's North Shore, with secondary impacts on Koolauloa and Waianae.

(2) It is assumed that the population guidelines of the City and County General Plans, as reflected in the limited supply of residential land in the development plans for the North Shore and surrounding areas, will remain in place.

(3) For many types of social and socio-economic impacts, managing outcomes may be more important (and sometimes easier to address) than predicting them. This is particularly true in regard to employment of area residents.

1.3 Scope and Structure of Report

The concept of "social impact" is a broad one, and certain topics may be judged by some people but not by others to fall within this category. The scope of this report excludes certain topics which are, however, being addressed for the EIS by other consultants. These include:

- o Detailed analysis of on-site employment and population impacts;
- o Impacts on traffic, infrastructure, and public services;
- o Archeological and historic sites.

The remainder of this report is organized into three broad sections:

- (1) Section 2.0 addresses existing socio-economic conditions, ranging from a census data-based description of the present population to a presentation of current community issues and concerns relevant to the project.
- (2) Section 3.0 provides a context for social impact forecasts; forces for change with or without the project; key social characteristics of the project; and alternative future for the project site.
- (3) Section 4.0 discusses potential impacts and mitigation, with particular emphasis on social aspects of employment, current on-site human activities, recreational and subsistence impacts, qualitative social concerns (e.g., lifestyle), and indicators of social stress or harmony (e.g., crime).

returned to the State following World War Two. It is not currently used for any public purpose.

As noted in Section 1.1, the project area proposed for recreational development totals 1,018.75 acres. Of these, 896 acres are in a single contiguous, inverted-L-shaped parcel south of Farrington Highway, and another 82 acres comprise a beachfront parcel immediately north of the highway and the target parcel. The remaining 10.75 acres are distributed among three noncontiguous beachfront parcels (27, 0.75, and 13 acres, respectively) further west on Farrington Highway. The distance along the highway from the easternmost edge of the 82-acre beachfront parcel to the westernmost edge of the 13-acre parcel is approximately 14,000 feet.

These lands -- now known as "Mokuleia Beach" -- were originally owned by the wealthy kamaulua Dillingham family, who used them for a vacation retreat and ranching purposes. The 896-acre parcel contains the old Dillingham estate home and is used by the current landowner, Northwestern Hotel, primarily for cattle and horse grazing. A part of the property is also used for stables (available to the public on a fee basis) and related equestrian activities; this portion of the land has been designated "Crossbar Ranch" although it is not actually an independent ranch or business entity. The landowner considers all these ranching and equestrian activities (which collectively employ about ten people) to be temporary uses of the land, since they are unprofitable.

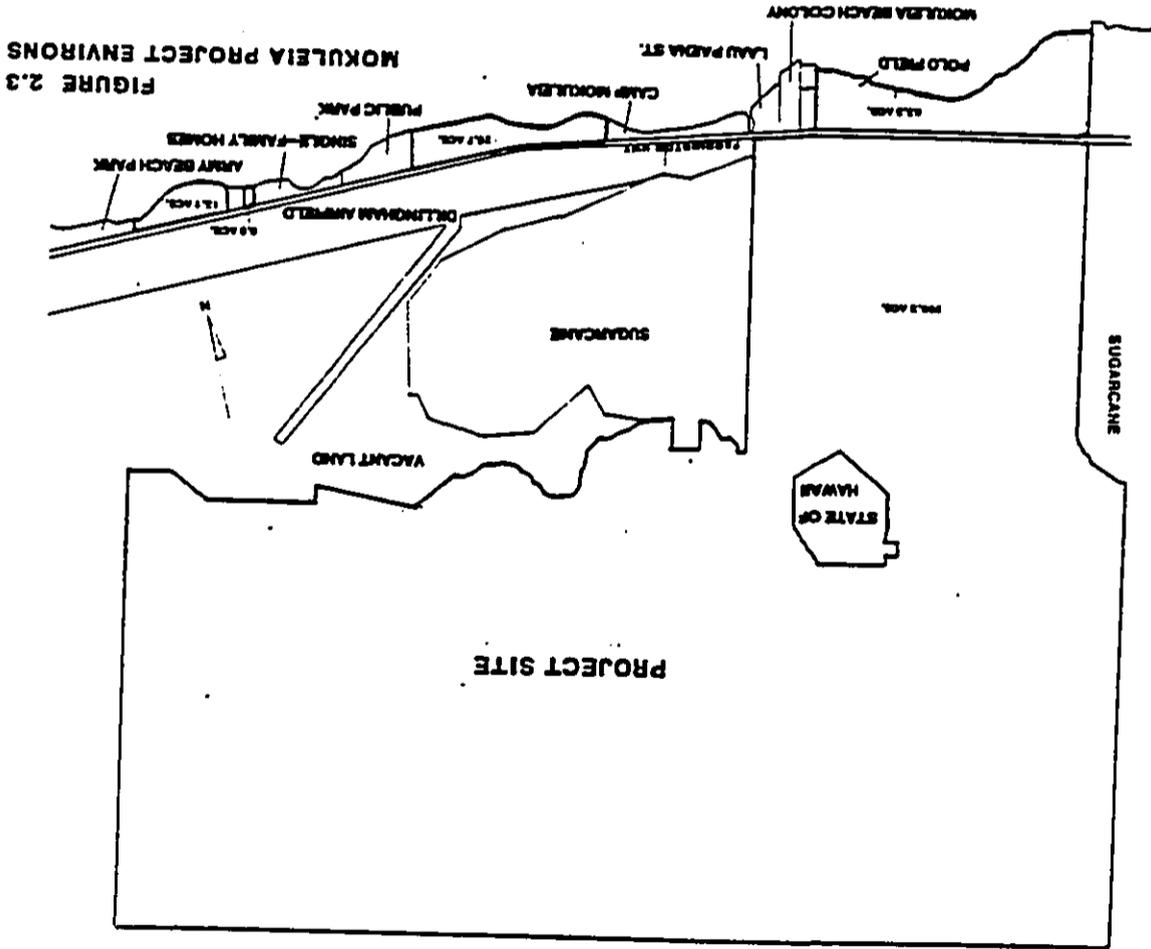
The 82-acre beachfront parcel is now primarily used only for grazing. However, the westernmost 18 acres are leased to the Hawaii Polo Club for weekend polo games during part of the year. At present, this site is the major center of polo activities for all Hawaii.

The remaining three beachfront parcels are all primarily now in open space and are designated on the City's North Shore Development Plan as intended for Public Facility and/or Recreation. The 27-acre parcel abutting Mokuleia Beach Park is designated Public Facility, presumably for possible future expansion of the park. However, the easternmost six of these 27 acres are currently leased to the Episcopal Church's recreational "Camp Mokuleia" complex and contains a few thatched huts.

Current project-site uses and activities will be further discussed in Section 1.2 ("Impacts on Current On-Site Human Activities"), and the immediately surrounding area will be further described in the following Section 2.3.

2.3 Overview of Complete Study Area

This discussion will provide a mostly qualitative overview (inflected with some selected quantitative indicators) of the study area, while following sub-sections will present detailed census data.



2.3.1 Primary Study Area

According to the U.S. Census, the North Shore (Maui) Division had a 1980 population of 9,819, only about 600 more than were counted in 1970. However, the estimated July 1981 population had increased to 10,534 (Hawaii State Census Statistical Areas Committee, 1985), primarily due to residential construction in the Haleiwa and Maui areas.

(NOTE: As of 1980, an additional 3,212 persons lived in the Sunset/Waikea/Puukoa communities. As earlier noted, these communities -- and other lands within the triangular shaded area on Figure 2.2 -- are not in the North Shore ["Maui"] Census Division but are in the City and County's North Shore Development Plan Area.

For this reason, some discussions of population in this report will combine the two areas. Table 2.1 on the following page provides an analysis of the 1980 populations for the various areas -- census divisions vs. Development Plan Areas -- as well as the major communities within each.)

Detailed demographic breakdowns of U.S. Census data will be provided in following sub-sections. Briefly, however, the census data indicate the predominant ethnic groups as of 1980 in the Maui Division were Filipino (32%) and Caucasian (31%), although different communities feature greatly different ethnic mixes. Compared to islandwide averages, the median age on the North Shore was slightly younger; the proportion of foreign-born individuals slightly higher; and average educational levels were significantly lower.

Remaining discussion will focus on individual communities:

2.3.1.1 Hukuleia (and Maui Beach)

Hukuleia is the community surrounding the project site. It is a rural area, with pockets of houses and apartment units but no public facilities (except beach parks) or retail areas, extending for about one mile along Farrington Highway. The mauka side of the highway is largely taken up by Hukuleia Ranch (the proposed resort site), Castle and Cooke sugar cane land, and the Billingham Airfield and Gliderport. Other activities on the mauka side (in addition to the residential pockets) include the Epilepsy Chapel, Camp Hukuleia, the City and County's Hukuleia Beach Park, the Hukuleia Army Beach, and -- toward the end of the road -- the YPCA's Camp Erdann.

It is to some extent a matter of opinion and personal definition as to whether the "Hukuleia" community is confined to the homes along Farrington Highway or whether it also includes the area along Crozier Drive which becomes Maui Beach Road as one travels east toward Haleiwa).

Table 2.1:
Distribution of 1980 Population Over Various
North Shore and Koolauloa Communities

North Shore	Total Pop.	% of Census Division Pop.	% of Development Plan Area Pop.	% of Combined Areas' Pop.
Maui CDP	4,051	41.1%	31.0%	16.8%
Haleiwa CDP	2,412	24.5%	18.5%	10.0%
remainder south & west of Maui River	3,386	34.4%	25.9%	14.1%
from Maui River to Kaunala Ridge (Sunset/Waikea/Puukoa)	3,212	---	24.6%	13.1%
Total in Census Div. (excl. Sunset etc.)	9,819	100.0%	(75.1%)	(11.0%)
Total in DP Area (incl. Sunset etc.)	13,061	(132.6%)	100.0%	(51.3%)
Koolauloa				
Kahuku CDP	935	6.6%	8.5%	3.8%
Lake CDP	4,613	32.7%	42.3%	19.3%
Hauula CDP	2,997	21.1%	27.3%	12.5%
Kaunua CDP	959	6.8%	8.7%	4.0%
remainder (excl. Sunset etc.)	1,149	10.2%	13.2%	6.0%
REPEAT: Sunset/Waikea/Puukoa	3,212	22.6%	---	(REPEAT) 13.1%
Total in Census Div. (incl. Sunset etc.)	11,195	100.0%	(129.2%)	(59.0%)
Total in DP Area (incl. Sunset etc.)	10,983	(77.1%)	100.0%	(45.7%)
Combined Total	21,011	---	---	100.0%

NOTE: "CDP" = Census Designated Place

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The latter area is also known as "Waiaina Beach," a term that will be generally used in this report. For the most part, this report will treat "Mokuleia" and "Waiaina Beach" as two separate but closely-related communities. The reason for this distinction is that properties along Farrington Highway are much more likely to be impacted by the proposed development than homes along Crozier Drive and Waiaina Beach Road. Thus, the term "Mokuleia" will generally refer to the area shown in Figure 2.2. However, it should be noted that significant social linkages exist between Mokuleia and Waiaina Beach. For example, the Mokuleia Community Association counts a number of Waiaina Beach residents among the approximately 100 families comprising the association membership (personal communication, Michael Bailey, April 21, 1987). Since this association was formed largely in response to a previous proposal by the Mokuleia Development Corporation, it may be apparent that at least some Waiaina Beach residents consider themselves a part of Mokuleia and/or strongly affected by development of this property.

Figure 2.1 shows the location of Crozier Drive and Waiaina Beach Road relative to "Mokuleia."

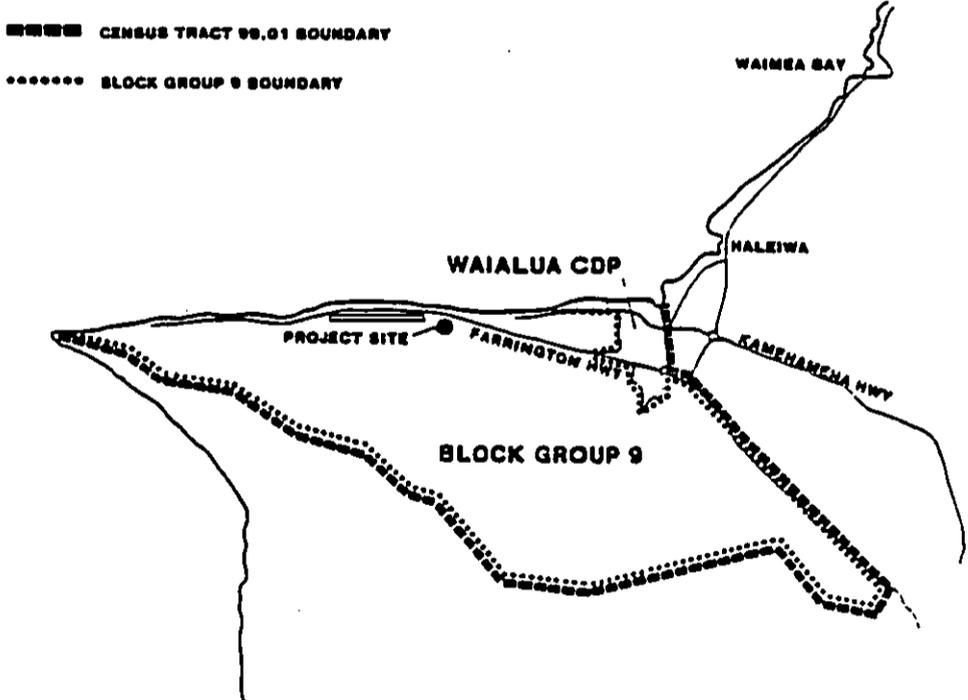
This figure also indicates the boundaries of Block Group 9 within Census Tract 99.01. This block group constitutes the "remainder" of the census tract outside the relatively concentrated residential areas comprising Waiaina town and Waiaina Beach. Because Mokuleia is not a Census-Designated Place, Block Group 9 data provide the best available 1980 statistics, as a substantial portion of Block Group 9 residents and housing units would be located in Mokuleia. However, note that a portion of Waiaina Beach homes (along Crozier Drive) are included in Block Group 9, as are scattered farms and other dwellings outside of the beach-front communities.

As of 1980, the population for Block Group 9 was 650, of which about 70% was Caucasian. Of the population aged 5 or older, 48% had been living outside Hawaii five years previously. Census data also indicate a wide range of incomes in the area. These figures would not include weekend or part-time residents, of whom there are at least several dozen and perhaps as many as several hundred.

Figure 2.3 shows the portions of Mokuleia north and to the west of the project site. This area surrounding the project site is characterized by agricultural, recreational, and residential uses. Land to the east along Farrington Highway is owned by Tropic and Crocker. The company produces sugar on acreage extending from the project site to the town of Waiaina. A few long-time families in the area own land in the upland regions above the sugarcane and are involved in ranching and some farming activities.

The Mokuleia Ranch, currently in operation on the project site, adds to the existing rural or "country" character in Mokuleia. Except for a small irrigated pasture used for dairy cows, these lands retain their natural vegetation growth. Ranch lands

FIGURE 2.4
WAIALUA CDP AND MOKULEIA BLOCK GROUP 9



skunk of the highway are also largely in a natural vegetation state, except for the Lapaku pasture where horses and cattle are grazed.

Block of Farrington Highway, recreational land uses are a dominant feature, along with residential pockets. The polo field provides weekend activities for an equestrian-oriented clientele most of whom live in Honolulu but some of whom live or have weekend homes on the North Shore). Further west, Camp Mokuia is owned and operated by the Episcopal Church. The Church owns three acres along the coast and leases another six acres from the Western National. Across from the Billingham Airfield, the City and County maintains the Mokuia Beach Park and the Army maintains its own beach area. At the end of Farrington Highway, Camp Pelehu is operated by the YMCA. Beaches along this entire coastline are sometimes used for sunbathing, snorkelling, and shallow water fishing.

A small area along the coastline west of the polo field provides a majority of Mokuia's current housing units. Newer homes adjacent to the field are owned and occupied by individuals closely associated with polo activities. Further west, the Mokuia Beach Colony contains 26 duplex structures with 52 units, which provide rental homes for a variety of individuals including military personnel and retirees. Fifteen to 20 single-family units along Iana Iana Street provide homes for a number of long-time Mokuia residents. Approximately 35 additional single-family units are scattered along Farrington Highway, five of which are located on land designated as Preservation on the Development Plan for the area; many of these are rental units for military personnel or second homes of residents in Honolulu.

Banks of Farrington Highway, the project site is bordered on the east and west by extensive sugarcane production. Also to the west, Billingham Airfield features recreational airplane glider rides for residents and visitors. Uplifts and thermal condlitions, produced by the steep pull south of the airfield and project site often create excellent conditions for this activity.

Nearest east of the area shown on Figure 2.3, a two-acre agricultural subdivision on Farrington Highway presently has only a few occupants. While these lots are sometimes regarded as "gentleman farmers," only a very limited amount of agricultural activity is actually taking place in this area at the moment. Figures provided by the City Department of General Planning indicate only eight homes on the 65 lots as of May 1986.

The "Waialua Beach" area indicated on Figure 2.1 is accessed via Kaimua Beach Road and Crozier Drive. Nearest to Waialua homes, along the coastline are generally older and more moderately priced. At Puuiki Beach, an area zoned for low- and medium-density apartments has introduced the first cluster of high-rise structures to the North Shore area.

The character along the coast changes noticeably at the beginning of Crozier Drive. Crozier Drive is, in fact, a private roadway and is characterized by numerous speed bumps to slow

traffic. Homes along this coastline are generally higher priced and more carefully landscaped and maintained. Many of these units are second homes for relatively affluent Honolulu or out-of-state people. At the end of Crozier Drive, a 10-acre parcel is used as a retreat for the employees of Castle and Cooke.

2.3.1.2 Waialua

With a 1980 population of 1,051, Waialua was the most populous community in the primary study area. Its population was predominantly Filipino (48%), with smaller but still significant numbers of Japanese (23%) and Caucasians (18%) also resident within the town. Compared to other communities in the primary and secondary study areas, Waialua's population was on average older and less well educated.

Although not a "company town" in the strictest sense of the term, Waialua nevertheless shares many characteristics with other communities in Hawaii which trace their beginnings to the plantation economy and to the dominance of sugar and pineapple beginning in the late 1800's. Waialua's ethnic and social make-up is the legacy of its plantation history. Some common legacies of the past shared by Waialua and most other communities of the North Shore include strong memories of the paternalistic plantation system; the presence of many immigrant families and their descendants, particularly from the Philippines; a strong respect for labor unions; and the establishment of schools, fire stations, and other regional amenities in the two primary plantation towns of Waialua and (for Koolauloa) Kahuku.

The size of Waialua's population has changed little over the past four decades. What change has occurred has been in terms of the community's physical appearance and expanded commercial development and public facilities. The recent construction of Puuiki Kai and other new residential subdivisions south of the mill town has added to the population and brought more young families back into what had begun to be an aging community. Life in Waialua is still dominated by mill activity. However, temporary shutdowns in recent years have made many residents nervous that Waialua may have to follow the lead of Kahuku (which lost its plantation in the early 1970's) in fighting a battle to survive. With a substantially larger population than Kahuku, Waialua could have a more difficult time. However, Waialua shares with Kahuku a tradition of strong community organization supported by both plantation management and the ILOU. One of the most important characteristics of the community is its stability, which contributes to a shared and deeply felt sense of history.

The importance of sugar on the North Shore can be traced to pre-contact times, when sugarcane was used as windbreaks for homes. Western methods of cultivation and processing began in 1811. Twenty years later, in 1831, a water-driven mill was built at Waialua, and the first mill stack constructed in 1883 at Thomson Quarry. Adverse weather conditions, the lack of a dependable labor supply, and periodic changes in ownership plagued these early efforts at sugar production. The first mill

at today's site was constructed shortly after 1898. Following the purchase of property by Foster & Cooke, and merger with land owned by the Oahu Railways and Land Company (owned by Billingham), the merger resulted in formation of Mainland Agriculture, Ltd., and the successful production of sugarcane.

The mill camp, which had developed around the mill, expanded with the immigration of immigrant Japanese in the late 1890's. Filipino laborers began arriving in 1908, replacing Japanese workers, who were leaving employment in the fields, and moving into supervisory positions, and work in the town. At its peak, the company employed more than 3,000 workers. Employment is currently 160, with no significant change expected for at least the next two years (personal communication, John Hirota, personnel director, Mainland Sugar Co., May 6, 1986). Although sugar is still past its peak as an economic activity and source of employment, the mill -- with its stark still dominating the Kaula skyline -- remains the dominant economic and social force in the community. To date, Mainland has not yet shared in the transition to a visitor industry-based economy, a transition which is occurring in other parts of the North Shore and Kaula.

The sugar mill and surrounding sugarcane acreage also remains a key determinant of Mainland's physical character. Many of the town's residents are employed at the mill and live in single-family residential areas within several blocks of the plantation offices and mill. Most of these housing units are older and in a low- to moderate-price range. In more recent years, some commercial and public facility developments such as a small convenience shopping center and the Mainland Recreation Center adjacent to the elementary school -- along with construction of the Paia Kai subdivision and additional residential units, much of Farrington Highway -- have somewhat modernized the community's character.

To the east of the mill area, on the Maileia side of Kikihi Stream, smaller individually-owned agricultural lots contain some diversified agricultural operations. These operations include the production of flower and nursery products, vegetables, and some hogs.

2.3.1.3 Maileia

Adjacent to Mainland, Maileia is the primary commercial center on the North Shore. Many older single-story buildings are evident along Kamehameha Highway, giving the community a "small-town" character. A large number of these stores are now directed toward the growing tourist market driving through the community, and Maileia is now the North Shore's center for auto and crafts restaurants, and small retail establishments of many types. Several new shopping centers constructed in the past few years have given the town a somewhat new face. However, the new projects have generally been small-scale in nature and have maintained the overall character of the town.

While Maileia in the past was to some extent an adjunct of Mainland, it is today both socially and economically distinct. A little more than a decade ago, Maileia formed its own community association, splitting off from the Mainland Community Association.

Maileia's 1980 population of 2,412 persons was primarily composed of nearly equal numbers of Caucasians (30%), Filipinos (29%), and Hawaiians/part-Hawaiians (21%). Compared to island-wide figures, the median age was lower and Maileia residents were more likely to have been Hawaii-born.

2.3.1.4 Other North Shore Communities

In geographic terms, the North Shore (including Sausal Beach and other communities technically in Kaula) extends east some 17 miles from the project site to Kahuku. A broad saddle, or upper plain, which traverses the entire island from south to north between its two mountain ranges, ends abruptly in a relatively steep hill or cliff immediately above the coastal plain of the North Shore area. In comparison to the neighboring Kaula area, the North Shore is characterized by more sporadic residential development which extends almost continuously along the Kamehameha Highway.

Single-family housing dominates the area along Kamehameha Highway from Maileia to Waimea Bay. Lands much of the highway are largely owned by Bishop Estate and used for the production of sugar and pineapple. A large area at Kaula is operated by Henders Field for the production of milk. A number of smaller agricultural projects such as nursery and vegetable farms can be found in the area.

Recreational activities are prominent throughout this area. Much of the coastline is made up of easily accessible sandy beaches. Surfing is a major recreational activity, along with scuba diving and snorkeling during the summer months. The boat harbor at Maileia provides the only major boat launch facility on the North Shore.

Nothing away from the Maileia area and toward Kahuku Point, the following areas are encountered:

Waimea Bay: Four miles east of Maileia, on the road toward Kahuku, lies Waimea Bay and Waimea Valley. This area is little populated but represents a unique recreational and tourism asset. Once a relatively large Hawaiian settlement dominated by an important heiau overlooking the bay and the valley behind, Waimea was founded by a great flood in 1884 which destroyed many home sites and agricultural fields in the valley (Clark, 1977). Today, the valley had been developed as a visitor attraction complete with a large restaurant. The white sand beach continues to attract weekend visitors from Honolulu, and has three times every winter the Bay hosts some of the world's finest surfers, who attempt to tame its crashing 20 to 30 foot waves.

Wahineia, its counterpart on the western edge of the North Shore, the population of Kahuku is predominantly Filipino and Japanese.

Lake: Koolauloa's largest community is Lake, with a 1980 population of 1,600. Lake is two miles from Kahuku, and, with its relatively large labor supply, could play a significant role as a source of employees for any economic development activity on the North Shore. To date, most residents have been employed in the Mormon Church institutions there: the Polynesian Cultural Center, Mormon Temple, and Brigham Young University-Honolulu.

Haunalea: Four miles from Lake lies Haunalea, with a 1980 population of nearly 3,000 -- predominantly Hawaiian, with a small number of Caucasians. Haunalea features more urban amenities than the areas to the south, including a small shopping center, a police/fire station complex, a satellite city hall and an elementary school. However, the town does not contain a major employment base.

Other Koolauloa Communities: The remaining three Koolauloa communities of Punaluu, Kahauna Valley, and Kuanua are primarily rural/residential in nature, and lack those amenities normally associated with towns.

2.3.2 Mahiava Division

With a 1980 population of 11,562, and given its proximity to the North Shore, the Mahiava Census Division must be considered a major potential source of labor for any large development on the North Shore.

Wahineia town proper, with a 1980 population of 16,900, has an economy based on the nearby pineapple fields and on several surrounding military installations. The largest of these is Schofield Barracks, with a separate 1980 population of 18,851. The population of Wahineia and the nearby military bases has been relatively stable in recent decades, with the prospect of continued stability at least for the near future.

As will be discussed further, Wahineia is characterized by serious unemployment and poverty problems, some of them associated with low-income military dependents.

2.3.3 Tertiary Study Area

The communities within what is defined as the "Tertiary Study Area" are discussed in this report in a very limited fashion, and only because the residents of these communities may be potential sources of labor for North Shore developments, and because these communities are located on the B-2 corridor to the North Shore.

Kaunaloa Beach: Beyond Waimea Bay lies Kaunaloa Beach, which is very similar in its coastal-strip character to Wahineia and nearby Sunset Beach. However, if the former outlying plantation camp lands of the highway is included, the area has a higher proportion of longtime and/or non-Caucasian residents.

Kaunaloa/Pupuken/Sunset Beach: To the east along Kamehameha Highway, beyond Kaunaloa Beach, lies Waimea, overlooked by the hillside community of Pupuken. Pupuken differs from the main community in having a more "local" population, containing several expensive homes with dramatic views from the palm, and also featuring numerous small agricultural lots. A supermarket at the base of Pupuken Road is the coast's major commercial attraction. Beyond the Waimea/Pupuken area is an area known as Sunset Beach, a strip residential development extending approximately two miles along the highway. As previously noted, these communities are technically in Koolauloa, and their combined population was approximately 3,200 in 1980.

2.3.2 Secondary Study Area

2.3.2.1 Koolauloa Division

The Koolauloa Census Division is adjacent to the North Shore, and constitutes the northern third of Oahu's Windward side. Its 1980 population was 14,195 (including Sunset Beach, etc., or 10,983 excluding these communities). The full population was predominantly Caucasian (38%) and Hawaiian or part-Hawaiian (23%), again with different ethnic mixes in different communities. Major employers are the Turtle Bay Hilton (southeast of Sunset Beach) with between 400 and 500 jobs and the Polynesian Cultural Center with nearly 1,000 employees.

In geographic terms, Koolauloa consists of a coastal plain situated between the shoreline and the Koolau Mountain Range. The coastal plain varies in width from a few thousand feet to approximately one mile. Excluding Sunset Beach et. al., the area contains six principal residential communities (Kuanua, Kahauna Valley, Punaluu, Haunalea, Lake, and Kahuku) which are loosely strung out almost equidistant from each other along the region's single arterial road, Kamehameha Highway. The area's major communities are Kahuku, Lake, and Haunalea.

Kahuku: This community was established as a sugar plantation and mill camp in 1881, and, with a population of 3,000, was, by the 1940's, clearly established on the commercial and population center of the eastern North Shore. With the closing of the mill in 1971, the population had dropped to 900, although development of a city-sponsored housing project in the early 1980's has since approximately doubled the town's population. Like

2.3.3.1 Hillman

With a population of 21,365 in 1980, Hillman Town is primarily a bedroom community. With the approval of a "high-technology industrial park", however, the community may become more of an employment center. Currently, its population is of mixed income strata but tends to have a somewhat higher socio-economic status than the Honolulu average.

2.3.3.2 Waipahu

Historically, a sugar plantation community, Waipahu has increasingly acquired the characteristics of a bedroom community for workers employed at Pearl Harbor and in the Honolulu area. The town's population grew between 1970 and 1980 at about the same rate as for Oahu as a whole, and in 1980 stood at 29,139. Since 1980, most growth has been taking place in subdivisions just north of Waipahu and along the H-1 freeway: Waipio-Gentry and Village Park. The Waikoleo area, between these two subdivisions, has also received Development Plan approval to begin construction before 1990.

Table 2.2 provides brief capsule descriptions of all major communities in the study area.

2.4 Population and Housing Characteristics

Discussion in this sub-section will provide detailed U.S. Census figures for the Primary and Secondary Study Areas. Within the Primary Study Area, particular attention will be given to Kaimukū (the Census designated place as indicated in Figure 2.4), Haleiwa, and the Hahaione area (as defined by Block Group 9 data).

Table 2.3(a) provides 1970 and 1980 census data on population levels and demographic characteristics for the Primary and Secondary Study Areas, while Table 2.3(b) gives similar information for Kaimukū, Haleiwa, and Block Group 9 (including Hahaione).

In addition to the 1970 and 1980 population figures in Table 2.3(a), the Hawaii State Census Statistical Areas Committee (1985) estimates July 1, 1984 resident population levels as 805,266 for the City and County of Honolulu; 10,531 for the North Shore (Kalaheo Division); 15,554 for the Kona Division; and 17,206 for the Kohala Division.

In terms of population characteristics, Tables 2.3(a) and (b) indicate the North Shore's major ethnic groups were Filipino (19%) and Caucasian (31%), while Kona's population was predominantly Caucasian and Hawaiian, and Kohala's population was heavily Caucasian and "other" (including black). Both areas

Table 2.2:
Principal Communities of the Study Area

Community	Community Description	Major Economic Activities	Population Characteristics
Primary Study Area (North Shore)			
Hahaione	Pockets of residential units along beach.	Very few jobs, other than low-intensity recreation and ranching.	A few hundred in 1980; predominantly Caucasian.
Waialua	Sugar plantation town, residential community.	Sugar cultivation and processing.	Approx. 4,000 in 1980, growing thru new housing; predominantly Filipino.
Haleiwa	Commercial center, small residential community.	Retail outlets, shopping centers.	Approx. 2,400 in 1980; Caucasian, Hawaiian, Filipino.
Sunset Beach Waimea/ Pupukea	Scattered beach homes, small residential subdivisions along highway.	Small retail outlets, visitor attraction at Waimea Bay.	Highly transient, mixed ethnicity, large number of Caucasians; about 3,200.
Secondary Study Area (Koolauloa)			
Kahala	Former sugar plantation town, residential community.	Farming and agriculture.	About 900 residents in 1980, now dominated by Filipino.
Lāie	Horseman community with Temple and University.	Polyesian Cultural Center, shopping center, Brigham Young University.	About 4,600 residents; large number of Japanese and Tongans; transient student population.
Hauula	Residential community with satellite city hall, police and fire station.	Shopping center, farming, small retail outlets.	About 3,000 people, half of them part-Hawaiian.
Secondary Study Area (Waikawa)			
Waikawa	Current economic center for Central Oahu.	Large military installations, pineapple fields.	In 1980, about 17,000 residents in Waikawa town (most Oriental or Filipino); plus roughly equal military population at nearby bases.
Tertiary Study Area (Miliama/Waipahu)			
Miliama	Rapidly growing bedroom community.	Shopping center, planned high-technology park.	Approx. 21,000 in 1980; white-collar characterist.
Waipahu	Began as plantation town, now largely residential.	Sugar mill, retail outlets (aging downtown area).	29,000 in 1980 -- about 40% Filipino.

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Table 2-3(a):

Population and Demographic Characteristics: City and County of Honolulu and Various Parts of Study Area, 1970 and 1980

	CITY AND COUNTY OF HONOLULU		NORTH SHORE DIVISION		KOOLAULOA DIVISION		WAHIAWA DIVISION	
	1970	1980	1970	1980	1970	1980	1970	1980
TOTAL POPULATION	630,528	767,588	9,171	9,849	10,562	14,194	27,329	41,362
	%	%	%	%	%	%	%	%
ETHNICITY*								
Caucasian	41.2	34.4	31.8	31.2	39.5	38.2	57.5	44.7
Japanese	28.8	24.9	24.1	17.7	8.7	7.4	17.8	4.0
Chinese	7.7	8.9	2.0	1.0	4.0	3.2	1.6	1.2
Filipino	10.4	12.6	32.0	32.4	10.7	7.1	11.6	12.7
Hawaiian	8.5	10.5	6.7	11.6	25.0	22.9	3.3	4.3
Other	5.5	10.4	3.4	6.0	12.1	21.2	8.2	23.1
AGE								
Less than 5 yr.	9.3	7.9	10.5	9.0	11.5	11.6	10.5	11.4
5 - 17 yr.	28.2	20.2	28.1	20.0	28.0	22.8	27.4	19.1
18 - 64 yr.	59.5	64.8	54.7	61.9	55.7	59.3	59.3	68.5
65 or more yr.	3.0	7.1	6.7	9.1	4.8	6.3	2.8	4.0
Median age	24.8 yr	28.1 yr	24.3 yr	26.3 yr	21.4 yr	23.8 yr	22.1 yr	22.9 yr
PLACE OF BIRTH*								
Hawaii	64.1	55.1	56.3	55.2	54.9	50.9	35.7	32.5
Other U.S.**	NC	30.1	NC	27.0	NC	31.4	NC	51.0
Foreign country	9.1	14.8	18.5	17.8	14.8	17.7	7.8	15.5
RESIDENCE 1 YR. PREVIOUS								
People aged 1+								
Same house	42.5	48.2	47.3	50.4	41.0	46.0	27.3	28.1
Same island	NC	25.3	NC	24.2	NC	28.3	NC	13.6
Different island	NC	1.3	NC	2.8	NC	0.8	NC	0.3
Different state	NC	18.4	NC	18.9	NC	14.8	NC	47.5
Different country	NC	8.6	NC	3.7	NC	10.0	NC	10.5
EDUCATIONS (selected--)								
People aged 25+								
0-8 years only	20.8	14.4	35.7	25.6	31.4	15.2	20.1	18.0
Hi school only	37.5	35.5	31.1	32.0	29.9	32.0	42.7	52.9
College, 1+ yr.	15.3	21.7	7.7	15.0	12.3	20.2	11.8	15.0

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)-68; 1980 Summary Tape Files 1-A and 3-A; State of Hawaii, 1973, Community Profiles for Hawaii. (Percentages computed by author.)

Table 2-3(b):

Population and Demographic Characteristics: Waialua, Moleiwa, and Mokuia Area, 1970 and 1980

	WAIALUA CDP		MALEIWA CDP		MOKUIA AREA (C.T. 39.01, Block Group 9)	
	1970	1980	1970	1980	1970	1980
TOTAL POPULATION	4,047	4,081	2,828	2,412	N/A	650
	%	%	%	%	%	%
ETHNICITY*						
Caucasian	24.6	17.5	28.3	30.1	N/A	68.5
Japanese	23.3	23.8	25.1	15.9	N/A	0.8
Chinese	1.3	1.0	3.5	0.4	N/A	0.0
Filipino	43.8	48.3	24.7	28.6	N/A	3.4
Hawaiian	2.6	3.0	13.0	23.8	N/A	12.9
Other	2.2	4.4	5.4	1.2	N/A	13.4
AGE						
Less than 5 yr.	9.9	8.2	10.8	9.2	N/A	7.8
5 - 17 yr.	28.5	20.5	30.8	23.2	N/A	12.5
18 - 64 yr.	58.6	58.0	50.5	58.2	N/A	78.5
65 or more yr.	7.1	12.2	7.8	9.5	N/A	3.2
Median age	28.0 yr	29.4 yr	22.8 yr	26.7 yr	N/A	25.3 yr
PLACE OF BIRTH*						
Hawaii	53.8	57.8	65.2	67.3	N/A	32.1
Other U.S.**	NC	12.3	NC	23.5	N/A	64.9
Foreign country	27.8	29.9	10.5	9.3	N/A	2.9
RESIDENCE 1 YR. PREVIOUS						
People aged 1+						
Same house	50.6	58.2	54.3	58.7	N/A	30.0
Same island	N/A	24.7	N/A	26.6	N/A	23.6
Different island	N/A	4.0	N/A	1.0	N/A	0.0
Different state	N/A	6.8	N/A	15.5	N/A	44.2
Different country	N/A	6.3	N/A	1.1	N/A	2.2
EDUCATIONS (selected--)						
People aged 25+						
0-8 years only	43.4	35.8	31.7	18.9	N/A	0.0
Hi school only	38.5	27.3	54.9	35.1	N/A	31.3
College, 1+ yr.	6.0	11.8	7.2	14.0	N/A	19.7

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)-68; 1980 Summary Tape Files 1-A and 3-A; State of Hawaii, 1973, Community Profiles for Hawaii. (Percentages computed by author.)

In all three areas were lower than the islandwide median education levels on the North Shore and Waikanae were significantly behind those of the overall Oahu population.

The various North Shore communities differ greatly on demographics. For example, Waialua residents in 1980 were heavily Filipino, 30% foreign-born, had little college education, and had generally been living in the same house or elsewhere in the five years before. Residents of Black Group 9 (including Hahaione) were mostly Hawaiian-born, well-educated Caucasians, nearly half of whom were in another state five years before.

Tables 2.1(a) and (b) provide 1970 and 1980 U.S. Census data on family characteristics and income levels for the same geographical areas discussed previously. They indicate there was a slightly higher percentage of families on the North Shore than islandwide characterized by both (1) female head and (2) presence of one child under 18. In contrast to the family orientation elsewhere on the North Shore, the Hahaione/Frazier area had only 67% of the population living in families, and only 39% of these Black Group 9 families had children living at home.

These tables also show significant poverty problems for the North Shore, Koolauloa, and Waikanae. In 1980, compared to islandwide figures, median family incomes were lower, and proportions of the population below official "poverty level" were higher. On the North Shore, the small number of families in Black Group 9 had particularly low incomes and high poverty rates, although a more detailed examination of income figures than shown in Table 2.4(b) indicates that this is because full-time residents in this area tended to be either quite low-income or fully comfortable, with few in the middle.

Tables 2.5(a) and (b) present selected 1970 and 1980 U.S. Census data for the previously discussed areas. Table 2.7 shows 1980 data on year of original occupancy (i.e., housing turnover).

In line with the previous findings on poverty, Study Area residents were more likely than residents elsewhere to be renters rather than owner-occupants; household sizes were larger; monthly rents consumed a larger percentage of typical family income; and housing values were much lower. Short-term turnover of rental units (particularly in Waikanae) was higher than the islandwide rate. Vacant units (particularly for rent) have been rare in Waikanae but somewhat more available on the North Shore. Koolauloa's apparent abundance in Table 2.5(a) of vacant units "for rent" would not actually be explained by the large number of vacant out-leased condominium units at Kuliama.

2.5 Labor Force Characteristics

The "labor force" within a given area refers to the number of potential workers residing there, whether or not they work in the same area or elsewhere. The following subsection will focus on the complementary topic of numbers of persons actually working in the Study Area, as well as the nature of their employment.

Table 2.4(a):

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

	CITY AND COUNTY OF HONOLULU		NORTH SHORE DIVISION		KOOLAULOA DIVISION		WAIKANA DIVISION	
	1970	1980	1970	1980	1970	1980	1970	1980
POPULATION IN FAMILIES	N/A	883,118	N/A	8,471	N/A	11,687	N/A	13,288
as percentage of total population	N/A	88.4%	N/A	88.0%	N/A	82.3%	N/A	80.1%
NUMBER OF FAMILIES	138,277	178,416	1,994	2,283	1,978	2,909	7,833	9,093
HEAD								
Husband/wife	86.7	82.8	86.4	82.8	86.4	83.7	91.5	89.0
Male only	3.6	4.5	5.0	4.6	4.6	5.7	2.4	3.0
Female only	9.8	12.7	6.6	12.6	8.8	10.6	6.1	8.0
WITH ONE CHILD OR UNDER 18								
Female head	63.4	54.9	60.8	58.1	63.6	62.0	69.8	65.4
Male head	6.2	7.5	5.4	9.3	6.0	6.7	4.4	5.7
BELOW POVERTY LEVEL	7.2	7.5	8.5	9.0	18.3	13.5	7.8	9.0
MEDIAN FAMILY INCOME	112,035	123,884	89,000 to 89,999	116,898	88,000 to 88,999	119,588	98,000 to 98,999	113,841
NON-FAMILY HOUSEHOLDS	N/A	33,298	N/A	839	N/A	943	N/A	1,289
percentage below poverty level	N/A	15.7%	N/A	25.6%	N/A	25.3%	N/A	18.2%

Notes: All figures (except "Population in Families" and "Non-Family Households") based on 1% sample; hence, numbers represent estimates.

"N/A" = "Not available."

Source: U.S. Bureau of the Census, 1970 Census of Population and Housing--Census Tracts--Honolulu, Hawaii, PHC(1)-48; 1980 Summary Tape Files 1-A and 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

Table 2. (b)(1): Family Characteristics and Income Levels: Waialua, Kalaheo, and Noholu Area, 1970 and 1980

POPULATION IN FAMILIES	WAIALUA CDP		KALAHEO DIVISION		NOHOLU AREA (C.T. 99.01, Block Group 3)	
	1970	1980	1970	1980	1970	1980
as percentage of total population	N/A	31.6%	N/A	49.5%	N/A	67.1%
NUMBER OF FAMILIES	878	942	584	566	158	158
HEAD	878	942	584	566	158	158
Male only	512	530	341	332	83	83
Female only	366	412	243	234	75	75
WITH OWN CHILDREN UNDER 18	N/A	66.6	N/A	60.6	N/A	38.1
Female head	N/A	6.6	N/A	19.4	N/A	9.6
BELOW POVERTY LEVEL	5.0	7.9	11.2	9.2	N/A	17.9
MEDIAN FAMILY INCOME	\$9,484	\$10,115	\$8,988	\$10,699	N/A	\$12,100
NON-FAMILY HOUSEHOLDS	N/A	198	N/A	184	N/A	119
Percentage below poverty level	N/A	29.2%	N/A	16.5%	N/A	16.8%

Notes: All figures (except "Population in Families" and "Non-Family Households") based on 1% sample; hence, numbers represent estimates. "N/A" = Not Available.

SOURCE: U.S. Bureau of the Census, 1970 Census of Population and Housing--General Statistics--Hawaii, Hawaii, PHC11-88; 1980 Summary Tape Files 1-A and 2-A; State of Hawaii, 1973, Community Profiles for Hawaii.

Table 2. (b)(1): Housing Stock and Characteristics: City and County of Honolulu and Various Parts of Study Area, 1970 and 1980

TOTAL YEAR-ROUND OCCUPIED UNITS	CITY AND COUNTY OF HONOLULU		NORTH SHORE DIVISION		KOOHAULOA DIVISION		WAIALUA DIVISION	
	1970	1980	1970	1980	1970	1980	1970	1980
vacant (total)	5.4%	6.2%	8.7%	11.0%	17.8%	20.0%	3.2%	3.8%
vacant for sale	0.6%	0.5%	0.7%	0.9%	0.8%	0.8%	0.2%	0.2%
vacant for rent	2.5%	2.8%	4.7%	5.3%	8.3%	9.3%	2.8%	3.4%
held for other use	N/A	0.9%	N/A	4.7%	N/A	3.9%	N/A	0.7%
total year-round occupied units	184,783	200,884	2,328	2,188	2,282	4,678	8,431	10,667
renter-occupied	45.0%	48.9%	40.2%	38.6%	27.2%	27.7%	27.9%	28.6%
owner-occupied	55.0%	51.1%	59.8%	61.4%	72.8%	72.3%	72.1%	71.4%
SELECTED CONDITIONS								
lacking some or all plumbing	1.5%	1.5%	8.3%	2.1%	8.5%	2.4%	1.9%	1.8%
1.51 or more persons/room	6.8%	7.4%	10.2%	7.2%	13.9%	16.0%	6.1%	4.9%
PERSONS PER HOUSEHOLD	3.60	3.15	3.87	3.35	4.10	3.55	3.88	3.40
MEDIAN CASH RENT (renter-occupied)	\$130	\$279	\$80	\$257	\$98	\$270	\$110	\$240
as % of median family income	12.8%	14.2%	N/A	15.8%	N/A	19.2%	N/A	20.8%
MEDIAN VALUES (renter-occupied)	\$38,400	\$130,400	\$20,000	\$78,400	\$25,000	\$86,500	\$25,000	\$86,700
renter-occupied	N/A	\$894	N/A	\$231	N/A	\$682	N/A	\$428
as % of median family income	N/A	25.2%	N/A	20.3%	N/A	24.2%	N/A	27.1%

Notes: 1. For 1980, median values are for non-condominium housing units. 2. Figures based on 1% sample; hence, numbers represent estimates. 3. "N/A" = Not Available.

SOURCE: U.S. Bureau of the Census, 1970 Census of Population and Housing--General Statistics--Hawaii, Hawaii, PHC11-88; 1980 Summary Tape Files 1-A and 2-A; State of Hawaii, 1973, Community Profiles for Hawaii.

Table 2-6(b):

Family Characteristics and Income Levels: Wai'alua, Haleiwa, and Mokuieia Area, 1970 and 1980

	WAI'ALUA CDP		HALEIWA CDP		MOKULEIA AREA IC.T. 99.U1, Block Group 31	
	1970	1980	1970	1980	1970	1980
POPULATION IN FAMILIES	N/A	3,710	N/A	2,160	N/A	438
as percentage of total population	N/A	91.6%	N/A	89.5%	N/A	87.1%
NUMBER OF FAMILIES	878	942	584	666	N/A	156
HEAD						
Husband/wife	87.6	83.0	84.1	75.2	N/A	78.8
Male only	5.3	7.2	5.1	0.9	N/A	8.3
Female only	7.1	9.8	10.8	23.9	N/A	12.9
WITH OWN CHILDREN UNDER 18	N/A	58.6	N/A	60.6	N/A	39.1
Female head	N/A	6.6	N/A	19.4	N/A	9.6
BELOW POVERTY LEVEL	5.0	7.9	11.2	9.2	N/A	17.9
MEDIAN FAMILY INCOME	\$9,484	\$18,115	\$8,988	\$15,699	N/A	\$12,100
NON-FAMILY HOUSEHOLDS	N/A	196	N/A	184	N/A	119
percentage below poverty level	N/A	28.7%	N/A	16.9%	N/A	16.8%

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 2-6(a):

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

	CITY AND COUNTY OF HONOLULU		NORTH SHORE DIVISION		KOAULOA DIVISION		WAIANA DIVISION	
	1970	1980	1970	1980	1970	1980	1970	1980
TOTAL YEAR-ROUND HOUSING UNITS	174,107	180,884	2,888	3,188	2,876	4,679	8,709	10,487
vacant (total)	3.4%	8.2%	8.7%	11.0%	17.6%	20.0%	3.2%	3.8%
vacant for sale	0.6%	0.3%	0.7%	2.9%	0.4%	0.8%	0.3%	0.2%
vacant for rent	2.5%	3.8%	2.8%	1.9%	2.2%	9.3%	2.2%	1.0%
held for occas'l use	N/A	0.3%	N/A	4.7%	N/A	3.8%	N/A	0.7%
other	N/A	3.2%	N/A	1.5%	N/A	4.1%	N/A	2.5%
TOTAL YEAR-ROUND OCCUPIED UNITS	164,763	230,314	2,338	2,844	2,362	3,742	8,431	10,283
TENURE								
owner-occupied	45.0%	49.9%	40.2%	39.6%	37.2%	37.7%	27.9%	26.6%
renter-occupied	55.0%	50.1%	59.8%	60.4%	62.8%	62.3%	72.1%	73.4%
SELECTED CONDITIONS								
lacking some or all plumbing	3.5%	1.5%	8.3%	2.1%	6.5%	2.4%	1.9%	1.8%
1.51 or more persons/room	6.9%	7.4%	10.2%	7.2%	15.9%	16.0%	6.4%	4.9%
PERSONS PER HOUSEHOLD	3.40	3.15	3.87	3.35	4.10	3.55	3.86	3.40
MEDIAN CASH RENT (renter-occupied)	\$130	\$278	\$80	\$257	\$80	\$270	\$110	\$240
as % of median family income	12.9%	14.2%	N/A	15.8%	N/A	18.2%	N/A	20.6%
MEDIAN VALUE (owner-occupied)	\$38,400	\$130,400	\$20,000	\$79,400	\$25,000	\$86,500	\$25,000	\$96,700
MEDIAN MONTHLY MORTGAGE (owner-occupied)**	N/A	\$484	N/A	\$331	N/A	\$482	N/A	\$428
as % of median family income	N/A	25.2%	N/A	20.3%	N/A	34.2%	N/A	37.1%

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 2.5(b):

Housing Stock and Characteristics: Waialua, Haleiwa, and Mokuia Area, 1970 and 1980

	WAIALUA CDP		HALEIWA CDP		MOKULIA AREA (C.T. 99.01, Block Group 9)	
	1970	1980	1970	1980	1970	1980
TOTAL YEAR-ROUND HOUSING UNITS	1,086	1,138	720	787	N/A	360
vacant (total)	N/A	3.2%	N/A	10.0%	N/A	26.1%
vacant for sale	N/A	0.2%	N/A	0.4%	N/A	0.3%
vacant for rent	N/A	1.3%	N/A	3.4%	N/A	1.7%
held for occas'l use	N/A	0.4%	N/A	3.1%	N/A	21.9%
other	N/A	1.3%	N/A	3.1%	N/A	2.2%
TOTAL YEAR-ROUND OCCUPIED UNITS	1,033	1,102	677	717	N/A	266
TENURE						
owner-occupied	50.4%	55.4%	30.6%	34.2%	N/A	19.2%
renter-occupied	49.6%	44.6%	69.4%	65.8%	N/A	80.8%
SELECTED CONDITIONS						
lacking some or all plumbing	6.1%	1.4%	15.1%	5.0%	N/A	1.5%
1.51 or more persons/room	8.5%	7.1%	12.3%	10.0%	N/A	2.6%
PERSONS PER HOUSEHOLD	3.91	3.68	3.83	3.38	N/A	2.44
MEDIAN CASH RENT (renter-occupied)	\$79	\$154	\$80	\$237	N/A	\$336
as % of median family income	10.0%	10.2%	10.7%	18.1%	N/A	33.5%
MEDIAN VALUE (owner-occupied)	\$22,400	\$70,900	\$27,600	\$84,900	N/A	\$177,300
MEDIAN MONTHLY MORTGAGE (owner-occupied)**	N/A	\$240	N/A	\$321	N/A	\$663
as % of median family income	N/A	15.8%	N/A	24.5%	N/A	65.8%

Notes: * For 1980, median values are for non-condominium housing units.
 ** Figures based on 1% sample; hence, numbers represent estimates.
 N/A = "Not available."
 Source: 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 2.6:

Occupied 1980 Housing Units by Year of Original Occupancy: City and County of Honolulu and Various Parts of Study Area

	CITY AND COUNTY OF HONOLULU	NORTH SHORE DIVISION	KOOLAUPA DIVISION	MAHIAMA DIVISION
ALL OCCUPIED HOUSING UNITS	230,214	2,844	3,742	10,263
1979 to March 1980	27.4	28.1	32.7	38.0
1975 to 1978	30.4	25.3	32.1	33.8
1970 to 1974	15.0	14.0	16.5	6.3
1960 to 1969	15.9	17.8	11.9	9.5
1950 to 1959	7.4	9.4	4.1	8.4
1949 or earlier	3.5	4.4	2.7	3.9
RENTER-OCCUPIED HOUSING UNITS	116,421	1,717	2,332	7,538
1979 to March 1980	41.8	43.0	44.9	49.9
1975 to 1978	36.5	29.3	30.9	40.3
1970 to 1974	11.2	13.3	9.7	4.3
1960 to 1969	7.2	9.3	9.0	2.9
1950 to 1959	2.1	2.9	2.4	1.8
1949 or earlier	1.2	2.3	3.0	0.7
OWNER-OCCUPIED HOUSING UNITS	114,793	1,127	1,410	2,725
1979 to March 1980	13.0	8.0	12.8	5.2
1975 to 1978	24.3	19.2	34.0	15.9
1970 to 1974	19.5	15.2	27.6	11.6
1960 to 1969	24.7	30.8	18.8	28.0
1950 to 1959	12.6	19.3	6.8	26.7
1949 or earlier	5.8	7.6	2.2	12.8

NOTE: All figures based on 1% sample; hence, numbers represent estimates.

Source: U.S. Bureau of the Census, 1980 (Summary Tape File 3-A).

Table 2.7(b):

Labor Force Size and Characteristics: Waialua, Haleiwa, and Mokuia Area, 1970 and 1980

	WAIALUA CDP		HALEIWA CDP		MOKUIA AREA (C.T. 39.01, Block Group 9)	
	1970	1980	1970	1980	1970	1980
POTENTIAL LABOR FORCE						
not in labor force	2,741	3,037	1,627	1,686	N/A	502
armed forces	38.4%	42.5%	48.2%	43.8%	N/A	20.3%
civil. labor force	4.7%	4.6%	8.7%	3.6%	N/A	20.7%
	56.3%	52.9%	43.1%	52.8%	N/A	59.0%
CIVILIAN LABOR FORCE						
unemployed	1,188	1,608	701	886	N/A	286
	4.7%	3.4%	5.8%	4.4%	N/A	13.2%
TOTAL EMPLOYED CIVILIAN LABOR FORCE	1,486	1,564	660	847	N/A	287
OCCUPATION						
service	N/A	14.9%	N/A	15.7%	N/A	11.7%
manager./profee. technical, sales & adminis.	N/A	11.3%	N/A	21.1%	N/A	43.7%
farm/fish/forest	N/A	21.0%	N/A	14.7%	N/A	25.7%
precision, craft, repair	N/A	12.7%	N/A	11.3%	N/A	2.7%
operators, fabri-cators, laborers	N/A	19.0%	N/A	13.8%	N/A	14.0%
	N/A	21.1%	N/A	23.4%	N/A	2.7%
INDUSTRY (selected)						
agric., forest, fish, mining	N/A	16.5%	N/A	9.2%	N/A	2.7%
construction	N/A	7.8%	N/A	9.2%	N/A	8.6%
manufacturing	N/A	23.2%	N/A	7.3%	N/A	2.7%
retail trade	N/A	15.3%	N/A	20.4%	N/A	10.5%
financial, insur., real estate	N/A	3.5%	N/A	2.7%	N/A	9.7%
personal, entertain. & recreat. services	N/A	6.8%	N/A	4.0%	N/A	5.1%
health, educ. & professional	N/A	12.5%	N/A	16.2%	N/A	22.6%
public adminis.	N/A	8.4%	N/A	18.1%	N/A	14.8%
COMMUTE TO WORK						
15 minutes or more	N/A	22.3%	N/A	20.5%	N/A	14.5%
seen travel (min.)	N/A	23.4 m	N/A	26.3 m	N/A	26.2 m

Notes: All figures based on 15% sample; hence, numbers represent estimates.
 "N/A" = "Not Available" in published form. "UC" = 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 Char-acteristics, PC(1)-D13; 1980 Summary Tape File 3-A; State of Hawaii, 1973, Community Profiles for Hawaii.

UC

Table 2.8:
 U.S. Census Data on 1980 Study Area Civilian Labor Force Size and Participation Rates

	North Shore	Vol. of Total CLE	CLE Participation Rate
Waialua CDP	8.4%	-- 3.5%	55%
Haleiwa CDP		-- 1.9%	52%
Mokuia/Keolu		-- 0.6%	71%
Koolauloa		13.1%	63%
Makua		21.3%	51%
Makua/Makua		56.8%	69%
			(Oahu = 66%)

Notes: "CLE" = "Civilian Labor Force."

Sources: Percentages computed by Community Resources, Inc. 1980 Census data referenced in Tables 2.10(a) and (b).

are in one sense not part of the current effective labor pool for North Shore projects but could become so if attractive alternative employment is developed within the area.

2.5.2 Occupation and Industry

Tables 2.7(a) and (b) also provide profiles of employed civilians in the Study Area in 1970 and 1980. The North Shore profile shifted only slightly from 1970 to 1980 -- primarily a cutback in the proportion involved in the "Manufacturing" industry, reflecting reductions in the workforce at the Kalaheo sugar mill. However, 26% of employed North Shore residents -- and 40% of those in Mahaloa town -- were still employed in either "Manufacturing" or "Agriculture" in 1980.)

Koalaheo's profile, however, shifted dramatically from 1970 to 1980, due to the total shutdown of sugar operations at Kahaolu, coupled with the opening of a major hotel at Kahaolu and some expansion of tourist-oriented activities at the Polynesian Cultural Center. It is this sort of shift which theoretically could occur on the North Shore if sugar operations there also ceased and the proposed Mokuleia project comes on-line.

Looking at 1980 occupational profiles in these tables, it may be observed that only 21% of employed civilians islandwide were involved in jobs which suggest manual labor -- "farming/fishing/forestry" or "precision, craft, repair" or "operators, fabricators, laborers." However, on the North Shore, the combined percentage for these categories totalled 46%. In neighboring Kona, which has begun the transition to a service economy, the total was just 26%, plus 29% in "service."

2.5.3 Unemployment

Tables 2.7(a) and (b) indicate that 1980 civilian unemployment rates differed greatly over various parts of the Study Area. The rates on the North Shore and in Kona were equal or only slightly exceeded the islandwide rate (although unemployment was high among Mokuleia/Crozier and other Black Group 9 residents). Kahaolu, however, had one of the highest unemployment rates on the island. In the combined Hiliwai/Waipahu area, the unemployment rate exceeded that for the island and for the North Shore, primarily due to high unemployment in some parts of Waipahu.

Table 2.9 provides 1985 unemployment figures, as estimated by the State Department of Labor and Industrial Relations (DLIR). It should be noted that the DLIR method for estimating regional unemployment utilizes comparative figures from the 1980 Census, so that the relative relationship between regional and islandwide unemployment in 1980 (e.g., observed equal rates for Oahu and the North Shore) is assumed still to hold true in subsequent years through the next census.

The apparent finding of low (or at least average) unemployment rates in the North Shore and Kona areas must be

Table 2.9:
Estimated 1985 Study Area Unemployment Figures

	Numbers	Rate
North Shore	210	5.1%
Koalaheo	358	5.5%
Waikawa	970	9.3%
Hiliwai/ Waipahu	1,518	5.6%
	3,056	

(NOTE: Oahu unemployment rate = 5.1%)

Source: Hawaii State Department of Labor and Industrial Relations, unpublished data.

tempered by the previously-discussed finding of low labor force participation rates. "Hidden unemployment" may occur when individuals are discouraged from entering or remaining in the labor force after repeated failures to find a job; such individuals eventually show up in employment statistics as labor force nonparticipants rather than among the unemployed. Discussions with State Employment Service personnel in the Study Area for this and other projects indicate there is a strong possibility that lack of jobs in the Study Area has resulted in such "hidden unemployment," although it is difficult to estimate exact numbers.

2.6 Existing Economic Activities and Employment

Within the Primary Study Area, the major current economic activities are the sugar operations at Waikawa and diverse retail activities in the Waikawa area.

Census data included in the "Urban Transportation Planning Package" (unpublished printouts available from the Hawaii State Department of Transportation) indicate that 864 Oahu residents were employed in the Waikawa/Mokuleia census tract 99.01 as of 1980, while an additional 1,167 were employed in the remainder of the division, from Waikawa to Kaimuki. This combined total of 2,001 jobs in the North Shore Division may be compared to the 3,837 persons in the civilian labor force for the area (Table 2.7(a)).

The nature of available employment in the Wainan/Mokolein census tract as of 1980 differed greatly from the jobs held by persons in the Wainan area and remainder of the North Shore census division. In Table 2.10, some 65.8% of Wainan/Mokolein jobs appear to be agriculture and/or sugar-related (since the major "manufacturing" activity in the area is the sugar mill). In Wainan, the job profile is much more heavily weighted toward retail and white-collar activities.

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Table 2.10:
Primary Study Area Jobs by Industry, 1980

Selected Industry Categories	C.T. 99.01 (Wainan/ Mokolein)	C.T. 99.02, 100 (rest of North Shore)
TOTAL JOBCOUNT	864	1,167
	%	%
Manufacturing	41.1	2.7
Agriculture/Forestry/ Fishing/Mining	21.1	12.6
Construction	10.0	7.5
Personal, Entertain- ment, and Recrea- tion Services	1.3	5.8
Retail Trade	5.2	27.5
Finance, Insurance, and Real Estate	0.0	7.5
Professional and Related Services	8.9	20.2
Public Administration	1.6	11.7

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

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Since 1980, the Wainan Sugar Company has reduced its workforce to the current level of about 160 (personal communication, John Hirota, personnel director, May 6, 1986).

Gaps in the Urban Transportation Planning Package data make it difficult to provide exact 1980 jobcounts for Koolaula or Wainan. However, as previously noted in Section 2.3, Koolaula's major economic activity is tourism, with some 550 jobs at Kuliama's Turtle Bay Hilton and Country Club and about 1,000 jobs (many part-time and/or for students) at the Polynesian Cultural Center in Laie. The Wainan area is largely dependent on military support activities and pineapple cultivation.

The 1980 jobcount for the Tertiary Study Area (Hawaii/Waipahu) was about 9,300 (Hawaii State Department of Planning and Economic Development, 1985, p. 330), including military personnel. These would include both pineapple and sugar workers, as well as various retail and service-industrial positions in both Waipahu and Hawaii.

2.7 Community Issues and Concerns

The purpose of this section is to identify major community concerns which may be directly or indirectly relevant to this project. The focus here will be on general needs and issues, as well as issues pertaining to the visitor industry in general.

2.7.1 General Needs and Issues

2.7.1.1 Inlandside

In the most recent Hawaii State Plan Survey (SHS Research, 1984), residents were asked to choose which of 11 societal goals represented the most important subject for governmental attention. Most frequent responses among the Oahu sample were (1) "improving education in public schools" (23%); (2) "getting more jobs and industry for Hawaii" (19%); and (3) "cutting down on crime" (11%).

A subsequent question explored resident values regarding the jobs-vs.-lifestyle issue by asking for agreement or disagreement with the statement: "We should provide more jobs through economic development, even if it changes our island ways and lifestyles." On Oahu, 55% agreed; 33% disagreed; and 13% had no opinion.

Public concern over jobs and economic development made this the most-often mentioned issue in the Honolulu Advertiser's 1986 statewide poll (Keir, 1986), followed closely by traffic, government infighting, crime, education, and housing.

2.7.1.2 Primary Study Area

Discussion is limited to the North Shore because there have been no recent published public opinion surveys with adequate sample sizes in Koolaula or Wainan since the City's Development

Plan surveys (SBS Research, 1978a), which are now eight years out of date. (NOTE: The Mahiana Neighborhood Board conducted a mail-out survey in March 1986, but no results are yet available. The Hillman Neighborhood Board also conducted a mail-out survey in 1985, but questions had little direct relevance to the proposed Mokuleia project.)

The North Shore Neighborhood Board conducted mail-out surveys in 1982 and 1981. Fairly high numbers of responses were obtained in both years (nearly 1,000 in 1982 and about 750 in 1981). However, it should be noted that mail-out survey results are not necessarily representative of overall public opinion since respondents are self-selected rather than randomly selected.

In the more recent survey -- results of which were reported in the Board's June/July 1985 Newsletter -- the topic area judged "most important" to the North Shore was crime, followed by education, and then by land use. Traffic congestion was not an option on this list, although it had been the number one concern on the 1978 Development Plan survey for the North Shore (SBS Research, 1978b). There was 56% opposition in 1981 to a four-lane road from Mahiana to Haleiwa, although this had received 51% support in the preceding 1982 survey.

Additional findings from the 1981 survey included:

- " a 13% plurality in opposition to "using agricultural lands for tenets of low to moderately priced homes" (with 30% in favor);
- " 65% stating that the maximum building height for the North Shore should be just one to two stories;
- " 61% feeling "very strongly" about the need for full-time ambulance services; and
- " 70% agreement that "there are an adequate number of parks and playgrounds in our area."

In the earlier 1982 survey (results of which were not published but were recorded at the City Neighborhood Commission), a 57% majority opposed a previous proposal to create an agricultural subdivision on the Mokuleia site now being proposed for resort use. The previous agricultural subdivision was supported by 25% of the 1982 respondents.

2.7.2 Issues Pertaining to Visitor Industry in General

2.7.2.1 Islandwide

The most recent Hawaii State Plan Survey (SBS Research, 1981) indicates substantial support for tourism among the Oahu sample, although 51% did prefer diversification of the economy rather than continued promotion of tourism (supported by 38%) if a choice could be made. Otherwise, however, 93% said that

"maintaining an economically healthy visitor industry" was either "important" or "extremely important." And 70% agreed (vs. 23.5% disagreement) with the statement "Tourism is still our best bet, even though some of its jobs may be part-time and may not pay as well."

A 1982 University of Hawaii statewide mail-out survey on perceived tourism impact (Ilu and Var, 1981) found that 75% of more of the respondents agreed that tourism had brought substantial economic benefits (more jobs, more outside money, and a higher standard of living) and some types of social benefits (variety of entertainment and of cultural activities). There was, substantial lack of agreement (40% or less) that tourism had increased crime (with the exception of prostitution), led to more drug use, exploited native Hawaiians, impaired "cultural identity," or overcrowded local beaches or parks. Public perception was more mixed as to whether tourism had significantly affected cost of living, traffic congestion, or general environmental/ecological quality.

2.7.2.2 Primary Study Area

The 1981 North Shore Neighborhood Board survey did not ask about resorts or the visitor industry in general. It did, however, ask about potential resort expansion at Kuliwa/Turtle Bay (although the question somewhat understated the actual number of proposed new units). Some 51% were in favor and 16% were opposed.

3.0 CONTEXT FOR IMPACT ASSESSMENT

The preceding section profiled existing conditions and issues in the study area, while the section after this will discuss potential social changes which may be generated by the proposed project. The purpose of this intermediary section is to establish a logical framework for the impact assessment to come.

3.1 Forces for Change With or Without Project

The standard model for socioeconomic impact assessment is to make two separate forecasts of likely future conditions with the proposed project and without it -- and then compare the differences between the two scenarios.

The ability accurately to predict conditions 20 years in the future is naturally limited. Some of the key factors would include city land use and population growth factors, as well as general economic conditions of the market. In the Primary Study Area, the future market for sugar will account for many changes to the physical and social character of the area. If the market for sugar declines, causing a loss of economic stability for business owners, then proposals for alternative uses of the land would likely occur. City and County government plans and policies (i.e. the General Plan and Development Plans), which will ultimately determine future development patterns, may also be influenced by market forces. Existing city plans, however, do provide some degree of certainty and a basis for estimating conditions in the various study areas in the future.

This sub-section is intended to provide an overview of basic forces for socioeconomic change in selected areas on Oahu. These changes, some of which may already be in process, should generally be expected to occur whether or not development takes place in Hahaione.

Topics to be discussed include:

- (1) population trends and patterns;
- (2) future major public facility construction; and
- (3) other potential economic/land use changes.

3.1.1 Primary Study Area

3.1.1.1 Population Trends and Land Use Policies

Table 3.1 shows 1950 - 1980 population levels and growth rates for the North Shore (Maialani) Division, as well as Koolau, Waipahu, Wahiawa, and Hahaione/Waipahu. Also shown are figures for the combined North Shore/Koolau area. These are given in order to facilitate comparison with City General

Table 3.1:
Population Levels and Growth Rates: Years 1950 to 1980

	1950 Pop.	1970 Pop.	1980 Pop.	Average Annual % Growth 1970-1980	Average Annual % Growth 1950-1980
North Shore	7,906	9,171	9,819	1.0072%	1.0071%
Koolau	5,223	10,562	14,195	1.0300%	1.0339%
(Combined North Shore/Koolau)	13,129	19,733	24,014	1.0200%	1.0204%
Wahiawa	17,363	37,329	41,562	1.0108%	1.0295%
Hahaione/Waipahu	N/A	30,251	59,391	1.0698%	N/A

Sources: U.S. Bureau of the Census, 1970 and 1980 (Summary Table 1-A); State of Hawaii, 1973, Community Profiles for Hawaii; percentages computed by Resources, Inc.)

Plan population guidelines, which pertain to Development Plan areas. As indicated in Section 2.0, the individual North Shore and Koolauloa Development Plan areas differ slightly from the census divisions, but their combined areas are identical.

The table shows strong consistency in growth rates for the short term (1970 to 1980) compared to the long term (1980 to 1985), for both the combined and separate North Shore and Koolauloa areas.

Utilizing these stable growth rates to project future population, the number which would be forecast for the year 2005 would range from 39,800 to 44,500 residents for the combined areas, depending on exactly what projection technique is used.

However, the City's General Plan calls for the population of these areas to be held to a figure between 2.9% and 3.3% of the total islandwide population in the year 2005 (1.6% to 1.8% for the North Shore Development Plan area and 1.3% to 1.5% for the Koolauloa Development Plan area). Applying these percentages to the current islandwide total of 954,500 for the year 2005, the combined Koolauloa/North Shore populations would be held to a number substantially lower than 40,000 -- i.e., somewhere between 27,681 and 31,199, or approximately three-quarters the number which could be expected from historic growth rates.

The estimated 1981 combined area population was already 26,088 (Basic State Census Statistical Areas Committee, 1985), a figure almost at the lower boundary of the General Plan guideline for the year 2005. Furthermore, the City's most recent analysis of residential-zoned population capacity (City and County of Honolulu, Department of General Planning, 1985) suggests that only 100 more housing units could be required in each of the two Development Plan areas to attain a projected year 2005 population of 29,100.

These figures strongly indicate that, given current City policies, housing demand on the North Shore and in Koolauloa will soon greatly exceed permitted supply. The expected result would be sharp increases in housing cost throughout both areas.

The situation is likely to be intensified in these areas because the city's current methodology for estimating "residential capacity" counts vacation homes as though they were occupied full time. The 1980 Census data show that only 0.23% of units islandwide were held for occasional use, but the figure was 5.44% of the North Shore/Koolauloa stock (1.55% in the Koolauloa Division, 5.86% in Koolauloa). Thus, the effective population "cap" for these areas would be even lower than indicated by City guidelines, and pressure for full-time housing units could be even greater.

Beach-front areas such as Hukuleia and Mainland Beach may be expected to appreciate particularly rapidly, for two reasons:

- beach-front Hawaii land is rapidly becoming of interest to an international (not just a local) market; and
- there are particularly high percentages of units in these areas already being held for occasional use.

Consequently, property taxes will rise in these areas, and there will be economic pressure for higher returns. Thus, even without the proposed Hukuleia project, there is a good likelihood that the current pockets of older, low-rental units will be phased out and replaced with newer, higher-priced units. Resident socio-economic characteristics could shift accordingly.

An exception could be the few single-family homes on Preservation-designated land west of Hukuleia Beach Park (see Figure 2.3 on page 6); these nonconforming uses could not be upgraded or replaced.

The proposed resort beach-front parcels west of Camp Hukuleia are also designated Preservation at the present time. Thus, the current City land use policy for all beach-front areas west of Camp Hukuleia along Farrington Highway is to become so to remain in open space.

City planners in both the Department of General Planning and the Department of Land Utilization were unable to document the exact reason for the "Preservation" designation. However, they noted that the entire Hukuleia coastline is considered to have high hazard potential due to susceptibility to tsunami flooding and storm damage from high waves, and they suggested that this is the probable reason.

Also, as will be further discussed in Section 1.2, the City's long-range policy is to acquire Northwestern Mutual's 27-acre parcel east of Hukuleia Beach for ultimate park expansion, and also to acquire an indeterminate number of acres within the large 82-acre makai parcel (including the present polo field location) for a new beach park.

Some additional changes which may be expected in the Hukuleia/Mainland area, given current City land use policies, would include:

- (1) Limited further high-rise apartment construction in the current multi-family area along Mainland Beach.
- (2) Gradual construction of more homes (perhaps "gentleman's estates") in the recently-approved Hukuleia residential subdivision.
- (3) At least some additional structures on the Episcopal Church's Camp Hukuleia. As will be discussed in more detail in Sec. 1.2, the Church owns three acres and leases an additional six from Northwestern Mutual. The Church's Master Plan for camp improvement assumes continued use of all nine acres, although the future of the six-acre parcel is still under discussion.

However, the Honolulu City Council in the past year approved a Special Use Permit for the proposed new structures called for in the Master Plan.

3.1.1.2 Major Future Public Facilities

The future new public facility with the greatest implications for the Primary Study Area would be the State's planned Haleiwa by-pass road. This would alleviate traffic congestion in the town and permit more orderly growth and development of commercial facilities. Without a nearby resort area, however, it could also affect the current trend toward visitor-oriented retail operations.

Other potential projects (although without committed funding as of this time) would include roadway improvements on Kamehameha Highway through Haleiwa and improvements to Mainland Beach Road continuing to the end of Crozier Drive, as well as the previously-mentioned beach park acquisitions.

3.1.1.3 Other Potential Economic/Land Use Changes

Topics discussed here are speculative in that they are not reflected in current City land use policies, but they could nonetheless have major implications for the Study Area's future.

The most significant economic uncertainty facing the area involves the future of sugarcane production in general and the Kaiman Sugar Plantation in particular. With its 160 employees, it is still the North Shore's largest single employer and is the threat which currently binds together the Kaiman community.

Given the overall precarious economic condition of Hawaii's sugar industry, relatively slight shifts in national or international market conditions could affect the plantation's viability at almost any time. Additionally, about half the plantation's land is under lease from the Bishop Estate, and these leases will expire in the year 2000. Plantation officials remain optimistic about the future, simultaneously pointing out that some of the sugar lands can be converted to pineapple production if the sugar industry does falter.

Should the sugar plantation shut down, both Castle and Cooke (the plantation's parent company) and Bishop Estate may be expected to propose other uses for portions of the former sugar lands, possibly including some urban development. Castle and Cooke recently assembled a new citizens' advisory committee, comprised of community leaders from the North Shore, through Kapiolani, to provide input on developing a new plan for the company's properties in Central Oahu and the North Shore. The contemplated plan is described as open-ended rather than a fixed land use map.

Another speculative economic prospect for the North Shore could be further development of aquaculture employment. Current

operations are centered in the Kohuku area (in Koolauloa), but several tracts of North Shore land also appear suited for such activities.

Development of a general aviation " reliever " airport has been proposed for the Billingham Airfield. This would appear to be more likely without the proposed project than with it.

3.1.2 Secondary Study Area: Koolauloa

3.1.2.1 Population Trends and Land Use Policies

The population situation for Koolauloa was largely discussed in the previous subsection in conjunction with the North Shore, Sunset Beach area. However, it may be noted that current City approvals indicate the bulk of the planned additional population will be located at Kohuku, where a community-based housing rehabilitation and expansion project is planned.

Perhaps the most significant recent major governmental land use decision involved approval (at State Land Use Commission and City Development Plan levels, with zoning still pending) for the planned expansion of the Kuliwa Resort (now also known as Tuttle Bay). It is estimated that this project will provide about 2,600 new full-time equivalent jobs at Kuliwa itself, with another 900 off-site jobs throughout the combined Koolauloa/North Shore region (Community Resources and A. Conn Lyman, Inc., 1981).

3.1.2.2 Major Future Public Facilities

The only major project with current funding is the infra-structure for the Kohuku Village project.

3.1.2.3 Other Potential Economic/Land Use Changes

Zions Securities Corp., the development arm of the Mormon Church in late, in recent years has proposed several versions of a residential development project. The most recent development plan amendment proposal (for 1985 - 86, subsequently withdrawn) would have produced 225 single-family units and 160 multi-family units on 65 acres.

3.1.3 Secondary Study Area: Waikanae

3.1.3.1 Population Trends and Land Use Policies

As might be inferred from Table 3.1 earlier in this section, Waikanae's recent growth rate has been much slower than one experienced in the 1950's, when military installations there were rapidly expanding. Since Waikanae is part of the City's larger

Central Oahu Development Plan area, there are no General Plan population guidelines for this community alone. However, the Development Plan maps indicate very limited future residential growth in and around Wahiawa.

3.1.3.2 Major Future Public Facilities

Projects with current funding include some improvements to the water system and the recreation center. These are unlikely to have any significant overall effect on long-term development patterns.

3.1.3.3 Other Potential Economic/Land Use Changes

Wahiawa's major economic props are pineapple and the military, both of which appear stable at the moment. There has been some speculation that political instability in the Philippines could lead to relocation of air force units to Hawaii and probably to Wahiawa. The probability of this cannot be easily assessed at the present time, nor the magnitude of any such redeployment.

3.1.4 Tertiary Study Area: Hilliani/Waipahu

3.1.4.1 Population Trends and Land Use Policies

As indicated in Table 3.1, the Hilliani/Waipahu area (i.e., the lower part of the City's Central Oahu Development Plan area) has been a major focus of Oahu's growth in recent years, primarily due to the steady expansion of Hilliani Town and several subdivisions north of Waipahu (Village Park and Waipio-Gentry). Estimated 1981 population for the census tracts containing these communities was 71,169, up from the 1980 figure of 59,391.

The City's Development Plans permit a major new subdivision on Waipio lands at Waikole, between Village Park and Waipio-Gentry, although zoning approval is still required. Recent City Council actions would permit limited expansion of the Village Park and Hilliani Town areas (500 and 300 units, respectively), as well as an initial 300-unit increment for a proposed major new subdivision at Waiawa, on the eastern side of the H-2 freeway above Waipahu.

Also approved on the Development Plans, but still awaiting zoning, is the proposed Hawaii Technology Park above Hilliani. According to the landowner's consultant (SRI International, 1982), this "high-tech" industrial subdivision could provide more than 10,000 on-site jobs, although it should be pointed out that the economic feasibility of high-technology manufacturing has yet to be established for Hawaii.

3.1.4.2 Major Future Public Facilities

Facilities with the greatest overall potential impact for the area would be highway or other transportation improvements. However, other than a new lane for the H-1 east of Waipahu and a planned new interchange off the H-2 at Kipapa, these are in the talking stage. Recent public speculation has focused on the possibility of diverting federal funds originally earmarked for the northward H-3 project to Central Oahu transportation improvements.

3.1.4.3 Other Potential Economic/Land Use Changes

The recent Council approvals for Village Park, Hilliani, and Waipahu represented only fractions of the original proposals for each project. Council indicated the partial approvals were all which could be allowed under current General Plan population guidelines for Central Oahu. At the same time, the Council rejected a proposal to amend the General Plan by merging the permitted population capacities for East and Central Oahu, which would have permitted more development in Central Oahu.

However, the General Plan is subject to periodic review and updating in 1987, and for of this writing some Councilmembers have indicated a desire to see the General Plan revision program moved forward and completed by the latter part of 1986. Whatever the final timeframe, there is a strong likelihood that proposed General Plan changes will include upward adjustments to the permitted future Central Oahu population, although it is uncertain whether such proposed changes would actually be approved.

If the population guidelines for Central Oahu are adjusted upward, the full original proposals for Village Park, Hilliani Town, and Waipahu are likely to be re-introduced. Should these full projects in turn receive approval, there would be significant implications for the future population (and labor force numbers) in the Tertiary Study Area. The complete Village Park expansion area population would be about 10,000 persons; the additional Hilliani Town area would house about 21,000 persons; and the full Waipahu project could accommodate more than 30,000 persons. (NOTE: It is uncertain whether all these projects -- particularly Waiawa, which would require substantial new infrastructure -- could build out to these full-capacity levels by the year 2005.)

Thus, the future population in the Tertiary Study Area could speculatively exceed current assumptions by 30,000 to a maximal 50,000 persons by the year 2005. However, given the speculative nature of these approvals, the possible additional population will not be considered in the labor supply analysis of the following Section 4.1.

Also undergoing Government review as of this writing is a City Administration proposal for a 1,500-unit low/moderate-income housing project on Castle and Cooke land ("Waipahu Estates") above

4.0 IMPACTS AND MITIGATIONS

Major topics to be discussed in this section include:

- o Impacts on current on-site human activities;
- o Recreational and subsistence activities;
- o Social aspects of employment, including adequacy of labor supply and potential mitigations;
- o Lifestyle impacts, including physical elements of "rural character" and social/political structure;
- o Indicators of social stress or harmony (crime, family cohesion, individual stress);
- o Social mitigations.

4.1 Impacts on Current On-Site Human Activities

This subject matter involves what is usually known as "displacement." However, in this case, such impacts are subject to three significant qualifications:

- (1) Displacement would be primarily of human activities, rather than human residents.
- (2) For many of these activities -- e.g., polo -- it has not yet been determined whether the project would actually mean termination or simply relocation and possibly even expansion; these possibilities are being actively explored.
- (3) Some activities could possibly be terminated if the project is not approved. For example, if the property is sold rather than developed, dairy cattle and non-employee residential leases might be ended to provide clear title for the new owners.

Under these conditions, it becomes more appropriate to consider the impacts as "consequences" for existing activities rather than as total "displacement."

4.1.1 Residents

There are currently nine tenant households on the property. Six of these are for ranch employees, who are provided free housing as part of their compensation, and the current population

the Amfar Waikolee site. The proposal has become controversial, and ultimate approval is not assured.

The uncertain future of the sugar industry is also a major concern to Waipaho, headquarters of Amfar's Onahu Sugar Co. All of this plantation's land is leased from the Robinson and/or Campbell Estates, and these leases expire in the mid 1990's. Given the proximity to air terminals and shipping harbors, it is possible that some diversified agriculture operations might relocate from the Neighbor Islands to Onahu Sugar lands if that plantation is forced to close.

3.2 Alternative Uses for the Project Site

While much of the property is now in ranching or equestrian use, the current property owners maintain these uses are not profitable and are not feasible for long-term continuation.

The owners have indicated an intention to put the property on the market if the current requested approvals are not granted. It is a matter for speculation if (1) a purchaser can be found for lands which have no demonstrated economic value, and some of which are designated for "preservation"; (2) the property would be sold in toto to one purchaser or piecemeal to several; and (3) any purchaser(s) would prove more successful than Northeastern Mutual in securing government approvals for development.

It is possible that all current leases and uses of the land could be terminated to provide clear title in the event of sale or potential sale.

Thus, short-term alternative uses of the land are not certain but could range from temporary continuation of current uses to a total cessation of all such uses. The long-term alternative uses currently cannot be forecast at all.

in these households is approximately 24. Three other houses are rented on a month-to-month basis to non-employees, and the current population in these households is approximately seven.

Most or all of these households would be displaced by the project, although some of the employee households might be either unaffected or relocated. The three non-employee tenants would possibly be displaced whether or not the project is approved, since sale of the land in the event of non-approval might result either in lease terminations prior to sale (to assure clear title) or after the sale by new owners. All tenants have been notified of the current owner's intent to develop the property and the likelihood of eventual lease terminations.

4.1.2 Cattle and Horseraising Operations

The Mokuia Ranch manager and nine employees now graze approximately 500 animal units on all parts of the property except the Crowbar Ranch (see next sub-section), steep areas, and dairy cattle pasture. Most of these "animal units" (counting calves and culls as one-half units) are beef cattle. Some horses are also grazed on the property as brood stock for ranch work purposes or occasional sale to outsiders.

Varying amounts of pasture land are also leased on a month-to-month basis to dairy operations. The number of dairy cattle has ranged from 200 to 1,000 in recent years.

These animal-raising ranch operations have been unprofitable for the landowner. While their eventual termination would be assured by project development, their continuation is questionable even if development does not take place.

4.1.3 Polo and Other Equestrian Activities

Crowbar Ranch: The "Crowbar Ranch" is actually a department within the overall ranch operations, rather than an independent entity. It provides horse stable facilities, daily grooming and feeding services, and limited equestrian activities. According to Mokuia Ranch manager James Duvett (personal communication, May 7, 1986), private owners now board about 80 horses at the ranch, including about 50 polo horses.

Project plans call for development on the current Crowbar Ranch site. However, equestrian facilities of some type are a likely project element. If the polo operations (below) are relocated but continued on the project site, stables and other equestrian facilities (possibly dressage or rodeo) may actually be expanded, albeit in a new location. The alternative would be scaled-down equestrian activities within the resort.

Polo Operations: The Hawaii Polo Club leases approximately 18 acres of beachfront Mokuia Ranch property owned by the Crowbar Ranch. According to club president Michael Dalley,

(personal communication, April 21, 1986), participation has been increasing over the past year, with memberships up 25 percent and spectator numbers up by 50 percent over the previous year. He said there are three levels of polo participants:

- o players, numbering about 30, many of whom keep their horses at the Crowbar Ranch;
- o about 100 associate members, who comprise the "social club"; and
- o spectators -- between 500 and 2,000 per event.

Current project plans call for resort development on the existing polo field site. However, there have been preliminary discussions between the landowner and the polo club on relocating the polo fields to a more suitable location. The most recent plan is to develop two fields, one of which would be used for practice during the game. No commitments have been made on either side as of this time. However, as noted above, if these plans come to fruition, it is likely that stable operations and related equestrian activities will be continued and perhaps expanded with the resort development.

If the proposed project is not approved and the property is subsequently sold, the future of both polo and other equestrian activities is uncertain.

4.1.4 Private Camping and Hiking

Camp Mokuia: This camp, operated by the Episcopal Church, is one of three organized camping operations in Mokuia (the other two being Camp Hoopua and the YMCA Camp Edmund). Camp Mokuia now consists of three acres owned by the Church to the east of Northwestern Mutual's 27-acre beachfront parcel, plus six of those 27 acres leased on a year-to-year basis.

Originally intended for Episcopal Church members only, the camp now offers year-round facilities and services to the general public. These include (1) weekend camping programs, which attract a mix of groups and individuals, and (2) summer camping for schools and other organized groups, such as the handicapped, cancer patients, and immigrant children. In 1985, the camp served approximately 20,000 clients, according to the camp director (personal communication, Father Brian Gieves, May 8, 1986).

Most camp facilities are located on the Church's own three acres. These include camping and recreational facilities, as well as administrative offices. The Church also leases a small portion of its property to Kamehameha Schools for a Hawaiian education program.

The six acres leased from Northwestern Mutual is primarily in open space but also contains thatched huts used for instruction by Kamehameha Schools, parking for visitors, and beach and

recreational facilities for campers. The Church had previously leased additional land for equestrian stables but has since terminated this lease.

The Church is presently in the process of raising an estimated \$3.5 million to implement the first phase of a three-phase Master Plan (Osapuff, Snyder, & Rowland, 1984), which is primarily centered on new adult-oriented structures for the Church's own three-acre. Subsequent phases assume acquisition (purchase or long-term lease) of the six-acre parcel now being leased from Northwestern Mutual. For this property, the Master Plan envisions ultimate construction of five youth-oriented cabins and a campfire area at the western end; two tent campgrounds near the beach; an archery field, tennis complex, and large sportsfield to create an open-space buffer between the youth- and adult-oriented zones; and a chapel, paved parking area, and a few additional structures bordering the three-acre parcel.

The proposed project calls for Resort use on the 27-acre parcel which includes the six leased acres. This would terminate existing camping activities on the leased land and prevent implementation of the proposed additional activities. There would also be impacts on the nature of camping at the remaining three acres, which would become a small parcel between two more urbanized sites.

However, the Church has proposed acquiring the six acres when its fundraising efforts are complete. The property owner has had preliminary discussions with the Church about the proposal, but neither party has yet made a firm commitment. However, as a good-faith gesture, the property owner has modified its tentative plans for the 27-acre parcel to leave the six-acre portion in landscaped open space, pending further negotiations with the Church.

Hiking and Camping on Mauka Property: Mauka portions of the project site include several trails suitable for hiking and a jeep access trail (recently washed out in one place) to Peacock Flats, which is an excellent potential nature/recreational site. Due to concerns over liability, the property owner recently has been hesitant to grant permission to outside parties to use any of these trails.

If the proposed project is approved, there would probably be enhancement rather than further reduction of hiking activities. The access road to Peacock Flat would be improved, and the developer would try to provide access to the general public, depending on other requirements for developer expenditures. Hiking trails could be improved, and there is a possibility that camping and/or picnic facilities would be constructed (either by the developer or a concession operator).

It may also be noted that improvements to the mauka area could constitute a mitigation if the Church camp is reduced to

three acres. A three-acre camp would require heavier use of nearby but off-site amenities to remain both rustic and feasible.

The developer's desire is to contract with an operator, which could finance needed improvements through small user fees. The mauka hiking, picnic, and/or camping facilities would then be open to the general public, not just resort residents or guests. Preliminary conversations have been held with the Episcopal Church. (It is intended that discussions will also be held with the City and County and the YWCA). The possibility of the Church operating the hiking/camping facilities is, however, independent of discussions about the future of the six-acre mauka site.

4.1.5 Fishing and Hunting

The project site is now closed to the general public for pig hunting or fishing (except by walking along the public shoreline). However, the rural nature of the area makes it relatively easy for trespassers to engage in such activities.

Fishing on the project site could well be facilitated rather than displaced through developer provision of shoreline access and public parking. Illegal hunting might be terminated. Alternatively, there is some possibility that a for-fee hunting zone could be developed in some mauka area.

4.1.6 Seamliners and Parties

The old Dillingham estate house is currently available on a daily rental basis for private seamliners and parties. The relocation of this house and associated activities has not yet been resolved. The developer has expressed a desire to preserve the house if possible, although this is contingent on golf course plans. If the house is not saved, the new resort facilities would of course provide alternative accommodations for seamliners and parties, although in a different type of structure and setting.

4.2 Outdoor Recreation and Food Gathering

Outdoor recreational and food gathering resources play a major role in the lives of Hawaii residents, primarily because the natural resources are readily available and conducive to year-round enjoyment. This is especially true in rural areas.

This section discusses the potential impact of the proposed development on recreation and food gathering resources within the project boundaries ("on-site") and closely adjacent areas along Farrington Highway ("near-site"), with consideration of the importance of these resources to the residents of surrounding communities. Also discussed are potential impacts of surrounding area's visitor population on off-site recreation areas in portions of the North Shore further away from the Mokuleia area.

4.2.1 On-Site and Near-Site Outdoor Recreational and Food Gathering Resources

Current recreational (and/or food gathering) on-site/near-site resources may be categorized into two types: land-oriented and ocean-oriented.

4.2.1.1 Land-Oriented Recreation

The preceding discussion ("Impacts on Current On-Site (Human Activities") dealt with impacts on on-site recreational aspects (including polo and other equestrian activities, as well as private camping and hiking). Also discussed there was the near-site (Camp Mokuleia).

The major additional near-site land-oriented recreational activities are those which are based at Dillingham Airfield. These currently consist primarily of glider rides, but there are also limited additional activities relating to recreational light-plane aviation and parachuting. As of this writing, neither the State Department of Transportation (DOT) nor the Federal Aviation Administration had responded to the EIS Preparation Notice by making official comments as to the project's proposed compatibility with current or future Dillingham operations. However, DOT chief Engineer Robert Chun (personal communication, June 19, 1986) stated on a highly preliminary basis that he did not foresee any incompatibility between the project and recreational activities at Dillingham, although he said the DOT may express concern over the possibility of future complaints about aircraft noise.

4.2.1.2 Ocean-Oriented Recreation and Food Gathering

In The Beaches of Oahu, Clark (1977) defines the "Mokuleia Beach Shoreline" as consisting of the six-mile stretch extending from Camp Harold Erdman on the western (Kaena Point) end to Puuiki Beach Park (off of Crozier Drive) on the eastern side. He identifies and characterizes the following specific beach areas (Figure 4.1):

- o Camp Harold Erdman is a YMCA facility. Although access is limited to YMCA users, its popularity as a summer camp for children -- along with year-round availability for leadership training, conferences, retreats, etc. -- makes it one of the best-known stretches of the Mokuleia Beach Shoreline to the Oahu public at large. Clark states that water activities include diving, snorkeling, and swimming. He characterizes the ocean as generally calm during the summer but subject to strong currents from October through April.
- o Mokuleia Army Beach facilities are limited to military personnel, although it has the widest and cleanest sandy beach of the Mokuleia stretch. However, states Clark,

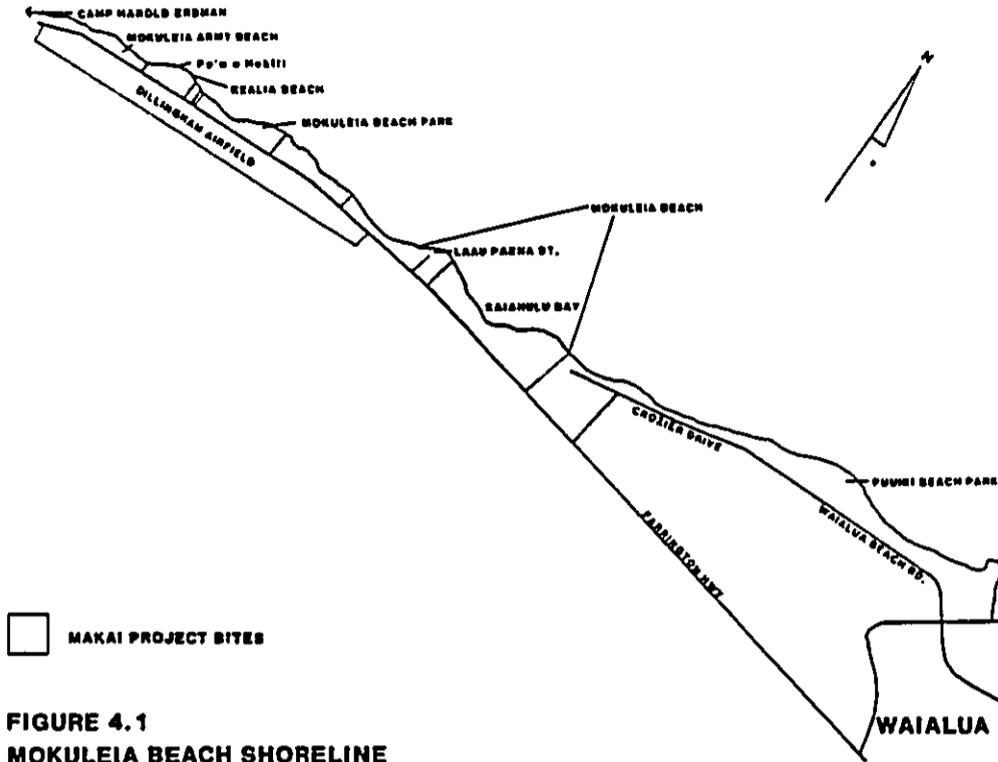


FIGURE 4.1
MOKULEIA BEACH SHORELINE

these areas are exposed to very severe rip currents and lateral currents during the winter months, especially during high surf periods. Over the years, this particular section of the Mokuia Beach Shoreline has been the scene of many serious and fatal swimming incidents.

" Kealia Beach includes the shoreline fronting the two small waterfront shoreline parcels proposed for resort development within this project. According to Clark (p. 105), the "most popular section of the beach is the Pu'u o Hekele area, the site of a former fishing shrine. The wide sand beach here is reached by following any of a number of unimproved roads through the brush to the shoreline. The area is frequented by fishermen and occasionally by campers." (It should be noted that legal access would now occur only along the shoreline, and that camping above the high-water mark is technically trespassing.)

Water activities include diving, swimming, and shorecasting. Clark recommends extreme caution in entering the water during winter months when surf is large. He characterizes the ocean as "relatively safe on calm days," but says along-shore currents are "insistent" even then.

" Mokuia Beach Park is the only developed public facility within the project area. Water activities include diving, shorecasting, and swimming. Available facilities include a comfort station, cooking stands and picnic facilities, a large grassy playground, public and emergency phones, and 65 parking stalls. The park is windy and shadeless, although the City has tried unsuccessfully to plant trees there (personal communication, Yukio Takekita, Chief, Advanced Planning Section, Department of Parks and Recreation, June 19, 1986). There are tentative plans for a new bath house and parking lot lights.

The beach fronting the 11.7-acre park lies on the leeward side of a sandy point. It is moderately wide but steep, and is somewhat protected by the broken offshore reef. However, Clark (p. 105) adds his usual admonition that there are "dangerous currents from October through April, especially when surf is big."

According to the Custodian of Permits and Records for the City Department of Parks and Recreation (personal communication, Ray Hasegawa, June 19, 1986), limited restroom facilities at the park require limiting the availability of camping permits to a total of 15 (each for up to ten persons) at any one time. He said the park is in little demand among campers most of the year due to its harsh physical character and risky swimming conditions; however, on three-day weekends, Mokuia Beach Park is among Oahu's most popular camping sites, apparently because its remoteness is appealing to city dwellers seeking an escape from urban environments.

" Mokuia cove, between park and lanu Paena St., residential area, is a shoreline stretch not specifically described by Clark. This includes the coastal area fronting the 27-acre project parcel and the abutting Camp Mokuia. There is currently no public access except along the sandy shoreline. Residents interviewed for this report favor Section 4.6 on "Community Concerns" indicating that little swimming takes place there but other activities include net throwing, pole casting, daytime and night diving for lobster, pole casting, day time around Camp Mokuia. There are no estimates of extent of usage, although Mokuia Development Company personnel report observing infrequent use, and other residents say that wintertime rough waters usually limit food-gathering activities to a limited number of persons very familiar with the area.

The Public Facilities map for the City Development Plans indicates the City intends to acquire Northwestern Mutual's entire 27-acre parcel for Mokuia Beach Park expansion purposes. No money for this purpose is included in the present CIP budget. The Public Facilities map indicates the acquisition is to take place between one and seven years in the future, although the current CIP program states that it will be more than seven years in the future.

" "Mokuia Beach" is Clark's term for the coastal area fronting the current main residential pocket on Farrington Highway (i.e., lanu Paena St., Mokuia Beach Colony, etc.); the large 82-acre project parcel which includes the current polo field location; and the private Castle and Cooke recreational area to the east (several cottages serving as an executive retreat for management personnel). As with most of the Mokuia Beach Shoreline, Clark warns of dangerous currents in the winter months, particularly in times of large surf, but notes that water activities do include swimming and diving, as well as shorecasting and beachcombing. However, the entire shoreline above the high-water mark is privately-owned, which sharply limits public access. People nonetheless can reach the beach, either through trespassing or along the shoreline, and area residents report recurring litter problems.

The City North Shore Development Plan Public Facilities map indicates a "site-undetermined" public park should be developed somewhere in the vicinity of Kai'ahulu Bay on Northwestern Mutual's 82-acre parcel. However, the map also indicates that acquisition of such a park site (of indeterminate acreage) is more than seven years in the future, and no City funds have been appropriated to date.

" Puniki Beach Park is privately-owned, with access limited primarily to Wai'anae Sugar employees. It is located off Wai'anae Beach Road rather than Farrington Highway. The reef structure there provides better protection against

high waves and currents than most other portions of the Mokuleia Beach Shoreline, although the beach is steep, a mixture of sand and pebbles, and the ocean bottom is rocky rather than sandy.

The park serves important social and recreational functions for the Waiāluu community. Waiāluu Sugar Company has dedicated a ballfield for the community little league and makes the four pavilions available for local church and other nonprofit groups. Intrusion into, or congestion of, this park would be a sensitive social impact. However, the location is off the main highway which would be used by resort guests, and a sign clearly marks the park as a private facility.

likely project impacts include:

- (1) Public access to the shoreline will increase due both to standard City requirements for such access and to the developer's publicly-stated intention to provide such access, as well as public parking facilities. However, at the present stage of project planning, there is no final determination as to the exact location of access trails, number of parking stalls, or design of lateral access trails parallel to the beach.
- (2) Increased use of the beach by resort guests and the general public could present safety problems due to the strong currents which often accompany high surf in winter. This could be mitigated by prominent warning signs, provision of lifeguards, and provision of attractive swimming pools in the hotels to encourage guests to use these facilities rather than the ocean.
- (3) Project approval as planned would preclude long-range City plans to expand Mokuleia Beach Park and establish a new park on Kai'āhulu Bay. (Alternatively, the cost to the City of condemning this land would be much greater.)
- (4) The current "recreateness" of Mokuleia Beach Park would be altered, affecting the nature of camping and other recreational experiences there and in nearby coastal stretches. However, landscaping on the adjoining 27-acre resort parcel could provide not only a visual/noise buffer, but also an aesthetic addition to the park's current barren appearance. Park users may also benefit from the availability of security forces at the hotel. It is possible that the ultimate result could be increased usage of Mokuleia Beach Park, although perhaps by different people and for different psychological purposes.
- (5) Some current Mokuleia residents may feel a sense of intrusion or competition with "outsiders" (resort guests and new residents, along with other Oahu residents attracted by

increased public access). This could focus on aesthetic aspects of the beach experience, food-gathering, or both.

It is difficult to assess the "objective" truth of concerns about competition over ocean food resources. The fruitfulness of the project shoreline cannot be adequately measured, since customary users are few and tend to be reluctant to discuss the location of prime food-gathering spots. They do report that fishing has deteriorated over the years in the area; although this is part of an islandwide trend due in large part to overfishing. Of those (probably few) Mokuleia residents who rely in large part on ocean food resources for subsistence, most would appear to be renters. Likely increases in long-term shoreline property values could decrease their numbers with or without the project (although perhaps more rapidly with the project).

Only very limited numbers of guests are likely to pick limu or dive for lobster in rough waters, though a few may try some shorecasting. And some part- or full-time new project residents may learn to tap the ocean's food resources. But the "true" extent of competition between future project population and Mokuleia residents outside the project can only be speculated upon at this time.

4.2.2 Off-Site Outdoor Recreation and Food Gathering Resources

The North Shore region has an abundance of existing coastal recreation areas, including the Mokuleia Beach Park, Pupukoa Beach Park, Waimea Beach, Keiaka Point State Recreation Area, Haleiwa Beach Park, Alii Beach Park, and the Haleiwa Boat Harbor. An off-shore resource area, the Pupukoa Marine Life Conservation District (MLCD), is managed by the State Division of Aquatic Resources. Inland of the Mokuleia area, there are the Sprein Resource Management areas of Mount Keolu and Paluā Natural Area Reserves.

These facilities provide important rural recreational experiences for all Oahu residents and may be particularly important for nearby North Shore residents, some of whom have chosen to live in the area due to the proximity of good surfing conditions and similar attractions.

The major issue for study, then, is the possibility that the proposed project could unduly congest North Shore coastal recreation resources. Analysis of this issue relies heavily on a similar study for the Kūiāua resort expansion (Community Resources and A. Lynn Lyman, 1984), in which two factors were considered as determining the probability of heavy visitor use of off-site recreational and food gathering facilities:

- (1) the frequency and mode of visitor travel of Kūiāua guests; and

(2) the extent to which these visitors are likely to focus their off-site travel on immediately surrounding communities.

Kullima, as the sole existing resort in the North Shore area, is viewed as a reasonable indicator of the future situation at Mokuleia.

A 1983 modeling study of Oahu tourist travel conducted for the Oahu Metropolitan Planning Organization (PRC Voorhees, 1984, pp. 36-48) found noticeable differences between the tendency of guests at Kullima versus those in Waikiki to leave their respective hotel areas. Waikiki guests made more than twice as many off-site daily trips per person as did Kullima guests, counting all modes of travel. And for motorized trips, which are the most likely to include stops at nearby recreational areas, Kullima guests made approximately 0.75 round trips off-site per day, which was slightly fewer than the Waikiki average.

It may therefore be concluded that 1983 Kullima guests used on-site facilities much more than did Waikiki hotel guests, as is the intent of a destination resort. This was true even though the Kullima facilities at that time were essentially limited to a single hotel and golf course. The proposed Mokuleia facilities would ultimately be more extensive and could be presumed to have even greater power to hold guests on-site for much of their stays.

In regard to current destination of Kullima guests who did travel off-site in rented vehicles, the PRC Voorhees (p. 46) data and other inquiries initiated by Community Resources indicate that:

" (Excluding the 41% of trip portions involving first-day arrivals at Kullima or return portions of outbound trips) approximately 43% of rental car trips were primarily oriented to destinations in the region, with most of these oriented to the Polynesian Cultural Center. (A likely parallel for Mokuleia would be the Waimea Falls Park.)

" However, more than half of the off-site trips were primarily oriented to more distant locations such as Waikiki or Sea Life Park.

" Inquiries were made by Community Resources to car rental and activity desks in the Turtle Bay Hilton and various Waikiki island resorts as to apparent destinations of persons renting cars: nearby or islandwide. The consistent response was that guests who do travel outside destination resorts, whether in rented cars or in tours, were largely interested in running the entire island.

These patterns do not suggest extensive orientation to nearby communities and/or their recreational resources. Rather, future visitor use of North Shore parks is likely to be a function of islandwide growth in the tourist population, since visitors staying in all parts of the island travel when they do leave their resorts to all other parts of the island.

At the same time, it must be recognized that certain locations -- e.g., Waimea Park on high-surf days or, further away, Inaaua Park -- have disproportionate appeal to visitors compared to other parks. Standard transportation gravity models for trip generation suggest that such high-appeal locations would receive proportionately more traffic from nearby origin points than more distant ones.

Based on these various considerations, it may be generally assumed that the proposed Mokuleia recreational community will not disproportionately congest nor adversely affect the qualitative experience of North Shore recreational facilities outside Mokuleia. Exceptions, if any, would likely involve more cars and observers at particularly scenic North Shore areas where surf is high and/or other major recreational events are taking place.

4.3 Social Aspects of Employment

Aspects to be discussed include (1) summary of predicted numbers of jobs; (2) additional assumptions about labor demand; (3) adequacy of local labor supply and potential additional labor sources; (4) economic quality of resort jobs; and (5) sociological/psychological aspects.

4.3.1 Summary of Predicted Numbers of Jobs

Economic consultant John Child & Co., Inc., is responsible for preparing employment forecasts for this project. Because their forecast is essential for the subsequent analysis conducted in this report, Tables 4.1 to 4.3 present their findings for projected development phasing, construction employment, and operational employment, respectively. A complete discussion of their assumptions and calculations will be provided in their own report, currently under preparation.

Development Phasing: Table 4.1 indicates the initial development emphasis will be on project infrastructure, 500 hotel units, one 18-hole golf course, and an initial increment of the commercial complex. Assuming project completion by the year 2005, the finished project would feature 2,100 hotel units; 1,200 condominium units; 700 residential lots (204 with building improvements); 36 holes of golf; and 101,000 square feet of commercial space.

Table 4.1:
Assumed Project Development Phasing

Type of Development	1990 - 1995	1996 - 2000	2001 - 2005	Total
Hotel Units	500	500	500	2,100
Condominium Units	0	575	50	1,200
Single-Family:				
Vacant lots	0	200	225	700
Building improve- ments	0	10	130	204
Commercial				
(in sq. ft.)	18,200	30,000	24,000	100,700
Golf course (holes)	18	0	0	36
Infrastructure				
(\$ million)	\$24.0	\$1.6	\$0.0	\$32.0

Source: John Child & Co., Inc.

Table 4.2:
Assumed Average Annual Full-Time Equivalent Construction Jobs

	1990 - 1995	1996 - 2000	2001 - 2005	Total
Direct Employment	230	240	140	210
Total Employment	560	530	330	490

Source: John Child & Co., Inc.

Table 4.3:
Assumed Average Annual Operational Employment

Type of Development	1990	1995	2000	2005
Direct Employment				
Hotel	450	990	1,410	1,890
Condominium	0	120	230	240
Commercial	90	230	380	500
Golf Course	30	50	50	50
Property Administration	50	50	50	50
Subtotal -- Direct	620	1,440	2,150	2,730
Indirect and Induced Employment				
Hotel	410	890	1,300	1,700
Condominium	0	60	120	120
Commercial	50	140	230	300
Other	10	20	30	40
Subtotal -- Indirect/Induced	470	1,110	1,680	2,160
Total Operational Employment	1,090	2,550	3,830	4,890

Source: John Child & Co., Inc.

Notes: (1) Figures are "full-time equivalent positions." The actual number of jobs could be higher, if many full-time equivalent jobs are split into several part-time positions. However, the actual number of workers could be lower due to multiple job-holding.

(2) Figures are also "annual averages." Depending on seasonal or weekly shifts in market demand, actual number of full-time equivalent positions could differ on any given day of the year.

Construction Employment: Table 4.2 indicates the project will provide an annual average of 210 direct on-site full-time equivalent construction jobs. Total jobs, including indirect and induced employment, would average 490 jobs per year throughout the state during the project's 17-year construction time frame. (An "indirect" job is generated when one business serves another business, while an "induced" job is generated when workers' wages circulate through the economy.) Because construction activities require substantial support from other businesses and provide high wages, indirect/induced employment exceeds on-site direct employment. It may be noted from the table that construction activities are expected to peak in the early 1990's.

Operational Employment: Table 4.3 indicates a forecast of 2,730 full-time equivalent permanent jobs on the project site by the presumed year 2005 build-out date. More than half of these are expected to be in place by 1995. Hotel employment is expected to generate nearly 70% of the total on-site jobs, with the remaining 30% distributed among commercial, condominium-related, golf course, and property administration jobs.

Indirect and induced employment would be scattered throughout the island or state. It is projected to total 2,160 full-time equivalent positions by project build-out, for a statewide total (direct, indirect, and induced) of 4,890.

The footnotes at the bottom of Table 4.3 indicate some of the reservations which must be attached to the operational job forecasts (which are, of course, estimates in the first place). Newert employment calculations are complicated by factors such as multiple job-holding (individuals holding more than one job, which suggests fewer workers than jobs), the tendency of some hotels to split positions into several part-time jobs (which could imply more workers than the total full-time equivalent job number), and seasonal or even weekly variations in occupancy and hence labor needs. This underscores the complexity of tourism labor forecasts and the need to make assumptions in order to proceed with analyses.

4.3.2 Additional Assumptions/Calculations Regarding Future Labor Demand

Subsequent portions of this analysis address the question of the adequacy of the study area's labor supply to meet projected future demand from this and other projects. This portion of the analysis sets forth additional assumptions and/or calculations regarding labor demand.

Assumptions are stated here in abbreviated form in order to facilitate ease of reading. However, each of the assumptions are discussed in more detail in Appendix A.

Assumptions About Project Demand

- (1) The major focus will be on operational, rather than construction, labor demand. Construction jobs should generate only short-term commuting, with no subsequent immigration pressures.
 - (2) Demand for direct-employment workers will be equal to the numbers provided in Table 4.3.
 - (3) Indirect/induced employment from the Mokuleia project will equal 648 in the overall Study Area, 80% of which will be in the North Shore. The 648 figure represents 30% of direct employment.
 - (4) In line with statewide figures on the hotel industry, the major demand generated by the Mokuleia project will be for less skilled persons. Specifically, it is assumed that 80% of the jobs will be suited for persons with less than a four-year college degree.
- Additional Study Area Labor Demand**
- (A) Demand for labor not resulting from the project will be calculated according to the official projections of the Oahu Metropolitan Planning Organization (OMPO), plus demand resulting from two major Study Area projects approved since the OMPO study:
 - Kuliama expansion (2,400 additional jobs by year 2005);
 - Hilliani High-Technology Park (14,280 additional jobs by year 2005);
 - (B) Because of the initial and uncertain character of high-tech jobs, it is appropriate to consider at least two scenarios:
 - the Hilliani High-Tech Park reaches full employment capacity by year 2005;
 - the High-Tech Park reaches only 50% of job capacity by that year.
 - (C) For tentative analyses suggesting labor demand and supply by educational level, it will be assumed that 80% of all additional employment demand will be for persons with less than a four-year college degree.
 - (D) An exception will be the high-technology park, for which the assumed figure is 53% (for reasons given in Appendix A).
 - (E) Current Minimum Population Job Levels will be held constant. This is a conservative assumption which is significant for the immediate Waianai area but of little statistical import for the overall Study Area.

Table 4.4 shows results by year and portion of Study Area for various portions of the total Study Area for estimated labor demand without the proposed Mokuleia project. Table 4.5 presents "bottom-line" job figures only for both total Study Area and North Shore portion) under each of four different conditions: (1) 50% development of the high-tech park, without Mokuleia project; (2) 50% development, with Mokuleia; (3) 100% high-tech development, without Mokuleia; (4) 100% development, with Mokuleia. Finally, Table 4.6 shows similar figures for estimated jobs requiring less than four years of college.

Major implications of these tables would include:

- (1) Without the Mokuleia project, projected future job growth on the North Shore is extremely limited -- only 417 additional jobs by the year 2005. Should the sugar plantation shut down, the loss of these agricultural jobs would more than wipe out the small anticipated North Shore employment gains. Future job growth is also expected to be relatively small for the Wahiawa area.
- (2) However, jobs in Koolauloa and the Hiliilani/Waipahu area will more than double due to the Kullilan expansion and (under the 100% build-out scenario) the high-tech park.
- (3) For the entire Study Area, labor demand is expected to grow from the 1980 base of 35,000 to 61,000 in the year 2005 for the 100% high-tech build-out scenario (or to 53,820 under the 50% build-out scenario).
- Without the high-tech park, however, job growth would be less than 11,000. This underscores the very major role which the high-tech jobs -- of which there are currently none in Central Oahu -- play in this labor demand analysis. If the actual build-out should fall short of even the 50% scenario, labor demand will be significantly less than indicated in Tables 4.4 to 4.6.
- (4) The addition of the Mokuleia jobs will significantly increase labor demand in the North Shore area by 1995 (by which time it would have become the area's largest employer). By 2005, the Mokuleia project will provide the North Shore with nearly double the number of jobs which are expected without the project.
- For the entire Study Area, of course, the addition of Mokuleia jobs would have a smaller proportionate impact. The assumed build-out rate for the high-tech park is a more significant variable.
- (5) The figures in Table 4.6 -- which assesses estimated demand for the labor market segment with less than four years of

Table 4.4:
Relevant Future Study Area Labor Demand Without Mokuleia Project

OHV-Projected Jobs	1980	1990	1995	2000	2005
North Shore	3,137	3,177	3,197	3,217	3,237
Koolauloa	2,939	3,669	4,034	4,398	4,809
Wahiawa	18,299	19,296	19,794	20,292	20,826
Hiliilani/Waipahu	11,451	12,986	13,793	14,520	15,408
Subtotal	35,826	39,128	40,778	42,427	44,280
Kullilan Expansion Jobs					
North Shore		63	148	233	317
Koolauloa		413	973	1,532	2,083
Wahiawa		0	0	0	0
Hiliilani/Waipahu		0	0	0	0
Subtotal		476	1,121	1,765	2,400
High-Tech Jobs					
(100% Development -- all in Hiliilani)		2,000	5,346	8,792	12,138
Direct		353	943	1,552	2,142
Indirect/Induced					
Subtotal		3,353	6,289	10,344	14,280
TOTAL BY AREA					
North Shore	3,137	3,240	3,345	3,450	3,551
Koolauloa	2,939	4,082	5,007	5,930	6,892
Wahiawa	18,299	19,296	19,794	20,292	20,826
Hiliilani/Waipahu	11,451	15,339	20,042	24,864	29,688
STUDY AREA TOTALS	35,826	41,957	48,188	54,536	60,960
(STUDY AREA TOTALS FOR 50% HIGH-TECH DEVELOPMENT SCENARIO)	35,826	40,280	45,044	49,361	53,820

Source: Community Resources, Inc., based on data sources and assumptions as outlined in preceding text.

Table 4.5:
Projected Labor Demand, With and Without Mokuiaia, by Year and Assumption for High-Tech Park Development -- Total Jobs

	Total Study Area		North Shore Division	
	Without Mokuiaia	With Mokuiaia	Without Mokuiaia	With Mokuiaia
1990				
Assuming 50% Build-Out of High-Tech Park	40,280	41,047	3,240	3,978
Assuming 100% Build-Out of High-Tech Park	41,957	42,724	3,240	3,978
1995				
50% High-Tech	45,044	46,826	3,345	5,058
100% High-Tech	48,188	49,970	3,345	5,058
2000				
50% High-Tech	49,364	52,024	3,450	6,008
100% High-Tech	54,536	57,196	3,450	6,008
2005				
50% High-Tech	53,820	57,198	3,554	6,802
100% High-Tech	60,960	64,338	3,554	6,802

Source: Community Resources, Inc., based on Table 4.3 and 4.4.

Table 4.6:
Projected Labor Demand, With and Without Mokuiaia, by Year and Assumption for High-Tech Park Development -- Jobs Requiring Less Than Four Years of College

	Total Study Area		North Shore Division	
	Without Mokuiaia	With Mokuiaia	Without Mokuiaia	With Mokuiaia
1990				
Assuming 50% Build-Out of High-Tech Park	32,454	33,068	2,592	3,182
Assuming 100% Build-Out of High-Tech Park	33,226	33,839	2,592	3,182
1995				
50% High-Tech	35,580	37,006	2,676	4,016
100% High-Tech	37,642	39,067	2,676	4,016
2000				
50% High-Tech	38,744	40,872	2,760	4,806
100% High-Tech	42,134	44,262	2,760	4,806
2005				
50% High-Tech	42,024	44,727	2,843	5,112
100% High-Tech	46,705	49,407	2,843	5,442

Source: Community Resources, Inc., based on Table 4.5 and "Assumption 4" and "Assumption C" from preceding text.

college -- are put forward more tentatively, for reasons discussed earlier. Given the assumptions on which they are based, these figures also indicate that the Mokuleia project would significantly increase the labor demand in the North Shore area for persons with less-than-college education.

Results of Tables 4.4 to 4.6 will be again reviewed in conjunction with results of the labor supply analysis.

4.3.3 Future Labor Supply

To estimate future labor supply -- both for the North Shore Primary Study Area and for the Total Study Area -- it is necessary first to estimate future population by age and sex cohort. Estimated future labor force participation rates for each cohort can then be applied. This discussion will also consider possible additional sources of labor and ways to tap these sources.

4.3.3.1 Estimated Future "Natural" Labor Supply

It must be firmly stated at the outset of this analysis that such estimation can only be estimates, not accurate prophecies. Actual future Study Area population and labor force will depend on various economic and market forces. These are more amenable to modeling at the statewide or islandwide level, as exemplified by the State's population and economic projections model (Hawaii State Department of Planning and Economic Development, 1984) or the City's most recent study of population implications of the development plans (City and County of Honolulu, Department of General Planning, 1985). Such regression-based models are generally less accurate for small areas for which regional economies may be more affected by unique local conditions.

However, the City's General Plan population guidelines, as implemented in the Development Plans, do provide a framework for estimating future regional population and, subsequently, labor force.

Method: Appendix B provides a detailed explanation of the methodology utilized for this analysis. Following is a brief conceptual overview:

- o Utilizing census data, 1980 populations for the four portions of the Study Area (North Shore, Koolauloa, Waikanae, and Miliama/Maipuu) were broken down into age-sex cohorts.
- o Within each area, the populations were further segmented into (1) military personnel; (2) military dependents; and (3) civilian population. Age-sex cohort information was generated for each type of population in each area.

o The military populations (active-duty and dependent) were held constant, while the civilian populations were projected (to years 1990, 1995, 2000, and 2005) using standard cohort analysis methodology. Statewide fertility and survival rates were used, which could underestimate the speed with which General Plan population targets are attained.

o In areas where natural increase would result in the population exceeding City population targets, it was assumed that outmigration would occur among the younger age cohorts (aged 45 or less), since the younger population tends to be more mobile. Enough outmigration was assumed to keep the population consistent with the City and County Department of General Planning's (1985) regional projections.

o Following U.S. Census definitions, the "potential labor force" was defined as dependents or civilians aged 16 or older. The total number of persons within each group (dependents vs. other civilians) was calculated within each sex and each portion of the Study Area.

o Sex-specific civilian labor force participation rates were calculated for each of the four areas from the 1980 census. For the military dependent population, participation rates were separately estimated by assuming that essentially all civilians in census tracts 90 (Whireler Air Force Base) and 95.01 to 95.05 (Schofield Barracks) were military dependents; thus, the observed participation rates for these areas were applied to dependents throughout the Study Area. Participation rates for the non-military-dependent civilian population could then be estimated by subtracting dependents from both the total population and the number of labor force participants.

o Future labor force participation rates were assumed to change in ways proportionate to the projected changes in statewide rates incorporated in the State's economic/population model. Utilizing data from the State model (Hawaii State Department of Planning and Economic Development, 1984), Community Resources calculated total projected sex-specific participation rates for the state as a whole for future years 1990, 1995, 2000, and 2005. Variations by age group were omitted because the overall 1980 rates for the Study Area could not be disaggregated by age group. These were then expressed as ratios to the statewide 1980 sex-specific rates, and the ratios were applied to the 1980 Study Area rates to provide future average rates.

For example, assume that females had a statewide participation rate of 50.0% in 1980 and were projected to have a rate of 55.5% in 2005. The ratio of the 2005 rate to the 1980 rate would then be 1.11 to one. However, within a certain portion of the Study Area, the 1980 female

participation rate may have been only 20.0% for military dependents and 40.0% for other civilians. The assumed 2005 female participation rates in this location would then be 22.2% for dependents and 44.4% for other civilians.

" In each future year, the estimated total civilian population aged 16 (broken down by sex and dependent/civilian status) were multiplied by estimated participation rates to derive estimated labor force participants. These could then be aggregated to provide total estimated future labor force participants within the total Study Area or particular portions (e.g., the North Shore).

" As a final and more tentative analytic step, area-specific projections were made of the likely proportion of labor force participants who would have less than four-year college degrees, since this is tentatively assumed to constitute the segment of the labor market most interested in the majority of Hukuleia resort jobs.

Population Results: Table 4.7 provides year 2005 population results (by age-sex cohort) for the total Study Area and the North Shore portion alone. These figures include assumed out-migration from Koolauloa to keep the population within City guidelines. Details of the outmigration calculations are given in Appendix D, which also provides tables showing (1) the base-line 1980 age-sex cohort populations for various portions of the Study Area and (2) projected population in each portion of the Study Area for each five-year period, both under conditions of natural increase alone (no outmigration) and under the condition of outmigration from Koolauloa.

Table 4.8 compares overall results for each future target year with city population guidelines. As may be observed, the fit is very close after outmigration from Koolauloa is assumed. The North Shore and Koolauloa areas are aggregated in this table because of the boundary differences between City Development Plan areas and census divisions (see pp. 3 - 5). If outmigration had not been factored into the calculations, the year 2005 population for the combined areas would have been 32,877 rather than the 30,291 figure in Table 4.6. The "natural increase" figure of 32,877 is still substantially less than the approximately 40,000 population which would be expected based on historical growth rates (Section 3.1.1.1). This indicates that historical growth in the Koolauloa/North Shore over the last 30 years has included a strong immigration component ignored by the age-cohort technique.

Finally, Table 4.9 presents information on estimated year 2005 population constituting the potential civilian labor force (i.e., military dependents and other civilians aged 16 or more). Fifteen-year-olds were eliminated from the earlier 15-24 age cohort by calculating their observed percentage of this cohort in 1980 and applying this percentage to future years. Appendix B contains an additional table showing this potential population

Table 4.7:
Potential Year 2005 Population -- Total Study Area
and North Shore *

Age Group	Total Study Area **			North Shore Division		
	Male	Female	Total	Male	Female	Total
0 to 4	7,268	6,929	14,197	440	417	857
5 to 14	12,848	12,141	24,989	819	792	1,611
15 to 24	18,463	12,264	30,726	1,184	808	1,992
25 to 34	14,352	12,351	26,704	1,062	760	1,822
35 to 44	10,922	10,090	21,013	963	700	1,663
45 to 54	8,286	8,633	16,920	800	658	1,457
55 to 64	6,207	6,788	12,995	550	524	1,074
65 to 74	4,218	4,872	9,090	346	301	718
75 to 84	2,679	3,200	5,879	254	313	568
85 & more	1,565	2,000	3,565	190	237	427
TOTALS	86,809	79,269	166,078	6,639	5,610	12,249

* Includes total civilian and armed forces populations
** Includes out-migration from the Koolauloa Division

Note: In this and ensuing tables, sums of categories may not exactly equal "Total" figure due to rounding error.

Source: Community Resources, Inc.

Table 4.8:
Comparison of Projected Future Populations with City General Plan
Population Guidelines

Year	North Shore/Koolauloa		Central Oahu	
	This Analysis	City General Plan Targets	This Analysis	City General Plan Targets
1990	27,691	27,566	118,427	123,108
1995	28,227	28,150	124,670	127,640
2000	28,962	29,001	130,485	134,851
2005	30,291	27,681 to 31,499	135,788	122,176 to 135,539

* City population figures for year 2005 taken from range in
General Plan Guidelines. Intervening figures City and County
Department of General Planning (1985) report, Residential
Development Implications of the Development Plans.

Source: Community Resources, Inc.

Table 4.9:
Potential Year 2005 Civilian Labor Force --
Persons 16 Years and Older -- Total Study Area and North Shore *

Age Group	Total Study Area			North Shore Division		
	Male	Female	Total	Male	Female	Total
16 to 24	9,541	10,495	20,036	740	674	1,413
25 to 34	9,330	11,791	21,121	828	709	1,537
35 to 44	8,754	10,025	18,779	862	694	1,556
45 to 54	7,872	8,582	16,454	780	653	1,433
55 to 64	6,135	6,778	12,914	547	523	1,070
65 to 74	4,218	4,872	9,090	346	401	748
75 to 84	2,679	3,200	5,879	254	313	568
85 & more	1,565	2,000	3,565	190	237	427
TOTALS	50,094	57,744	107,838	4,518	4,204	8,752

* Includes civilians and military dependents only. Armed forces
personnel are not included.

Source: Community Resources, Inc.

for each portion of the Study Area in years 1990, 1995, 2000, and 2005 (for both the "natural increase" and "Koolaulou outmigration" conditions).

Labor Force Supply Results: Table 4.10 shows estimated civilian labor force participants at five-year increments for both the North Shore alone and the total Study Area, while Table 4.11 breaks down year 2005 results by sex, location, and civilian vs. dependent status. Table 4.12 presents estimates of both total population aged 16 or more and also total labor force participants lacking four-year college degrees. These numbers are based on assumptions about future educational patterns which are described in Appendix B. Since the numbers in Table 4.12 are based on a particularly lengthy chain of assumptions, they should be regarded as highly tentative.

Major implications of Tables 4.10 to 4.12 would include:

- (1) Without the Hukuleia project, the ratio of expected workers to jobs on the North Shore will grow increasingly higher, suggesting progressively higher rates of unemployment and/or commuting to other places for jobs.
- (2) With the Hukuleia project, the opposite trend is expected (assuming that jobs become available according to the schedule set forth in Tables 4.1 and 4.3). By the early 1990's, it will be necessary to import labor to the North Shore even if every North Shore labor force participant is already working there.
If current city population control policies remain in place, this could suggest some exacerbation of the pressures for immigration (and on housing availability and cost) which are expected to occur even without the Hukuleia project (see Section 3.0).
- (3) For the total Study Area, the high-technology park is a more significant determinant of the labor supply/demand ratio. If the park manages to build out even to 50% of projected levels, jobs in the overall Study Area will increase more rapidly than workers (although there would still be a significant excess of workers). If the park attains 100% of the projected employment by year 2005 and Hukuleia also meets its projected schedule, then there would be almost as many jobs as workers in the total Study Area by 2005.
Realistically, however, many high-tech park workers may commute from Pearl City or Honolulu, just as many Study Area workers may still commute to Honolulu jobs.
- (4) More than half the total Study Area year 2005 participants would be in the Tertiary Study Area (Millioni/Waipahu), from which location they may be more attracted to Honolulu and/or high-tech park jobs than to the North Shore. However, there

Table 4.10:
Estimated Future Labor Force Participants -- North Shore and
Total Study Area -- 1990 to 2005

North Shore	1990	1995	2000	2005
-- Male	2,766	2,899	3,000	3,076
-- Female	1,711	1,853	1,961	2,032
-- Total	4,477	4,751	4,961	5,108
Ratio Total Participants to Expected Labor Demand				
-- Without Hukuleia	1.38	1.42	1.44	1.44
-- With Hukuleia	1.13	0.94	0.83	0.75
Total Study Area				
-- Male	30,864	33,031	34,885	36,626
-- Female	27,496	29,942	31,983	33,555
-- Total	58,360	62,973	66,868	70,181
Ratio Total Participants to Expected Labor Demand				
-- 50% High-Tech Build-Out WITHOUT Hukuleia	1.45	1.40	1.35	1.30
-- 50% High-Tech Build-Out WITH Hukuleia	1.42	1.34	1.29	1.23
-- 100% High-Tech Build-Out WITHOUT Hukuleia	1.39	1.31	1.23	1.15
-- 100% High-Tech Build-Out WITH Hukuleia	1.37	1.26	1.17	1.09

Source: Community Resources, Inc.; ratios based on figures in Table 4.5.

Table 4.11:
Expected Year 2005 Study Area Labor Force Participants
by Sex, Civilian/Dependent Status, and Geographical Location

	Dependents		Civilian		Total
	Male	Female	Male	Female	
North Shore	9	40	3,067	1,991	5,059
Koalauna	8	34	4,592	3,732	8,324
Mahlewa	377	1,689	5,913	5,105	11,018
Hiliiani/Waipahu	140	627	22,521	20,336	42,857
STUDY AREA TOTALS	534	2,390	36,093	31,164	67,257

Pct. of Grand Total (70,180) 0.8% 3.4% 4.2% 51.4% 44.4% 95.8%

Source: Community Resources, Inc.

Table 4.12:
Expected Total Population and Labor Force Participants
With Less Than A Four-Year College Education -- 1990 to 2005

	Total Population Aged 16 or More			
	1990	1995	2000	2005
North Shore	5,876	5,937	5,882	5,803
Koalauna	8,605	8,431	8,207	8,420
Mahlewa	16,575	17,206	17,547	17,854
Hiliiani/Waipahu	35,394	36,993	37,434	37,430
TOTAL STUDY AREA	66,450	68,567	69,070	69,507

Total Labor Force Participants Aged 16 or More

	1990	1995	2000	2005
North Shore	3,479	3,516	3,173	3,387
Koalauna	5,445	5,345	5,193	5,270
Mahlewa	9,263	9,678	9,905	10,010
Hiliiani/Waipahu	24,891	26,134	26,440	26,174
TOTAL STUDY AREA	43,078	44,673	45,011	44,841

Ratio Total Participants to Expected Labor Demand (Jobs Requiring Less Than Four Years of College)

-- 50% High-Tech Build-Out WITHOUT Hokuileia	1.33	1.26	1.16	1.07
-- 50% High-Tech Build-Out WITH Hokuileia	1.30	1.21	1.10	1.00
-- 100% High-Tech Build-Out WITHOUT Hokuileia	1.30	1.19	1.07	0.96
-- 100% High-Tech Build-Out WITH Hokuileia	1.27	1.14	1.02	0.91

Source: Community Resources, Inc.; ratios based on figures in Table 4.6.

would still be more than 26,000 potential workers in the Primary and Secondary Study Areas combined.

(5) The vast majority (96%) of estimated total Study Area workers would be from civilian households. Few military dependents are expected to be in the civilian labor force in Koolauloa or the North Shore, but more than 2,800 military dependents from Wahiawa or Mililani/Waipahu could be actively seeking jobs.

(6) Attending to estimated future persons with less than four years of college, the overall population and the number of labor force participants in this category is expected to be fairly stable from 1990 through 2005, since increasing educational levels would compensate for overall population growth. (Again, it is stressed that the figures in Table 4.12 and consequent conclusions are particularly tentative.)

However, jobs suitable for such individuals will grow rapidly, suggesting that labor shortages in the total Study Area may occur more rapidly than would be suggested by Table 4.10 -- perhaps by the late 1990's. High-tech park build-out rates and Mokuleia approvals would both be significant determinants of the final outcome.

Net labor shortages for the total Study Area would occur with or without the proposed Mokuleia project, so long as the high-technology park actually develops fairly rapidly. From an islandwide perspective, this may be considered a positive social outcome, since it would alleviate traffic congestion by encouraging counter-flow commuting patterns.

However, labor shortages -- particularly for the North Shore area alone -- could be more problematic from the perspective of Mokuleia resort operators or North Shore residents who must cope with consequent immigration and housing pressures.

Additionally, it is possible that labor shortage problems could be borne more heavily by employers outside Mokuleia. For example, Mokuleia is in a location to intercept some of the potential Kailua labor supply which might otherwise come from the North Shore or Wahiawa. Thus, a possible consequence of the Mokuleia project could be displacement of labor shortages and housing pressures to Koolauloa, with increased need in that region to draw upon commuters from the Koolauloko district.

4.3.3.2 Potential Additional Labor Sources

From the perspective of a resort operation concerned with availability of nearby labor, it is necessary to consider two different levels at which labor supply might be increased:

(1) Increases in the total number of labor force participants -- i.e., further increases over the expected numbers contained in the preceding tables. Such

increases would require targeting particular groups and designing intervention strategies which would attract them into the labor force.

(2) Increases in the number of area labor force participants who are aware of, and are interested in, the types of jobs available at the project.

The purpose of this discussion is to identify likely target groups at each of these two levels, as an aid to the eventual design of possible job training or other mitigation measures.

Increasing Study Area Labor Force Participation Rates: Three groups will be considered as possible targets for increasing total number of labor force participants: (1) the educationally disadvantaged; (2) females (of various age and parental statuses); and (3) military dependents. It is anticipated that there would be some overlap among these groups.

In general, it may be assumed that attracting more people from these groups into the labor force will also result in many of the new entrants being interested in resort-related employment. Entry-level resort jobs require certain basic education and functional skills, but rarely advanced education; thus, remedial work with the educationally disadvantaged could result in their being well-suited for many resort jobs. Females have historically comprised much of the resort labor force. And military dependents often fit best into jobs requiring just basic education and limited training -- i.e., situations where employers expect a certain amount of transience and turnover, and where subsequent retraining of new employees is not overly burdensome on the business.

Educationally Disadvantaged: An implication of the projected labor market supply/demand situation (future demand for labor increasing more rapidly than supply) is that competition for local labor will increase, resulting in pressures for immigration. Potential immigrants may be more competitive than current local residents, particularly the educationally disadvantaged. Even with city population controls, persons without jobs in the area may move out, to be replaced by persons with jobs or with better chances of obtaining these jobs. This process would automatically increase net labor force participation but at severe social costs to current residents. Thus, the focus on educationally disadvantaged residents is rooted as much in social considerations as in purely economic concerns about overall labor supply availability.

Historically, educational levels on the North Shore have lagged behind islandwide levels. As previously noted (Section 2.4), about one-fourth of North Shore residents (and 36% of Waianae residents) aged 25 or greater in 1980 had an eighth grade education or less. Only 15% of the North Shore adult population had attended college for four years, compared to 22% islandwide. Additionally, indicators of poor academic performance within the

two North Shore high schools (Mataluu and Kahuku) suggest that future labor market entrance will continue to be less competitive. On a standard achievement test for tenth-graders (the Stanford Achievement Test), 20% of students statewide scored significantly below average on reading; the comparable below-average figures were 33% for Kahuku High School and 50% for Mataluu High School (unpublished computer printouts obtained from the Hawaii State Department of Education).

In addition to basic educational skills, many disadvantaged residents lack "functional" skills (good work habits and attitudes, communication abilities, knowledge of how to seek jobs and behave in job interviews, etc.). Although a high proportion of resort jobs require only minimal academic skills, the functional skill requirements of such jobs could render many area residents uncompetitive for most resort (or any other type of) jobs.

Females: Table 4.13 shows 1980 labor force participation rates for females in the Primary and Secondary Study Areas, compared to islandwide rates. It may be observed that female rates were particularly low for the North Shore and Mataluu (although much of the reason for Mataluu's low rate would be the large number of military dependents -- to be discussed next -- among these females).

Further breakdowns in Table 4.13 indicate that participation rates are particularly low for females with children under six years of age. Many mothers of young children may not wish or need to work, but in other cases lack of child care may prevent entry into the labor force. If the participation rates for the 5,389 females with young children in the Primary and Secondary Study Areas had matched islandwide rates in 1980, an additional 787 women would have been in the labor force. (Note that most of these would have been from Mataluu and few from the North Shore.)

However, even greater gains in the number of female labor force participants -- an additional 1,812 -- would have been made if the proportion of non-residents in the labor force had matched the islandwide rate. For this Study Area (particularly the North Shore), then, child care may not represent as important an intervention strategy as determining the ages and reasons for nonparticipation of other females.

Further studies would be required to answer these questions more definitively, but one likely explanation involves the aging of the female population. Older women have lower labor force participation rates than younger ones, and the projected leveling-off of overall female participation rates at the turn of the century is due to expected increases in the proportion of women in the older age groups. Low participation rates by older women may be judged socially positive if this reflects increased security and prosperity among older women, but not so if it instead reflects lack of skills or employer reluctance to hire senior citizens. Therefore, steps to increase female labor force

participation in the future may appropriately focus as much or more on the special problems of older women as of young mothers.

Military Dependents: Table 4.14 breaks down projected year 2005 labor force nonparticipants by sex and civilian status (military dependents vs. other civilians) for each portion of the Study Area. Military dependents comprise 13% of the total reserve labor pool. Most of these dependents are females in the Mataluu area. For Mataluu, dependents comprise 34% of total enlisted year 2005 nonparticipants.

The reason for high nonparticipation among dependents was summarized in the Kuliua socio-economic analysis:

According to representatives of the Waipahu Employment Services Office, many of their applicants are civilian dependents of armed forces personnel. In the Mataluu area, such persons typically experience difficulty in the labor market because of their distance from major employment centers, and because their short lengths of stay in the islands (generally three years with an option to renew) are perceived by themselves and by employers as a handicap. (Community Resources and A. Iono Iyama, Inc., 1984, p. 148)

Resorts generally prefer to hire area residents because of expected lower turnover, which would not necessarily be the case for military dependents. However, certain types of positions (for example, food service) normally experience high turnover, and military dependents may be a valuable labor source for such positions.

Increased Employment of Labor Force Participants in Resorts: As previously stated, there is reason to believe that increasing the labor force participation rates for the foregoing groups would likely result in a fairly automatic flow-through to resort employment. However, there are other groups already in the labor force -- or likely to be in it at a future time -- whose interest in or aptitudes for resort employment may require some enhancement in order to assure an adequate labor supply.

These groups would include (1) the unemployed and underemployed; (2) commuters out of the Study Area; (3) youth, particularly high school students; and (4) plantation workers. The basic need for most of these groups is for an appropriately designed information and awareness program.

Unemployed/Underemployed: Employing the unemployed is perhaps one of the most obvious measures. According to unpublished data obtained from the Hawaii State Department of Labor and Industrial Relations, average 1985 labor force and unemployment data were as follows:

Table 4.14:
Expected Year 2005 Study Area Labor Force Nonparticipants
by Sex, Civilian/Dependent Status, and Geographical Location

	Military Dependents		Other Civilians	
	Male	Female	Male	Female
North Shore	7	76	84	1,464
Koolauloa	6	65	71	1,860
Waikanae	307	3,193	3,501	2,743
Mililani/Waipahu	114	1,184	1,298	6,966
STUDY AREA TOTALS	434	4,518	4,954	13,033
Pct. of Grand Total (37,657)	1.2%	12.0%	13.2%	34.6%

Source: Community Resources, Inc.

Table 4.13:
Labor Force Status of Women by Family Situation:
City and County of Honolulu and Various Parts of Study Area, 1980

Source: U.S. Bureau of the Census, 1980, Summary Tape File 3-A.

FAMILY STATUS	CITY AND COUNTY OF HONOLULU		NORTH SHORE DIVISION		KOOLOAULOA DIVISION		WAIKANA DIVISION	
	(NO.)	(%)	(NO.)	(%)	(NO.)	(%)	(NO.)	(%)
TOTAL POTENTIAL FEMALE LABOR FORCE (AGE 15+)	278,231	100.00	3,140	100.00	4,880	100.00	11,216	100.00
IN LABOR FORCE (INCL. MILITARY)	156,818	57.81	1,446	46.05	2,582	52.91	5,004	44.61
NOT IN LABOR FORCE	121,413	42.19	1,694	53.95	2,298	47.09	6,212	55.39
Breakdown by Family Status:								
WITH OWN CHILDREN UNDER 6 YEARS	48,868	100.00	618	100.00	1,108	100.00	3,884	100.00
IN LABOR FORCE	24,828	51.04	242	39.16	482	44.46	1,230	31.57
NOT IN LABOR FORCE	24,040	48.96	376	60.84	626	55.54	2,654	68.43
WITH OWN CHILDREN 6 TO 17 YEARS	82,415	100.00	623	100.00	690	100.00	2,284	100.00
IN LABOR FORCE	36,248	44.10	418	67.10	411	59.56	1,293	56.18
NOT IN LABOR FORCE	46,167	55.90	205	32.90	279	40.44	991	43.82
OTHER WOMEN 16 YEARS AND OVER	174,288	100.00	1,898	100.00	3,164	100.00	5,198	100.00
IN LABOR FORCE	97,542	56.00	768	40.46	1,679	52.75	2,281	43.81
NOT IN LABOR FORCE	76,746	43.99	1,130	59.54	1,485	47.25	2,917	56.19

	Estimated Civ. Labor Force	Unemploy. Rate	No. of Unemployed
North Shore	4,100	5.1%	210
Koolauloa	6,500	5.5%	358
Waikanae	10,430	9.3%	970
Hillman/Waipahu	27,150	5.6%	1,518
			TOTAL: 3,056

Thus, the average number of Study Area unemployed as of 1985 would provide more than enough persons to meet the entire on-site Honolulu project labor demand (2,730) as of 2005. This in of course somewhat simplistic, in that the majority of the unemployed live in the far reaches of the Study Area rather than close to the project; many unemployed persons would be seeking other types of jobs; etc. However, it does provide an indication as to the availability of labor in this group.

Another, less obvious group would be the underemployed (here defined not as persons working below their education level) but rather as persons not working in full-time, year-round jobs). Table 4.15 provides a breakdown of Primary and Secondary Study Area workers by sex, whether typical work week is greater or less than 35 hours per week, and whether individuals worked more or less than 40 weeks the preceding year.

This table indicates that 41% of workers in these areas worked fewer than 40 weeks and/or averaged less than 35 hours per week worked. Within these areas in 1979, a total of 3,300 men and women (27% of the total employment) worked less than 35 hours per week, and, of these, 1,600 (13% of total employment) also worked less than 40 weeks in that year. These are average figures. The table also shows that it is primarily females who are thus "underemployed." Countywide, 43% of females met this definition of "underemployment." However, for North Shore females, the figure was 50%; for Koolauloa, 61%; and for Waikanae, 56%. Thus, Study Area females are not only disproportionately outside the labor force, but also disproportionately underemployed even when they are in the labor force.

Comments: As discussed in Section 2.5.1, about 25% of employed 1980 North Shore civilian workers had to commute at least 45 minutes one-way to their workplace. Increased availability of jobs on the North Shore would not automatically result in all such commuters switching to more nearby jobs, but there is clearly a potential for the reduction of this high percentage.

High School Youth: Based on calculations set forth in the Koolau socio-economic analysis (Community Resources and A. Low

Table 4.15: 1980 Study Area Employment Distribution by Number of Weeks Employed and Average Time Worked Weekly

Area	Usually Work 35 or More Hours per Week		Usually Work Less Than 35 Hours per Week	
	Worked 40 Weeks or More in 1979	Worked Less Than 40 Weeks in 1979	Worked 40 Weeks or More in 1979	Worked Less Than 40 Weeks in 1979
City & County of Honolulu	182,229	101,310	284,629	101,310
North Shore	2,477	970	3,447	411
Koolauloa	2,524	1,227	3,751	431
Waikanae	13,026	2,881	15,907	1,428
City & County of Honolulu	24,581	25,275	49,856	19,021
North Shore	206	206	206	206
Koolauloa	193	193	193	193
Waikanae	1,428	1,428	1,428	1,428
City & County of Honolulu	25,080	25,080	44,111	15,410
North Shore	198	198	198	198
Koolauloa	186	186	186	186
Waikanae	1,220	1,220	1,220	1,220
City & County of Honolulu	18,026	18,026	32,809	11,449
North Shore	18.0	18.0	18.0	18.0
Koolauloa	18.0	18.0	18.0	18.0
Waikanae	18.0	18.0	18.0	18.0
City & County of Honolulu	18.0	18.0	18.0	18.0

Source: U.S. Bureau of the Census, 1980 Census of Population-General Social and Economic Characteristics--Hawaii, PC80-1-C13.

	Estimated Civ. Labor Force	Unemploy. Rate	No. of Unemployed
North Shore	4,100	5.1%	210
Koolauloa	6,500	5.5%	358
Waikawa	10,430	9.3%	970
Hillinae/Maipuu	27,150	5.6%	1,518
TOTAL:			3,056

Thus, the average number of Study Area unemployed as of 1985 would provide more than enough persons to meet the entire on-site Honolulu project labor demand (2,730) as of 2005. This is of course somewhat simplistic, in that the majority of the unemployed live in the far reaches of the Study Area rather than close to the project; many unemployed persons would be seeking other types of jobs; etc. However, it does provide an indication as to the availability of labor in this group.

Another, less obvious group would be the underemployed (here defined not as persons working below their education level but rather as persons not working in full-time, year-round jobs). Table 4.15 provides a breakdown of Primary and Secondary Study Area workers by sex, whether typical work week is greater or less than 35 hours per week, and whether individuals worked more or less than 40 weeks the preceding year.

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Comments: As discussed in Section 2.5.1, about 25% of employed 1980 North Shore civilian workers had to commute at least 45 minutes one-way to their workplace. Increased availability of jobs on the North Shore would not automatically result in all such commuters switching to more nearby jobs, but there is clearly a potential for the reduction of this high percentage.

High School Youth: Based on calculations set forth in the Koolauloa socio-economic analysis (Community Resources and A. John

Table 4.18:
1980 Study Area Employment Distribution by Number of Weeks Employed and Average Time Worked Weekly

	Usually Work 35 or More Hours per Week						Usually Work Less Than 35 Hours per Week					
	Worked 40 Weeks or More in 1979			Worked Less Than 40 Weeks in 1979			Worked 40 Weeks or More in 1979			Worked Less Than 40 Weeks in 1979		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
City & County of Honolulu	183,329	101,310	284,639	24,581	25,275	49,856	19,031	25,080	44,111	15,410	26,039	41,449
North Shore	2,477	970	3,447	411	368	779	206	238	444	196	358	554
Koolauloa	2,524	1,227	3,751	431	483	914	513	763	1,276	400	646	1,046
Waikawa	13,026	2,851	15,877	1,426	1,458	2,884	836	888	1,725	629	1,220	1,849
% Distribution of All Workers by Sex in Each Category												
	%	%	%	%	%	%	%	%	%	%	%	%
City & County of Honolulu	75.6	57.0	67.8	10.1	14.2	11.8	7.9	16.1	10.5	6.4	14.7	9.9
North Shore	75.3	50.2	66.0	12.5	19.0	14.9	6.3	12.3	6.8	6.0	18.5	10.6
Koolauloa	65.3	39.3	53.7	11.1	15.5	13.1	13.3	24.5	18.3	10.3	20.7	15.0
Waikawa	81.8	44.4	71.1	9.0	22.7	12.8	5.3	13.9	7.7	4.0	19.0	8.3

Source: U.S. Bureau of the Census, 1980 Census of Population--General Social and Economic Characteristics--HAWAII, PC80-1-C13.

Lynn, Inc., 1985, pp. 151 - 153). It is estimated that Kahuku and Waialua High schools will graduate approximately 16,700 seniors in the 1984 - 2015 time period; in the same time, Lelelehu High School (Wahiawa) is estimated to graduate another 10,500 seniors. Data from the Hawaii State Department of Education (1977) suggests at least 35% of graduating seniors would be seeking immediate full- or part-time work. This translates into a 30-year availability of more than 5,800 seniors from Kahuku and Waialua High schools, plus another 3,675 from Lelelehu High School.

Many of these graduates may simply replace persons leaving the Study Area labor force through retirement or death. However, other high school graduates could outmigrate due to lack of job opportunities for awareness of actual job opportunities in the Study Area. The Tuttle Bay Hilton has begun to forge strong communication linkages with area high school vocational instructors, resulting in job shadowing programs intended to introduce high school students to resort employment prior to graduation. Continuation and expansion of such programs at the proposed Mokuleia project would help to assure maximization of employment benefits for area residents.

Retaining Plantation Workers: This suggestion is made on a contingency basis, in the event of further cutbacks in, or a total elimination of, the Waialua Sugar Plantation workforce at several hundred additional North Shore jobs are dependent on business with the plantation and/or its employees.

Community contacts on the part of developer representatives indicate substantial community awareness of the experience at the opening of the first Kuliha hotel in the early 1970's, when former Kahuku plantation workers were initially denied jobs due to apparent lack of qualifications for resort work. Thus, while the current number of plantation jobs is relatively insignificant compared to total labor force or to total projected Mokuleia project labor demand, the fate of Waialua plantation workers may be considered highly significant by members of the North Shore community.

4.4 Lifestyle and Social Cohesion

This sub-section focuses on qualitative social impacts related to changes in the nature of the place or the people living in the place -- particularly the Primary Study Area (i.e., the North Shore), since it is not anticipated that the project would generate many such impacts in the Secondary or Tertiary areas).

Two aspects will be considered:

- " physical aspects of "rural character" which help create a "sense of place" for the North Shore; and
- " changes in social/political structure.

4.4.1 Physical Elements of "Rural Character"

Changes to physical character of an area represent social impacts to the extent that they affect "sense of place" and community identity.

4.4.1.1 Existing Neighborhood Character

The Primary Study Area (Waialua Census Division), extending from Waimea Bay westward to Keena Point, represented 18% of Oahu's total land area but only 1.3% of the island's population in 1980. This highlights the area's overall rural character. Along with portions of the Windward and Leeward coasts, the Primary Study Area may be considered one of the remaining areas on Oahu to be described as "country".

The area is largely characterized by:

- (1) low-density residential neighborhoods (generally single-family houses with a limited number of low- and medium-density apartments);
- (2) low-density commercial uses concentrated along the coastline and around the towns of Haleiwa and Waialua;
- (3) extensive agricultural uses (primarily sugar production); and
- (4) numerous recreational activities (popular beach areas, along with camping and hiking in the mountain areas).

The following discussion will provide a more detailed account of the existing physical character for specific areas within the Primary Study Area.

Haleiwa/Waiea Bay: The town of Haleiwa is the primary commercial center on the North Shore of Oahu. Many older single-story buildings are evident along Kamehameha Highway, giving the community its "small-town" character. A large number of these driving establishments directed toward the growing tourist market recent years have generally been small-scale in nature and have maintained the overall character of the town. In the past, Haleiwa has been considered to some extent an adjunct of Waipahoehoe. Today, however, the community appears to be both socially and economically distinct.

Single-family housing dominates the area along Kamehameha Highway from Haleiwa to Waimea Bay. Lands south of the highway are largely owned by Bishop Estate and used for the production of sugar and pineapple. A large area at Kaula is operated by Hawaiian Gold for the production of milk. A number of smaller agricultural projects such as nursery and vegetable farms can be found in the area.

Recreational activities are prominent throughout this area. Much of the coastline is made up of easily accessible sandy beaches. Surfing is a major recreational activity, along with scuba diving and snorkeling during the summer months. The boat harbor at Haleiwa provides the only major boat launch facility on the North Shore.

Waialua: One key determinant of Waialua's physical character is the sugar mill and the surrounding acreage planted in sugarcane. Many of the town's residents are employed at the mill and live in single-family residential areas within several blocks of the plantation offices and mill. Most of these housing units are older and in a low- to moderate-price range. In more recent years, some commercial and public facility developments such as a small convenience shopping center and the Waialua Recreation Center adjacent to the elementary school -- along with construction of the Puna Kai subdivision and additional residential units mauka of Farrington Highway -- have somewhat modernized the community's character.

To the east of the mill area, on the Haleiwa side of Kikiki Stream, smaller individually owned agricultural lots contain some diversified agricultural operations. These operations include the production of flower and nursery products, vegetables, and some hogs. The various features of the community give the area a very rural-oriented character.

Crozier Drive/Waiawa Beach Road: Coastal areas from Waialua to the beginning of Mokuleia are accessed via Waiawa Beach Road and Crozier Drive. Nearest to Waialua, homes along the coastline are generally older and more moderately priced. At Pauiki Beach, an area zoned for low- and medium-density apartments has introduced the first cluster of high-rise structures to the North Shore area.

The character along the coast changes noticeably at the beginning of Crozier Drive. Crozier Drive is, in fact, a private roadway and is characterized by numerous speed bumps to slow traffic. Homes along this coastline are generally higher priced and more carefully landscaped and maintained. Many of these units are second homes for relatively affluent Honolulu or out-of-state people. At the end of Crozier Drive, a 10-acre parcel is used as a retreat for the employees of Castle and Cooke.

Farrington Highway Agricultural lots: A two-acre agricultural subdivision on Farrington Highway presently has only a few occupants. While these lots are sometimes regarded as estates for "gentleman farmers," only a very limited amount of agricultural activity is actually taking place in this area at the moment.

Mokuleia: The area surrounding the project site is characterized by agricultural, recreational, and residential

uses, which most residents regard as providing a "rural" atmosphere.

Figure 2.3 (page 6) shows the portions of Mokuleia mauka and to the west of the project site. Land to the east along Farrington Highway is owned by Castle and Cooke. The company produces sugar on acreage extending from the project site to the town of Waialua. A few long-time families in the area own land in the upland regions above the sugarcane and are involved in ranching and some farming activities.

The Mokuleia Ranch, currently in operation on the project site, adds to the existing rural or "country" character in Mokuleia. Approximately 100 acres adjacent to Farrington Highway are occupied by Crozier Ranch equestrian activities. The ranch provides boarding and training facilities for horses whose owners are involved in polo and other equestrian activities. The remainder of the land mauka of the highway (about 3,000 acres) are utilized for dairy and beef cattle pasturing. Except for a small irrigated pasture used for dairy cows, these lands retain their natural vegetation growth. Ranch lands mauka of the highway are also largely in a natural vegetation state, except for the Ikapaku pasture where horses and cattle are grazed.

Also of a clearly agricultural character are the sugarcane fields on either side of the large mauka project parcel.

Mauka of Farrington Highway, recreational land uses are a dominant feature, along with residential pockets. As previously discussed in Sections 4.1 and 4.2, the recreational uses include the polo field, Camp Mokuleia, Mokuleia Beach Park, the Army Beach, and the YMCA's Camp Erdann, as well as the Williamson Airfield on the mauka side. The main residential pocket is between the polo field and Camp Mokuleia, with a few additional houses between Mokuleia Beach Park and the project's 13-acre parcel.

4.4.1.2 Expedited Future Character Without Project

Section 3.0 discussed population trends and economic forces that will bring about some changes in the overall character of the Study Area even without resort development at Mokuleia. The discussion noted that current county slow-growth policies for the North Shore would restrict future housing residential housing supply, while continuing demand for full- or part-time housing units (particularly in beach-front areas) would likely increase housing costs.

Roadway improvements, particularly the Haleiwa by-pass road, will open new lands for commercial and other types of land uses. In the area of housing, the current North Shore Development Plan indicates that future projects will be small-scale -- primarily infill of vacant residential-zoned lots within or adjacent to existing neighborhood areas.

Without resort development, Mokuleia's and Waiaina's physical character is likely to remain much as it is today, at least in terms of the distribution of urban, agricultural, and preservation uses. At present, the largest increase of housing units can be expected to occur in the area currently zoned for low- and medium-density apartments on Waiaina Beach Road. Additional changes may also occur within residential areas along the beaches as property values rise and older ramshackle houses are torn down and replaced by newer units.

Along Farrington Highway, the five houses in the Preservation area could eventually be phased out, leaving the area as natural open space. The agricultural subdivision lots will slowly be built out. The Episcopal Church's Camp Mokuleia Master Plan (see Section 4.1.4) would result in more structures on some or all of that nine-acre beach-front property. However, the City tentatively plans to acquire (for Mokuleia Beach Park expansion purposes) the entire 27-acre parcel which includes the Camp Mokuleia expansion area, so the exact future of this parcel remains somewhat unclear. Also, as noted in Section 4.2, the City also has long-range plans to acquire part of the 82-acre Northeastern Mutual parcel for another beach park.

4.1.1.3 Overall Project Impacts

Impacts to the physical character of the Primary Study Area from a major resort in Mokuleia would most noticeably be in the nature of increased densities in areas that have been described as having a rural or country-style atmosphere. Major impacts are expected to be restricted to the Mokuleia area with a few exceptions which are discussed in the following paragraphs.

- (1) Traffic will increase along Farrington Highway and should carry over into the Haleiwa/Waiaina Bay area along Kamehameha Highway. Traffic impacts are to be discussed further by other consultants.
- (2) Commercial development may be further increased in the Haleiwa community. New commercial projects in Haleiwa have been gradually changing to appeal more to the visitor market. The addition of another resort area would likely encourage more of this type of activity. However, any future development in the Haleiwa area would be required to follow guidelines set forth in the Haleiwa Historic, Cultural, and Scenic District regulations, which are intended to preserve the community's general architectural character.
- (3) General urbanization pressures may be experienced in North Shore areas. Plans for development of other subdivisions in the area cannot be predicted at this point. The economic viability of sugar and pineapple operations is likely to be the critical issue in regards to the majority of agricultural lands. Nonetheless, a new major development will improve property

values, and as a result, increase the potential for additional development. Any future development, however, will ultimately be dependent on policies of the City and County of Honolulu.

The most significant impacts to the physical character of the area will be in Mokuleia, in and around the project site. Some key features include:

- (1) Recreational milieu of the Mokuleia development would, in general, be highly compatible with the current recreational orientation of Mokuleia and the North Shore in general. However, the recreational facilities would be shared with paying visitors rather than reserved just for full- or part-time Oahu residents. The two golf courses would represent a new recreational aspect for Mokuleia.
- (2) Overall densities would increase in Mokuleia due to project structures. The proposed development would in fact be one of the lowest-density resort/recreational communities in Hawaii, counting the several thousand acres of mauia lands. However, structures visible from Farrington Highway -- hotels, condominiums, and the commercial center -- would be clustered. This visual density would be mitigated by further development of the pond system and could further be mitigated by plantings along the road.
- (3) More "manicured" landscaping which usually accompanies both resort and recreational communities would represent a change from the current overall character along Farrington Highway, which is a mixture of natural vegetation (and/or weeds on unattended properties), pastureland, and various styles of residential landscaping. (As beach-front properties become increasingly expensive, however, it may be expected that future residential landscaping in Mokuleia will also become more "manicured.")
- (4) Residential units in the project are likely to be of somewhat different architectural styles than current Mokuleia homes, although these are now a mixture and may well change over time.
- (5) Sugarcane fields on either side of the project site along Farrington Highway are visually and aesthetically compatible with the proposed development. Some bus and truck traffic on the road, however, in a matter yet to be worked out between the developer and the plantation.

4.4.1.4 Impact on Mokuia Beach-Front Character

Project beach-front development would have particular implications for the character of Farrington Highway, above and beyond the highway. The current character of Mokuia (aka) of the highway features alternating pockets of residential, recreational, and natural areas. The development would fill in most of the existing large pockets of open space (although the development and landscaping would preserve much of the open space) and would eliminate the visual presence of grazing animals along the highway.

There would be several site-specific impacts for existing mahai parcels not owned by Northwestern Mutual: existing residential areas, Camp Mokuia, and Mokuia Beach Park.

Existing residential areas, located between the proposed resort development sites, would be subject to increased pressures to upgrade the nature of structures on the sites. The increase in property values -- and, consequently, property taxes -- resulting from construction of resort units in the area would increase the likelihood that some of these properties would be sold (with profits to existing owners) to new landowners who would seek to improve the nature of their property.

Most affected would be the older single-family and duplex units used primarily for rentals and as longtime second homes. This would be an intensification of a trend which is likely to occur anyway as Hawaii beach-front property becomes of interest to an international market, and the outcome would be perceived as "positive" by some persons and "negative" by others.

Camp Mokuia is the Episcopal Church-owned campground. As previously noted in Section 4.1.4, the Church owns three acres and leases six more acres from Northwestern Mutual. The Church's long-range Master Plan calls for permanent acquisition of these six acres. The Plan notes that camp-related people interviewed for the study were "very protective of the special nature of the camp and its grounds" and considered preservation of the current "country atmosphere" to be a high priority (Gaspoff, Snyder, & Rowland, 1981).

If the six acres go into Resort use (albeit primarily as landscaped open space), planned future structures for the three-acre camp site would probably be more densely developed. With or without the six acres, the surrounding resort units would affect the "country atmosphere" at the actual camp location. A mitigating factor would likely be the development of residential-oriented recreational facilities within the Mokuia project (hiking, camping, and equestrian activities). Assuming these are affordably priced for local residents, their nearby presence would represent highly compatible amenities for Camp Mokuia users. For many Hawaii youth groups and organizations, the combination of Camp Mokuia and Mokuia could provide a way to

enjoy recreational/resort amenities while still camping and paying low fees for lodging.

Mokuia Beach Park impacts were previously discussed in Section 4.2.1. As noted there, development of resort units on either side would affect the park's current quasi-wilderness character, particularly for camping. At the same time, landscaping of the resort parcels would alleviate the essentially barren nature of the park environs, and the development would also improve security for campers through increased police services and anticipated presence of nearby hotel security. A clear mitigation need would be appropriate landscaping of the resort parcels bordering the park to provide noise and visual buffers.

4.4.1.5 Amenities

One of the less positive aspects of "rural character" has to do with lack of amenities (whether private commercial or public services) in sparsely populated areas.

Additional visitor and resort residential population will provide a base for expanding both public services and private amenities. The 1984 North Shore Neighborhood Survey discussed in Section 2.7.1 indicated substantial public concern over crime and the need for full-time ambulance service; such police and public safety services are more likely to be justified with an expanded *de facto* population base.

The resort would also result in numerous private amenities. These would be primarily on-site -- restaurants, entertainment, and the several recreational facilities now being finalized. Additionally, the increased local market could also result in more stores, restaurants, and entertainment amenities in areas such as Haleiwa.

4.4.2 Social/Political Structure

Interviews with community leaders suggest four basic social groupings at present in the Mokuia-Mokuia area:

- (a) **Plantation-Oriented:** Predominantly residing in and around Mokuia, these people grew up around the Mokuia Sugar Plantation and/or are currently tied to the plantation in some economic way. Many are Filipino immigrants or descendants of Filipino immigrants. As of the 1980 Census, 48% of the population of the Mokuia community was Filipino, and 30% was foreign-born. It may be assumed that Plantation-Oriented people represent the largest of the five groups, since Mokuia's 1980 population of 4,051 represented 76% of the total population in the Mokuia-Mokuia census tract (Tract 99.01).

At the present time, it is difficult to predict with certainty whether the plantation will still exist in the year 2005 or, if not, whether Waiolua's population at that time will still reflect a plantation heritage. The existence of alternative employment centers such as the proposed resort would be a major factor. Without an employment center to provide common social and economic bonds, Waiolua would gradually lose such of its present relatively homogeneous population, and the replacement population would be less likely to have common ties with institutions such as the plantation, labor unions, or even the Catholic Church. With a nearby employment center, social change will still occur, but it will be experienced by a more unified community.

(b) **Military-Oriented:** These people work at Schofield, Pearl Harbor, HAVCOH or other facilities, either in the armed forces or as civilian workers. They are generally Caucasian and live in rental units along Waiolua Beach Road or Farrington Highway near the project site. In 1980, Census data show 237 armed forces personnel residing in Census Tract 99.01, 92% of whom lived outside the Waiolua community core.

Depending on the exact type and price range of housing units to be built at the project site, it is reasonable to assume that some of the new residents would be military personnel, most probably singles sharing units. Thus, one project impact could be a modest increase in the area's military population.

(c) **Ranch or Horse-Oriented People:** These people either live around the project area and raise horses, or live in the nearby two-acre agricultural subdivision. Their numbers are uncertain but are probably just a few hundred, since the entire Census block group including Mokuiea and other rural areas surrounding Waiolua and Waiolua Beach had a total population of just 613 in 1980. However, there are also part-time residents and residents of other areas who may keep horses in the area and drive up to attend polo games in season.

If the project continues to develop along contemplated equestrian-oriented lines, the numbers of such persons (full-time or part-time) in the Mokuiea area would likely increase.

(d) **Beach-Front Residents:** These include non-military, non-ranch people who live on or near the beach on Farrington Highway near the project site, as well as parts of Waiolua Beach Road and Frazier Drive. (There would of course be some overlap between "beach" people and "horse" people in the Mokuiea area.) Some live in expensive homes, but there are also a number of long-time renters who rely to some degree on the ocean for income or subsistence, as well as a few young surfers.

Census block group data indicate a greater income spread in these areas -- i.e., larger proportions of both high-income and low-income than in the Waiolua area. As previously indicated, it is expected that population pressure and city growth policies will gradually result in fewer low-income residents among the Beach-Front Residents over the next few decades.

The new residential population at the project site would ultimately exceed the current beach-front population along Farrington Highway. It is anticipated that the two groups would be socially compatible, although the very long-range expectation would be that persons able to afford actual beach-front land in the future would be on average more affluent than those in condominium units on the project site.

Approval of a major resort at Mokuiea would introduce three broad new potential population groups, as described below. Also briefly discussed are some of the factors which would affect the quality of social interaction between newcomers and "oldtimers."

(a) **Visitors** would comprise 74% of the estimated average daily on-site census in the year 2005. The current tentative development concept calls for an income mix among visitors rather than a pure luxury resort. Preliminary discussions with community leaders suggest this is desirable from the perspective of Waiolua and Mokuiea residents, although some Mokuiea residents may prefer an "upscale resort."

Published literature on the determinants of resident-visitor interaction and its quality (INESKO, 1976; Knox, 1978, 1979; Graburn, 1983; Kendall and Var, 1981) suggests that major determinants of resident attitudes and behavior rarely involve economic benefits. Rather, they usually have more to do with residents' age, perceived visitor respect for local culture, displaced political resentment, and competition for resources. In Hawaii, coastal resources are particularly important, and the exact form provisions for public access to the shoreline could be a major long-range determinant of area residents' attitudes toward visitors.

(b) **Resort Residents** are expected to number about 1,200 (910 full-time and 260 part-time) in the year 2005. They will thus be the largest single bloc, perhaps even the majority, of residents along Farrington Highway in Mokuiea. The quality of their interaction with other area residents will depend on such factors as membership in regional associations vs. on-site homeowner or condominium associations, and demographic characteristics and place of work.

4.5.1 Social Mechanisms

Past experience with resort social impact assessment in Hawaii indicates at least five social mechanisms which can affect "quality of life" as indicated by measures such as crime or mental health rates:

- (1) **Nature of Employment:** Sociological/psychological aspects of resort employment have been discussed at length in several past Hawaii resort social impact studies (Community Resources, 1980, 1981, 1986; Community Resources and A. Lono Lyman, 1985) and will not be repeated here. Rather, the present discussion will focus on outcomes which might affect all Primary Study Area residents, whether or not they are employed at the project site or in related work.
- (2) **Group Rivalries for Jobs:** This topic also relates to direct employment and has been implicitly covered in the reconsideration of job training or other programs to maximize employment among current local residents.
- (3) **Pressure on Housing and Other Infrastructure:** Section 3.0 presented some reasons for believing that current City population control policies will result in increased housing pressure even without the proposed project. The extent to which these pressures will be exacerbated by the present proposal may also depend in part on the success of programs to maximize employment among currently-housed local residents.
- (4) **Changes in Resident Social Composition:** Some of the changes discussed in the preceding Section 4.1 may -- by some theories of social change -- impact measures of social stress and harmony.
- (5) **Presence of Visitors:** As noted in Section 4.4, numerous factors can affect the quality of resident-visitor interaction. One alleged outcome of this interaction is increased crime, and the validity of this concern will be explored here.

Since the first two of the above five mechanisms have been considered in depth previously, this discussion will focus on the latter three as potential causal factors.

4.5.2 Family and Individual Stress

Divorce, child abuse/neglect, and mental health outcomes resulting from broad socio-economic transformations (as opposed to the job factors considered in Section 4.3) have been subjects of particular interest within the "boomtown" branch of the social impact literature.

Characteristics of resort residents cannot currently be stated with accuracy. A residential population consisting largely of retirees from outside Hawaii would of course be the least likely to have frequent interactions with longtime residents of the Mainland-Hawaii area. However, there is also a reasonable possibility that substantial numbers of residents could be renters or owner-occupants who are professional persons (similar to pockets of current Honolulu or Sunset Beach residents) or military households with several incomes.

Immigrating Resort Workers could theoretically compete with current area residents for both resort jobs and (given current City growth policies for the North Shore) housing. At the Turtle Bay Hilton, there has been some sense of job competition between young Mainland-born "surfers" and longtime local residents (Community Resources and A. Lono Lyman, Inc., 1984), and other rural Hawaii resort areas have also begun to experience some preliminary friction between Hawaii-born residents and immigrants from the Philippines or Southeast Asia over resort jobs (Community Resources, 1986), although this should be less of a concern in the largely Filipino Malama area.

Social conflicts due to job competition will be minimized to the extent that current area residents are qualified for resort employment. Thus, the previously discussed potential job training program would be a mitigation/prevention measure for qualitative social problems as well as simple labor supply.

Efforts to maximize employment among currently-housed residents of the North Shore or other areas within reasonable commuting distance would also mitigate competition for housing (and subsequent intensification of anticipated increased housing costs expected to result from City growth policies) between current residents and any potential immigrants. As will be shortly discussed, housing pressures are expected to be a major determinant of future impacts on social outcomes such as mental health and family stability.

4.5 Indicators of Social Stress or Harmony

The primary indicators to be considered in this discussion will be crime rates and stress on family life (i.e., divorces, child abuse/neglect) and/or individuals' mental health. However, it is appropriate to begin with a discussion of possible social mechanisms by which these outcomes can be affected.

The "boomtown" social impact concerns have been most extensively discussed in regard to energy or mining activities in sparsely populated portions of the Mainland (or Canadian) West. Much of the socio-economic impact literature of the 1970's and early 1980's has been rooted in studies of such small communities undergoing rapid population growth.

"Boomtown" areas have reportedly been subject to two broad types of social impacts:

- o Strains on infrastructures and services (including housing): These are a function strictly of population growth, without regard to types of people. Resident frustration with crowding and inadequate services can lead to family and mental health impacts. Established businesses and government agencies may lose workers to the better-paying new industries, and consequent manpower shortages eventually lead to further labor in-migration (Fillmore, Hammond, Moore, Johnson, and Coddington, 1981). Proposed mitigations have included day care, targeted training/recruitment, and other measures aimed at increasing labor force participation of nonworking spouses of current residents (Maistead, Letatrutz, and Albrecht, 1984).

- o Social disruption: These are primarily a function of alleged conflicts between different types of people (newcomers vs. oldtimers). A spate of early boomtown studies blamed crime, mental health, and family disruption on such sociological factors as breakdown of traditional social roles, informal ties, and values; alienation; lack of "community"; newcomer-oldtimer antagonism; etc. (c.f., Kohra, 1974; Cortese and Jones, 1977; Meisz, 1979; Freudenberg, 1981). These early views were challenged in a pair of highly controversial articles by Wilkinson and colleagues (Wilkinson, Thompson, Reynolds, and Ostresh, 1982; Reynolds, Wilkinson, Thompson, and Ostresh, 1982), which asserted that early case studies had failed to use solid research techniques and were biased due to an anti-growth orientation. Wilson et. al. did not argue that rapid population growth was problematic, but they did call for better research techniques and for consideration of the view that many of the problems were rooted more in simple population strains than in abstract disturbances to the existing social order.

Subsequent social research has featured better research design but more contradictory results. A number of studies (e.g., Bland, Ort, and Stohs, 1983; Kraunich and Greider, 1984; England and Albrecht, 1984) have indicated that "boomtown" communities have few if any more serious psychiatric and social problems than comparable slow-growth communities, but they do exhibit a sense of frustration and community breakdown due to strains on services and infrastructure.

"The results show that ... boomtowns are perceived as less friendly, less helpful, and have poorer family environments and poorer community spirit ... In general, the analysis shows that boomtowns do disrupt virtually all community services from amenities to informal relationships. The exception is economic support, which is strengthened." (England and Albrecht, 1984, p. 242)

The relevance of these studies of energy boomtowns to the current assessment of rural Hawaii resort impacts lies in the tentative conclusion that observed individual and family strains are probably linked more to pressures on housing and other infrastructure than to shifts in population composition.

In the case of energy "boomtowns," such phenomena are transitional; they disappear when government and/or private market forces are able to catch up with demand. However, for Oahu's North Shore, current government policies are intended to keep supply of housing (although not of schools, roads, or other public services) well shy of anticipated demand.

Additionally, some indicators of social pathology are increasing for reasons independent of economic or population factors. Reported child abuse/neglect cases on Oahu more than doubled from 1980 to 1984, and roughly similar proportionate increases were reported in all portions of the Study Area (Primary, Secondary, and Tertiary) in the same time period (unpublished computer printouts obtained from Hawaii State Department of Social Services and Housing, May 1986).

The implication is that indicators of stress on families and individuals will likely show significant increases even if the Honolulu project is not built.

Project impacts are expected to be of a dual and opposing nature. On the one hand, the availability of several thousand jobs will further increase housing pressures and associated social stress. On the other hand, without substantial employment opportunities, less affluent current residents may be expected to bear most of these social costs, whereas resort employment (combined with the advantage of already possessing housing within the area) may enable them to cope with anticipated stresses much more adequately than would be the case if the regional economy remains depressed.

4.5.3 Crime

Tourism development is often alleged to generate increased crime rates, either because visitors are easy targets, or because of resentment over the apparent wealth of visitors (or permanent Resort residents), or else because of general social pressures and friction between newcomers and longtime residents. Thus, crime impacts would be a cumulative consequence of interaction between longtime residents and all new de facto population groups; however, in Hawaii, the greatest public attention has been directed toward crimes against tourists themselves.

As part of the Kailua social assessment, Community Resources (and A. Louie Lyman, Inc., 1985, pp. 208 - 223) undertook a comprehensive review of three sources of evidence on crime-tourism links: (1) academic research or reported crime statistics; (2) actual 1970 and 1980 crime and juvenile delinquency rates for several rural Hawaii resort areas susceptible with one another; and (3) key informant interviews with police officers in Kona, Kohala, Maui, Molokai, and Kauai. Major results of this review included:

- o The nine academic studies (including six based on Hawaii data) were generally contradictory and inconclusive, in large part because of different definitions and methods. There was some consistency in finding a statistical relationship (usually slight to moderate) between tourism and the crimes of rape and robbery, but not other crimes such as murder or assault.
- o Overall serious crime rate changes from 1970 to 1980 exceeded countywide increase in only one of three study areas -- West Maui. However, juvenile delinquency rates showed much higher than average increases in all three rural resort areas.
- o Police perceptions provided the most consistent, if still complex, picture:
 - On-site crime at self-contained West Hawaii destination resorts is minimal (due to effective security efforts) and is usually limited to theft by hotel workers. Residential components of such resorts do not generate disproportionate crime.
 - Off-site, the major crime impact is likely to involve increased petty thefts from visitors at beach parks or other tourist attractions. Perpetrators are likely to be juveniles. There are often minor spurs in such crimes following completion of major new hotel projects in rural areas, but crime figures tend to level off after a year or so.
 - Most police do not believe that local residents are any more likely to be crime victims if they live near resorts, nor do they believe that (with the possible exception of some juveniles) otherwise law-abiding residents are tempted to crime by the presence of tourists.
 - Tourism is felt to have some indirect effect on crime rates. "Street scenes" in tourist towns such as Kailua-Kona or Lahaina are associated with increased juvenile problems. Social adjustment problems between foreign residents and newcomers can lead to conflicts, and Mainland-raised individuals are more likely to report even minor crimes.

Mainland police personnel interviewed for this report basically concurred with the foregoing assessment. Crime rates are low on the North Shore, and such tourist-directed crime as does occur primarily involves theft of valuables from parked cars and beaches, particularly at popular surfing beaches such as Chun's Reef and Pipeline. Police were more conversant about practical matters such as traffic and flood-evacuation strategies for Mokuleia, matters which are outside the scope of the present discussion.

Thus, some relationship between tourism and crime does appear to exist, but in a variety of minor and often indirect ways rather than in any simple or major fashion. As a self-contained destination area, Mokuleia is less likely to increase crime rates than would the expansion of tourist-oriented "street scenes" in Waikiki or West Maui. Increased public access to the Mokuleia beach may be expected to generate opportunities for theft of tourist belongings, but this can be somewhat controlled through private security and limits on hours during which access is permitted.

Most Mokuleia resident complaints about crime now involve illegal firearms use (e.g., target practice) in the Kona Point area or illegal marijuana growing in the mauike areas. In both cases, the increased density of population caused by the project may be expected ultimately to reduce these illegal activities, but there is a potential for unpleasant or even violent incidents to occur in the process. Mitigations would include strong project security in the mauike areas and cooperation with police in searching for illegal marijuana patches before the area is opened to the public. For the Kona Point area, strong warnings to Mokuleia guests of the area's remoteness and poor roads should dissuade most people from exploring the region and thus protect them from harassment.

4.6 Social Mitigations

4.6.1 Mitigation of Community Concerns

A preliminary community dialogue program initiated by the developer has resulted in the initial identification of various community concerns, many of which (e.g., traffic) are outside the scope of the present "social" analysis. Many community concerns in the "social" arena are clearly subject to mitigation, although only very broad statements can be made at this point in the planning process. These would include:

- o Negotiated resolution of questions about the future of public activities, Camp Mokuleia, and hiking/camping access to the mauike properties. These negotiations are in progress.

" Landscaping to mitigate any sense of intrusion by project structures or population on the nature of recreation by project residents. Initial experiences at beach-front locations adjacent to the project's main parcels. Initial efforts along these lines have been made for Camp Mokuleia, and the major remaining need would probably involve Mokuleia Beach Park.

" Control of any problems caused by increased public access to the Mokuleia shoreline. For most area residents, such increased access will likely constitute a social good and provide an inherent mitigation for the loss of potential city and County park expansion land. However, concerns about overfishing, public safety in rough waters, litter, and protection of vegetation remain to be addressed. The latter three likely are easily mitigatable through provision of lifeguards and warning signs; waste receptacles for litter; and walkways designed to avoid any rare vegetation. Overfishing, however, is an islandwide problem which may require islandwide solutions.

" Discouragement of Mokuleia guest exploration of the Keena Point road, due to fears of (1) generating demand for paving the road, and/or (2) incidents in which guests might be confronted by persons engaging in illegal firearms practice. Most guests could be easily dissuaded from exploring the area by activity desks and rental companies, just as Big Island visitors are usually cautioned against taking the Saddle Road because of its poor condition.

4.6.2 Short- and Long-Term Communication Mechanisms with Nearby Community

Preliminary discussions with community leaders resulted in strong requests to the developer to expand the community information effort and to consider incorporating citizen requests for project modifications and/or additional community benefits. This would be a "short-term" effort, in the sense that it involves the project planning stage. There may also be a need to establish a more "long-term" communication mechanism for the operational stages of project resort components. This is because the developer's role diminishes and ultimately disappears as the project builds out, leaving the community to deal with a proliferation of hotel and shop owners -- rather than a single developer -- if there is a need to work out future issues which cannot be foreseen today.

For the short term, the developer has already begun a community dialogue program through some preliminary contacts, and a more comprehensive effort is now under design.

The preliminary dialogue steps taken as of this writing (June 1986) include one-on-one meetings in the spring of 1986 with numerous Mainland and Mokuleia community members, as well as two general community presentations during the month of May. The

final was made to about a dozen community leaders, and the second was an open meeting attended by approximately 60 community members. At both presentations, the developer discussed the project's overall rationale, identified some of the engineering requirements of developing the parcel, and presented the proposed plan.

The developer has also initiated a program for establishing and maintaining dialogue with interested community members, currently being scheduled as coffee hours and informal meetings at which the project will be presented and community members can voice their concerns.

One of the components of this program will involve forming some kind of advisory group which will work closely with the developer to identify community concerns and priorities and explore possible mitigative measures. An stated earlier, one of these measures may be job training, but the full range of community views and priorities has yet to be explored.

The question of long-term communication mechanisms may well be addressed during the course of these initial discussions. At present, little can be stated about this with any certainty. However, some of the potential elements may include:

- o creation of a resort operators' association (typically oriented to marketing, but also potentially a vehicle for interaction with the local community);
- o standing citizens' advisory committee;
- o special community-oriented resort events and programs;
- o record of agreements -- either formal (through incorporation into zoning conditions) or informal.

4.6.3 Job Training and Related Efforts to Maximize Resident Employment Benefits

Job training oriented to already-housed current residents could possibly mitigate both potential labor shortages discussed in Section 4.3, and also the increased pressure on North Shore housing cost and availability which is anticipated even without the Mokuleia project due to city population policies.

The developer has stated that actual implementation of any such programs would depend on community priorities as they evolve in the course of the current dialogue process. Therefore, the developer regards discussion of any specific program elements as highly premature at this time.

However, it may be recalled that Section 4.3.2 identified seven likely target groups (again involving some overlap), either for increasing overall Study Area labor supply or for capturing more of this supply for resort employment. These included:

APPENDIX A:
DETAILED ASSUMPTIONS REGARDING LABOR DEMAND

This appendix provides a more detailed explanation of the assumptions about Study Area labor demand listed in summary form in Section 4.3.2 of the text.

1. Project Demand

Assumption #1: Focus on Operational Employment. It is assumed that the major public policy issue (for both demand and supply considerations) involves operational rather than construction employment. While there will be community interest in construction work (and any job training effort might well involve efforts to increase study area residents' participation in construction work opportunities), construction jobs are unlikely to generate such population or housing pressure in the study area. While the project will provide numerous construction jobs, each individual structure and infrastructure effort will last a few years at longest, and many workers will be on-site only for a portion of this time. Thus, construction workers temporarily commuting from other parts of Oahu are unlikely to seek permanent residence on the North Shore because of this project.

Assumption #2: Demand for Direct-Employment Workers Will Be Equal to the Numbers Provided in Table 4.3. As previously noted, the actual operational employment situation could be more complicated, due to part-time jobs, multiple job-holding, and seasonal factors. Simplifying assumptions are necessary -- e.g., it seems particularly appropriate to use average employment figures (as provided in Table 4.3) rather than attempting to guess extent of seasonal variations in resort employment 20 years in the future.

Implicit in Assumption #2 is the further assumption that the effects of multiple job-holding essentially cancel out the effects of splitting full-time equivalent jobs into several part-time jobs. Some justification for this implicit assumption is provided by data in the Planning component of the State Tourism Study (Hawaii State Department of Planning and Economic Development, 1978). This study indicated 77% of visitor industry employees are full-time and 23% part-time (p. 102), and it also found that 14% of visitor industry employees have a second job, of which 55% (or 7.7% of the total) had a second job less than 20 hours per week (p. 206). This leads to the following equation:

$$W(A) = W(F) + W(P) + W(F+P) + W(P+P) + W(F+P) + W(F+P) + 0.63W(A) + 0.23W(A) + 0.077W(A) + 0.063W(A)$$

where $W(A)$ = all visitor industry workers; $W(F)$ = workers with one full-time job only; $W(P)$ = workers with one part-time job only; $W(F+P)$ = workers with one full- and one part-time job; $W(P+P)$ = workers with two part-time jobs; and $W(F+P)$ = workers with two full-time jobs.

- " Disadvantaged residents -- for whom remedial education in both basic academic skills and functional skills (work habits, self-presentation) would be required.
- " Military dependents -- most of whom live in the Wahiawa area.
- " Females -- perhaps mothers needing child care assistance but, as time goes by and the population is projected to age, also possibly including substantial numbers of older women.
- " Unemployed and "underemployed" -- tapping this labor segment would primarily involve simple community job awareness and liaison with employment services.
- " Commuters out of the area -- again, job awareness would be the main requirement.
- " High school youth -- who could be reached through various linkages with the public schools and vocational job shadowing programs.
- " Plantation workers -- contingency programs for retraining these individuals as a high-need target group in the event of future lay-offs or a shutdown.

Somewhat related to job training (in the sense of sharing the objective of maximizing employment benefits for nearby residents and thereby minimizing any housing pressures) are various other services and programs which have been implemented or planned for other Hawaii resorts. Examples could include:

- " child care;
- " special programs for older workers;
- " rental housing referrals;
- " information and referral services for potential entrepreneurs;
- " transportation service such as provided by some rural Olig Island resorts for their employees.

Assuming the 7.7% of workers with a second and part-time job also consists of 23% part-time workers (i.e., part-time for the first job as well), then the equations become:

$$W(A) = W(F) + W(P) + W(F+P) + W(F+P) + W(F+P) + W(F+P) \\ = 0.610W(A) + 0.23W(A) + 0.059W(A) + 0.018W(A) + 0.063W(A)$$

Assigning a value of 1.0 full-time equivalent positions to each full-time job and 0.5 to each part-time job, then a total 1,000 workers (W(A) = 1,000) would generate the following number of full-time equivalent positions:

$$W(F) = 630 + 1.0 = 630.0 \text{ full-time equivalents} \\ W(P) = 230 + 0.5 = 115.0 \\ W(F+P) = 59 + 1.5 = 88.5 \\ W(F+P) = 18 + 1.0 = 18.0 \\ W(F+P) = 63 + 2.0 = 126.0 \\ 977.5 \text{ full-time equivalents}$$

The inverse of 977.5/1,000 produces a ratio of 1.02 workers for each full-time equivalent position. This is so close to 1.00 that, given the age of the foregoing data and the general error range which must be allowed in any such analysis, it would seem to justify the overall assumption that number of workers equals number of full-time equivalent positions.

Another aspect of the direct employment issue involves accepting the on-site employment as equivalent to total direct employment. Lodging expenses account for only 32% of Hawaii visitor expenditures, while other major expenditure categories (e.g., food and beverage, 25%, or gifts and souvenirs, 13%, or transportation, 11% -- Hawaii State Department of Planning and Economic Development, 1985, p. 210) could arguably generate direct jobs away from a resort destination complex but still within a regional study area. This was part of the rationale for the assumption in the Kullman survey analysis (Community Resources and A. Loui Lyman, Inc., 1984) that Kullman's on-site direct jobs would also generate more than 500 off-site direct jobs in the Kona/North Shore region. However, for the present analysis, the possibility of "off-site direct jobs" will be assumed to be incorporated in the indirect/induced category. It may also be noted that most true "off-site direct jobs" in the study area would be at visitor attractions such as Waialeale Falls Park or in Hilo/Nailon retail complexes.

Assumption #3: Indirect/induced employment from the Kullman project will equal 648 in the overall Study Area. The economic consultant forecast of 2,160 indirect/induced jobs (Table 1.3) does not specify what proportion will remain in the study area. For this analysis, it will be assumed that 30% (or 648) will stay in the Study Area, of which 80% (or 518) will be in the North Shore and the remainder in Kona/Nailon or Waialeale.

The 30% proportion may be compared to the 15% used for Kullman, where it was argued (Community Resources and A. Loui Lyman, Inc., 1984, p. 143) that indirect spending from resorts is centralized in Honolulu. The 30% figure is used here because (1) a second major North Shore resort may attract some unchaining and wholesaling operations to the area, and (2) a more liberal figure can accommodate any additional "off-site direct" jobs not specifically included in subsequent assumptions about future job growth not directly related to this project.

Assumption #4: The major demand generated by the Kullman project will be for less skilled persons. This may be operationalized as persons lacking a four-year college degree. The Hanover component of the State Tourism Study (Hawaii State Department of Planning and Economic Development, 1978, p. 102) found that only about 20% of visitor industry employees have four-year college degrees. Thus, one focus for this analysis will be on the availability of labor for the other 80%.

Eighty percent of the previously noted Kullman project jobs would equal 2,184 for on-site direct employment, plus 518 off-site jobs for the total Study Area (415 of them on the North Shore).

The assumption that most demand will be for persons lacking four-year college degrees is made more tentatively than other assumptions, and analyses based on educational levels will be appended to analyses based on total projected labor demand and supply. Some aspects of hotel work in particular (e.g., front-desk operations) are becoming more technologically sophisticated and may in future require better-educated workers. And some college-educated workers are willing to take lower-level resort jobs in order to remain in Hawaii and/or with hopes of moving up to management positions. However, because a simple comparison of total job demand with total labor supply omits the aspect of labor force qualifications, the 80% assumption will provide a rough indication.

2. Additional Study Area Labor Demand

Assumption A: Non-project labor demand will be calculated according to OHPO projections, plus Kullman expansion and Millard High-Technology Park Jobs. The City Department of General Planning provided year 2000 job estimates as input to the Oahu Metropolitan Planning Organization (OMPO) May 2000 traffic study. These job estimates (in the form of unpublished computer printouts obtained from the Hawaii State Department of Transportation) represent the closest thing to "official" government projections of jobs for the Study Area in the future.

For this analysis, the 1980 job numbers for 1980 and 2000 were modified as follows:

" Estimated numbers for 1990 and 1995 were derived as straight-line interpolations from the 1980 and 2000 figures. Numbers for the year 2005 were derived by calculating the average annual percentage growth rate for the 2000 figures and utilizing this percentage to project to 2005.

" Added to these figures would be 2,400 Study Area jobs from the Kuliha expansion as of the year 2005. The Kuliha socio-economic study (Community Resources and A. Loui Lyman, 1984, p. 143) projects a total additional 3,555 jobs in the North Shore/Koolauloa area from future Kuliha development. However, the study assumes that 1,155 of these jobs would come from previous land use approvals which would arguably have been included in the 2000 count.

of the 2,400 new jobs, 635 would be off-site. Since Kuliha's location is close to the North Shore/Koolauloa boundaries, it will be assumed that half of these off-site jobs will be in Koolauloa and the other half in the North Shore area.

Based on Kuliha's plans to develop a new 350-room hotel by 1990, it is assumed that 476 of the new jobs will be in existence as of 1990 (350 on-site, plus off-site jobs based on appropriate multiplier factors), with 1995 and 2000 job figures calculated as straight-line interpolations.

" Also to be added to the OHPV job figures would be the 11,280 jobs projected for the Millini High-Technology Park as of the year 2005 (SRI International, 1982). Of these, 85% are estimated to be direct and 15% on-site but indirect/induced (e.g., warehousing, cafeterias, etc.).

The official in charge of developing the park (James Caldwell, senior vice president, Oceanic Properties, personal communication, June 23, 1986) estimates that 2,000 direct jobs (implying an additional 353 indirect/induced jobs) will be on-line by 1990, with the remainder in place by 2005. Figures for 1995 and 2000 were interpolated from the 1990 and 2005 totals.

Assumption B: Because of the uncertainty of high-technology park employment prospects, it is appropriate to consider varying scenarios for job development there. High-tech activities have an extremely limited track record in Hawaii. Therefore, one scenario will assume development to the full employment levels stated previously (2,353 in 1990; 11,280 in 2005), but a second scenario will assume development to only 50% of these totals.

Assumption C: For tentative analyses segmenting labor demand and supply by educational level, it will be assumed that 80% of all additional employment demand will be for persons with

less than a four-year college degree. An exception will be the high-technology park, for which the assumed figure is 63%. The 80% figure is an extension of the Hokuleia assumption to Kuliha. OHPV jobs (many of which would be agricultural or retail), and the indirect high-tech jobs. The 63% figure for direct high-tech jobs is based on the following assumptions about educational requirements for the assumed breakdown of direct high-tech jobs (from Environment Capital Managers, 1983):

Employee Category	Pct. of Total	Assumed Pct. with Four-Year Degrees
Managerial	6.2%	6.2%
Engineers	20.8%	20.8%
Technicians	43.4%	10.0%
Operatives	19.8%	0.0%
Clerical	6.6%	0.0%
Maintenance	2.8%	0.0%
	100.0%	37.0%

Additionally, it may be noted that the official in charge of developing the park (James Caldwell, senior vice president, Oceanic Properties, personal communication, May 19, 1986) believes few residents from the North Shore would be employed there because of lack of skills. The park is currently envisioned as a research center rather than a manufacturing/assembly center. Mr. Caldwell said a high majority of employees are expected to come from the lower Central Oahu and Ewa Triangle (Wahiawa, Salt Lake, Makiki) because many of these residents now work in skilled jobs for the military at Pearl Harbor or in Wahiawa. These skills are expected to be transferable to the future high-tech park, whereas the skills of North Shore plantation workers would not be applicable.

Assumption D: Current Koolauloa plantation job levels are held constant. This is a conservative measure from the perspective of this analysis, since it assumes continuation of sugar activities. However, the impact of this assumption (involving only about 500 jobs) is negligible in contrast with assumptions about the high-tech park.

APPENDIX B:
 HONOLULU FUTURE LABOR SUPPLY ANALYSIS

This appendix provides the detailed basis for the figures and assumptions summarized in Section 4.3.3 of this report.

1. General Discussion

The future population and potential labor supply were calculated for the North Shore, Koolauloa, Mokuiaea, and Miliama/Waipahu areas with the use of the Cohort-Survival Model technique. This model is a projection technique which assumes that an existing population increases through the natural process of births and deaths. The model further assumes (unless otherwise adjusted) that the net migration with the given population is equal to zero. It begins by breaking the total population into age groups, called cohorts. Each cohort is further subdivided into a male cohort and a female cohort.

Cohort-survival analysis takes each of these cohorts and projects them separately. Survival rates for each cohort are determined from historical records and multiplied by the number of persons within a cohort. Since the survival rates will always be less than 100% (some individuals will always die), a given cohort of people projected through time will tend to become smaller and smaller. Births are generated for the lowest age cohort by the use of birthrates applied to the cohorts of women of childbearing age, generally 15 to 44 years.

Following the completion of the cohort-survival analysis, which provided estimated populations in the four portions of the Study Area for years 1990, 1995, 2000, and 2005, the potential labor force for each area by year was determined. This was accomplished by subtracting all persons 15 years or younger from the estimated populations and multiplying the resulting figures by area-specific labor force participation rates. The final step of the analysis estimated future educational levels within each portion of the Study Area. This achieved projected population levels of labor force participants that are expected to have less than four years of college.

2. 1980 Population

The 1980 population was calculated with the use of data from the U.S. Census Bureau on file at the State Department of Planning and Economic Development (1980 Summary Tape File 3-A). Table B-1 presents the results of these calculations by age-sex cohorts for the four portions of the Study Area.

This population was further segmented into military personnel, military dependents, and civilians. The total number of military personnel by sex within a given area was also found in the census data 3-A file. The corresponding dependent

Table B-1
 1980 Study Area Population by Age Cohort

Age Group	NORTH SHORE DIVISION		KOOLOULOA DIVISION		MOKUIAEA DIVISION		MILIAMA/WAIPAHU DIVISION	
	Male	Female Total	Male	Female Total	Male	Female Total	Male	Female Total
0 to 4	502	502	883	883	1,460	1,460	2,388	2,388
5 to 14	853	853	1,233	1,233	1,252	1,252	2,447	2,447
15 to 24	1,395	1,395	1,832	1,832	1,889	1,889	3,003	3,003
25 to 34	1,007	1,007	1,298	1,298	1,327	1,327	2,130	2,130
35 to 44	451	451	683	683	722	722	1,124	1,124
45 to 54	368	368	494	494	508	508	772	772
55 to 64	434	434	476	476	473	473	1,075	1,075
65 to 74	350	350	368	368	345	345	994	994
75 to 84	145	145	258	258	262	262	449	449
85 & above	35	35	71	71	24	24	47	47
TOTALS	5,558	5,558	7,049	7,049	7,166	7,166	12,055	12,055
	4,291	4,291	5,848	5,848	5,965	5,965	10,202	10,202
	1,267	1,267	1,201	1,201	1,201	1,201	1,853	1,853

SOURCE: U.S. Bureau of Census, 1980 Summary Tape File 3-A.

APPENDIX B:
HOKIUSIA FUTURE LABOR SUPPLY ANALYSIS

This appendix provides the detailed basis for the figures and assumptions summarized in Section 4.3.3 of this report.

1. General Discussion

The future population and potential labor supply were calculated for the North Shore, Koolauloa, Waikanae, and Miliama/Waipahu areas with the use of the Cohort-Survival Model technique. This model is a projection technique which assumes that an existing population increases through the natural process of births and deaths. The model further assumes future deaths are adjusted to that the net migration with the given population is equal to zero. It begins by breaking the total population into age groups, called cohorts. Each cohort is further subdivided into a male cohort and a female cohort.

Cohort-survival analysis takes each of these cohorts and projects them separately. Survival rates for each cohort are determined from historical records and multiplied by the number of persons within a cohort. Since the survival rates will always be less than 100% (some individuals will always die), a given cohort of people projected through time will tend to become smaller and smaller. Births are generated for the lowest age cohort by the use of birthrates applied to the cohorts of women of childbearing age, generally 15 to 44 years.

Following the completion of the cohort-survival analysis, which provided estimated populations in the four portions of the Study Area for years 1990, 1995, 2000, and 2005, the potential labor force for each area by year was determined. This was accomplished by subtracting all persons 15 years or younger from the estimated populations and multiplying the resulting figures by area-specific labor force participation rates. The final step of the analysis estimated future educational levels within each portion of the Study Area. This achieved projected population levels of labor force participants that are expected to have less than four years of college.

2. 1980 Population

The 1980 population was calculated with the use of data from the U.S. Census Bureau on file at the State Department of Planning and Economic Development (1980 Summary Tape File 3-A). Table B-1 presents the results of these calculations by age-sex cohorts for the four portions of the Study Area.

This population was further segmented into military personnel, military dependents, and civilians. The total number of military personnel by sex within a given area was also found in the census data 3-A file. The corresponding dependent

Table B-1
1980 Study Area Population By Age Cohort

Age Group	NORTH SHORE DIVISION			KOOLAULOA DIVISION			WAIKANA DIVISION			MILIAM/WAIPAHU (C.T. 87-01-88-03)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0 to 4	502	381	883	813	827	1,640	2,388	2,357	4,726	3,368	3,050	6,418
5 to 14	853	607	1,460	1,233	1,252	2,485	3,247	3,068	6,315	5,694	5,460	11,154
15 to 24	1,395	911	2,306	1,532	1,859	3,391	9,003	4,014	13,017	5,784	5,575	11,359
25 to 34	1,007	739	1,746	1,433	1,298	2,731	4,737	3,530	8,267	5,724	6,070	11,794
35 to 44	451	432	883	888	628	1,514	1,772	1,532	3,304	3,931	3,788	7,719
45 to 54	388	434	800	435	473	908	1,075	1,293	2,368	2,655	2,661	5,316
55 to 64	454	422	876	419	416	835	974	994	1,968	1,674	1,573	3,247
65 to 74	350	216	566	345	282	607	617	448	1,065	997	622	1,619
75 to 84	145	113	258	127	96	223	214	247	461	307	303	610
85 & over	35	38	71	24	37	61	47	61	128	68	67	135
TOTALS	5,358	4,291	9,649	7,049	7,146	14,195	24,055	17,585	41,620	30,202	29,189	59,391

SOURCE: U.S. Bureau of Census, 1980 Summary Tape File 3-A.

population (by gross number only) within each area was established using the Hawaii State Department of Planning and Economic Development report Population Characteristics of Hawaii by Military Status, 1980. The military and dependent populations for each of the four areas in 1980 are shown below.

	Military	Dependents
North Shore	864	285
Koolauloa	138	242
Muhioa	12,034	11,933
Hiihii/Waipahu	4,110	4,426

The known male/female military personnel populations within each area were distributed into age cohorts from 15 to 64 years old based on statewide military personnel characteristics. (Statewide characteristics were utilized due to a lack of detailed data on military personnel and dependents by specific area.) See reference previously noted for statewide military data.) Male and female military personnel were distributed by age as follows:

Age Group	Male	Female
15 to 21	0.510301	0.532305
25 to 31	0.320326	0.381772
35 to 44	0.138329	0.044434
45 to 51	0.026151	0.034686
55 to 64	0.004590	0.005801
	1.000000	1.000000

In 1980, the male/female breakdown of military dependents statewide was 0.325814 and 0.674186, respectively. These figures were used to estimate the male/female populations within the four areas. As was done with the military personnel, statewide military dependent characteristics were used to distribute the male/female populations into age cohorts. Proportions for these calculations are as follows:

Age Group	Male	Female
0 to 4	0.351030	0.165382
5 to 14	0.460827	0.210090
15 to 24	0.139659	0.205327
25 to 34	0.021337	0.263917
35 to 44	0.004952	0.113613
45 to 54	0.006289	0.029534
55 to 64	0.004167	0.006111
65 to 74	0.005150	0.004714
75 to 84	0.000217	0.000085
85 plus	0.000217	0.000119
	1.000000	1.000000

Table B-2 shows the estimated 1980 age-sex characteristics of active military personnel within the Study Area. Table B-3 provides the same information for military dependents. These military populations were held constant for purposes of this analysis.

3. Projected Future Population

The cohort survival analysis was applied to the 1980 civilian population (i.e., the remaining population after military personnel and their dependents were subtracted from the total base population). The initial step in this process was to calculate survival rates for each individual age-sex cohort. This was accomplished by using selected life table values for 1980 found in The State of Hawaii Data Book--1985 (Hawaii State Department of Planning and Economic Development, pg. 88, 1985). The resulting 10-year rates are as follows:

Age Group	Male	Female
0 to 4	0.99307	0.99497
5 to 14	0.99740	0.99836
15 to 24	0.99226	0.99672
25 to 34	0.98695	0.99475
35 to 44	0.98292	0.99097
45 to 54	0.96154	0.97935
55 to 64	0.91601	0.95403
65 to 74	0.82586	0.89716
75 to 84	0.61077	0.75509
85 plus	0.17659	0.29495
	1.00000	1.00000

The 1980 civilian population in each area was multiplied by the above rates to obtain the number of individuals expected to survive to 1990. These individuals were then moved up one age cohort.

The number of births during the 1980-1990 period were calculated using the 1980 statewide fertility rate of 78.7 births per 1000 women (area-specific rates were unavailable). For each area, the number of women aged 15 to 44 was multiplied by the fertility rate to obtain the number of total births. Half of the total expected births were placed in the 0 to 4 year-old age cohort. They were distributed by sex using the observed 1980 percentage of male births versus total births of 0.511 (i.e., for every 100 births, 51.1 were males in 1980). The remaining half of total births was similarly distributed by sex. Then multiplied by the survival rate of the 0 to 4 year-old age cohort. These individuals were then added to the 5 to 11 year-old age cohort. This resulted in a final estimated population by area for the year 1990.

The cohort analysis for years 1995, 2000, and 2005 followed the same procedure as described above except for one aspect.

Table B-2
1980 Study Area Active Military Population By Age Cohort

Age Group	NORTH SHORE DIVISION			KOOLAULOA DIVISION			WAHIAWA DIVISION			MILILANI/WAIPAHU (C.T. 87.01-89.03)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0 to 4	0	0	0	0	0	0	0	0	0	0	0	0
5 to 14	0	0	0	0	0	0	0	0	0	0	0	0
15 to 24	373	71	444	67	3	70	5,827	327	6,154	1,733	380	2,113
25 to 34	234	51	285	42	3	45	3,488	235	3,723	1,088	273	1,360
35 to 44	101	6	107	18	0	18	1,580	27	1,607	470	32	501
45 to 54	19	5	24	3	0	3	302	21	323	90	25	115
55 to 64	3	1	4	1	0	1	52	4	57	16	5	21
65 to 74	0	0	0	0	0	0	0	0	0	0	0	0
75 to 84	0	0	0	0	0	0	0	0	0	0	0	0
85 & more	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	731	133	864	132	3	135	11,419	615	12,034	3,396	714	4,110

SOURCE: U.S. Bureau of Census, 1980 Summary Tape File 3-A.
(Note: Totals may not add due to rounding)

Table B-3
1980 Study Area Military Dependent Population By Age Cohort

Age Group	NORTH SHORE DIVISION			KOOLAULOA DIVISION			WAHIAWA DIVISION			MILILANI/WAIPAHU (C.T. 87.01-89.03)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0 to 4	33	32	64	28	27	55	1,365	1,331	2,696	506	493	1,000
5 to 14	43	40	73	36	34	71	1,791	1,690	3,481	664	627	1,291
15 to 24	13	39	52	11	33	45	943	1,652	2,195	201	613	814
25 to 34	3	51	53	2	43	46	106	2,123	2,230	39	788	827
35 to 44	0	22	22	0	19	19	19	914	933	7	339	346
45 to 54	1	6	7	0	5	5	24	238	262	9	68	77
55 to 64	0	1	1	0	1	1	17	52	69	6	19	25
65 to 74	0	1	1	0	1	1	20	38	58	7	14	21
75 to 84	0	0	0	0	0	0	1	7	8	0	3	3
85 & more	0	0	0	0	0	0	1	1	2	0	1	1
TOTALS	93	192	285	79	163	242	3,888	6,045	11,933	1,442	2,994	4,436

SOURCE: U.S. Bureau of Census, 1980 Summary Tape File 3-A.
(Note: Totals may not add due to rounding)

This involved ranking the 10-year survival rates to 5-year rates. Five-year rates used for the remainder of the analysis are as follows:

Age Group	Male	Female
0 to 4	0.99653	0.99748
5 to 14	0.99869	0.99918
15 to 24	0.99612	0.99836
25 to 34	0.98945	0.99737
35 to 44	0.99142	0.99547
45 to 54	0.98058	0.98962
55 to 64	0.95708	0.97674
65 to 74	0.90817	0.94719
75 to 84	0.80048	0.86896
85 plus	0.42023	0.54318
	1.00000	1.00000

The results of the analysis indicated that the natural increase of population in the Koolauloa area would begin to significantly exceed City and County general plan guidelines during the 1990 to 1995 period. Consequently, it was assumed that outmigration would occur among the younger age cohorts (aged 15 or less), where the younger population tends to be more mobile. By 1995, it was assumed that 10% of the younger-aged population would outmigrate. Between 1995 and 2000, the number of outmigrants was lowered slightly to 7%. These figures were chosen in order to maintain the area's population consistent with regional projections. Table B-4 shows projected populations in each portion of the Study Area for each five-year period, both under conditions of natural increase alone and under the condition of outmigration from Koolauloa.

Following U.S. Census definitions, the "potential labor force" was defined as all dependents or civilians aged 16 or older. For the Study Area in 1980, the proportion of 15 year-olds within the 15 to 24 year-old age cohort was 8.8% for males, and 8.6% for females. These figures were held constant and used to subtract out the estimated number of 15 year-olds for each five-year interval. The result provides an estimated potential labor force for future years. The gross number of persons aged 16 or more are also shown in Table B-4.

4. Labor Force Participation

The rates at which individuals are expected to participate in the labor market were calculated for each of the four areas beginning with information from the 1980 census. For the military dependent population, participation rates were separately estimated by assuming that essentially all civilians in census tracts 90 (Wheeler Air Force Base) and 95, 01 to 95, 05 (Schofield Barracks) were military dependents. Participation rates for the civilian population by area were estimated by subtracting the number of dependents from both the total

Table B-4
Potential Study Area Population: Years 1980, 1995, 2000, and 2005
(With and Without Out-Migration in the Koolauloa Area)

Study Areas	SCENARIO A: NO MIGRATION											
	1980			1995			2000			2005		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
North Shore	6,080	4,880	10,960	8,292	5,150	11,443	6,475	5,397	11,872	6,639	5,610	12,249
Koolauloa	8,310	8,424	16,734	8,973	9,120	18,093	9,611	9,796	19,407	10,208	10,422	20,630
Waianua	25,219	18,769	43,988	25,815	19,408	45,223	26,397	20,041	46,438	26,937	20,600	47,537
Mililani/ Waipahu	37,687	16,732	54,419	40,123	39,325	79,447	42,315	41,732	84,047	44,308	43,942	88,250
TOTALS	77,296	68,825	146,121	81,203	73,003	154,206	84,798	76,966	161,764	88,089	80,574	168,664
Gross Number of Persons Aged 16+	41,380	48,158	89,538	44,937	51,948	96,885	47,982	55,360	103,342	50,936	58,630	109,566

Study Areas	SCENARIO B: WITH OUT-MIGRATION FROM KOOLAULOA											
	1980			1995			2000			2005		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
North Shore	6,080	4,880	10,960	8,292	5,150	11,443	6,475	5,397	11,872	6,639	5,610	12,249
Koolauloa*	8,310	8,424	16,734	8,330	8,484	16,814	8,467	8,623	17,090	8,928	9,117	18,045
Waianua	25,219	18,769	43,988	25,815	19,408	45,223	26,397	20,041	46,438	26,937	20,600	47,537
Mililani/ Waipahu	37,687	16,732	54,419	40,123	39,325	79,447	42,315	41,732	84,047	44,308	43,942	88,250
TOTALS	77,296	68,825	146,121	80,560	72,337	152,897	83,654	75,793	159,447	86,809	79,269	166,078
Gross Number of Persons Aged 16+	41,380	48,158	89,538	44,543	51,520	96,063	47,228	54,596	101,824	50,095	57,743	107,838

* Includes a 10% out-migration between 1980-1995 and a 7% out-migration between 1995-2000.
(Note: Totals may not add due to rounding)

population and the number of labor force participants in 1980 to derive an adjusted rate.

Future labor force participation rates were assumed to change in ways proportionate to the projected changes in statewide rates incorporated in the State's economic/population model (Hawaii State Department of Planning and Economic Development, 1981). Utilizing data from this model, total projected sex-specific participation rates were calculated for the state as a whole for future years 1990, 1995, 2000, and 2005. (Variations by age group were omitted because the area-specific 1980 rates for the Study Area could not be disaggregated by age group.) These were then expressed as ratios to the statewide 1980 sex-specific rates, and the ratios were applied to the 1980 Study Area rates to provide future average rates.

For example, assume that females had a statewide participation rate of 50.0% in 1980 and were projected to have a rate of 55.5% in 2005. The ratio of the 2005 rate to the 1980 rate could then be 1.11 to one. However, within a certain portion of the Study Area, the 1980 female participation rate may have been only 20.0% for military dependents and 40.0% for other civilians. The assumed 2005 female participation rates in this location could then be 22.2% for dependents and 44.4% for other civilians.

The results of the steps described above are shown in Table B-5.

By multiplying the potential labor force in the various areas (those persons aged 16 or more) by the ratios shown in Table B-5, an estimated number of labor force participants was provided. Table B-6 gives the results of this step.

5. Future Educational Patterns

The final analytical step of the potential labor supply analysis was to calculate the estimated number of persons within each area expected to have less than a four-year college degree. This step was conducted since it is tentatively assumed that such individuals constitute the segment of the labor market most interested in the majority of Mokuleia resort jobs.

In order to make assumptions about future educational levels, educational characteristics for the island of Oahu and for the Waianai Census Division (the North Shore Primary Study Area) were established for years 1950, 1960, 1970, and 1980. This analysis showed that for each ten-year interval, the percentage of persons aged 25 or more with a minimum of four years of college rose at an increasing rate, most significantly during the 1970 to 1980 period. A higher than average increase was observed for Kona/Kailua during the 1970-1980 period, and a lower than average increase was observed for Makena during the same time frame. Since 1970 data for the Mililani/Waipahu area were unavailable, the increase in education of persons living in this area could not be calculated for other than 1980.

Table B-5

Labor Force Participation Rates

	1980	1990	1995	2000	2005
Dependents					
Total Study Area					
male:	0.577689	0.564375	0.559606	0.556126	0.550862
female:	0.330628	0.343616	0.348930	0.350111	0.345978
Other Civilian					
North Shore					
male:	0.710137	0.693531	0.687670	0.683763	0.676925
female:	0.465518	0.483806	0.491287	0.492950	0.487131
Kona/Kailua					
male:	0.746640	0.729180	0.723018	0.718910	0.711721
female:	0.524433	0.545035	0.553464	0.555337	0.548781
Makena					
male:	0.716606	0.699849	0.693934	0.689992	0.683092
female:	0.535196	0.556221	0.564822	0.566731	0.560011
Mililani/Waipahu					
male:	0.801217	0.782510	0.775998	0.771989	0.763771
female:	0.630317	0.655079	0.665209	0.667460	0.659581

Source: Community Resources, Inc.

Table B-6

Potential Study Area Civilian Labor Force Participants: Years 1990, 1995, 2000, and 2005
(With and Without Out-Migration in the Koolauloa Area)

SCENARIO A: NO MIGRATION

Study Area	1990			1995			2000			2005		
	Male	Female	Total									
North Shore	2,766	1,711	4,477	2,899	1,853	4,751	3,000	1,961	4,961	3,076	2,032	5,108
Koolauloa	4,184	3,275	7,459	4,474	3,637	8,111	4,828	3,944	8,772	5,197	4,253	9,450
Waianua	5,416	5,950	11,366	5,794	6,303	12,097	6,055	6,611	12,666	6,290	6,795	13,085
Hillians/ Waipahu	16,498	16,560	33,058	20,078	18,355	38,433	21,468	19,845	41,313	22,661	20,962	43,623
TOTALS	30,864	27,496	58,360	33,245	30,148	63,392	35,351	32,361	67,712	37,224	34,042	71,266

SCENARIO B: WITH OUT-MIGRATION FROM KOOLAULOA

Study Area	1990			1995			2000			2005		
	Male	Female	Total									
North Shore	2,766	1,711	4,477	2,899	1,853	4,751	3,000	1,961	4,961	3,076	2,032	5,108
Koolauloa *	4,184	3,275	7,459	4,260	3,431	7,691	4,362	3,566	7,928	4,599	3,766	8,365
Waianua	5,416	5,950	11,366	5,794	6,303	12,097	6,055	6,611	12,666	6,290	6,795	13,085
Hillians/ Waipahu	16,498	16,560	33,058	20,078	18,355	38,433	21,468	19,845	41,313	22,661	20,962	43,623
TOTALS	30,864	27,496	58,360	33,031	29,942	62,973	34,885	31,983	66,868	36,626	33,558	70,184

* Includes a 10% out-migration between 1990-1995 and a 7% out-migration between 1995-2000.

(Note: Totals may not add due to rounding)

Based on a review of the above findings, the following assumptions were made for individual study areas concerning the future level of labor force participants that may be expected to have four or more years of college:

- o For the North Shore, the percentage growth trend observed during the 1970-1980 period will continue to the year 2005.
- o For Koolauloa, the significant rate of growth from 1970 to 1980 was the result of the expansion of a four-year college at later, and consequently, the rate of future growth will decrease and reach a level equal to the expected statewide average in 2005.
- o For Waianua, the percentage growth trend observed during 1970 to 1980 will continue to the year 2005.
- o For the Hillians/Waipahu area, immigration will increase the rate of growth of persons with higher education to a level slightly higher than the statewide average in 2005.

Figure B-1 presents a graphic display of past and projected levels of persons 25 years and older with four or more years of college by area.

After achieving estimated levels of persons with four or more years of college by area, the complement of this population was established as the estimated participant population with less than four years of college. The proportions utilized to calculate this population are as follows:

	1990	1995	2000	2005
North Shore	77.7	74.0	70.0	66.3
Koolauloa	73.0	69.5	65.5	63.0
Waianua	81.5	80.0	78.2	76.5
Hillians/Waipahu	71.0	68.0	64.0	60.0

The total estimated number of labor force participants shown in Table B-6 were multiplied by the above figures to obtain a total number of participants expected to have less than a four years of college. These results are provided in Table B-7.

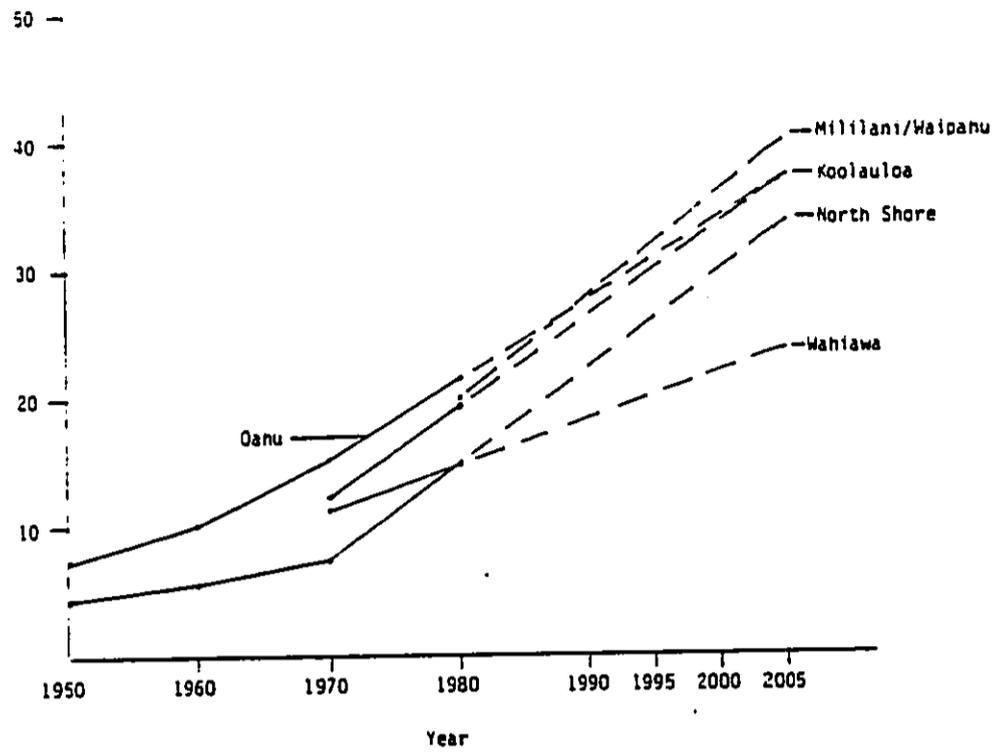


Figure B-1
Projected Educational Levels For Study Area Population

Table B-7
Potential Study Area Civilian Labor Force Participants--
Persons With Less Than 4 Years of College:
Years 1990, 1995, 2000, and 2005
(With and Without Out-Migration in the Koolauloa Area)

NO MIGRATION				
Area	1990	1995	2000	2005
North Shore	3,479	3,516	3,473	3,387
Koolauloa	5,445	5,637	5,746	5,954
Wahiawa	9,263	9,678	9,905	10,010
Mililani/ Waipahu	24,891	26,134	26,440	26,174
TOTALS	43,078	44,965	45,564	45,525

WITH OUT-MIGRATION IN THE KOOLAULO A AREA				
Area	1990	1995	2000	2005
North Shore	3,479	3,516	3,473	3,387
Koolauloa *	5,445	5,348	5,193	5,270
Wahiawa	9,263	9,678	9,905	10,010
Mililani/ Waipahu	24,891	26,134	26,440	26,174
TOTALS	43,078	44,673	45,011	44,841

* Out-migration in years 1995 and 2000.

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APPENDIX D

Development Plan
Public Facilities Amendment

Prepared by
Engineers, Surveyors Hawaii, Inc.

June 1986

DEVELOPMENT PLAN
PUBLIC FACILITIES AMENDMENT

MOKULEIA
PUBLIC FACILITY MAP
SUMMARY OF ADDITIONS AND DELETIONS

MOKULEIA

ADDITIONS:

<u>Title</u>	<u>Description</u>
New Interceptor Sewer Lines	Construct new 12" to 15" sewer lines in Farrington Highway and new privately constructed roadways.
Sewage Lift Stations	Construct sewage lift stations to move the wastewater towards the treatment plant.
New Wastewater Treatment Plant and Appurtenances	Construction new wastewater treatment plant, injection wells, and appurtenances to treat and dispose of the wastewater.
New Water Wells	Complete the installation of pumps and appurtenances on three (3) new wells that have been drilled but not yet completed and drill one new well and install the required pumps and appurtenances.
New Water Reservoir and Lift Stations	Construct two (2) reservoirs, one at the low service limits, the other at the higher service limit, together with the required water lift stations and appurtenances.
New Water Transmission Mains	Construction of water transmission mains of various sizes to be laid in the private and public roadways.
Farrington Highway Improvements	Miscellaneous pavement widening and shoulder improvements and left turn sac. Reconstruction and lengthening of one bridge, raising the roadway grade to provide adequate flood clearance and miscellaneous highway lighting.
Primary Access Roadway 56' to 76' wide	Construct primary access roadway from Farrington Highway through the development to service the adjacent sections of land within the project that will be developed.

Prepared For
MOKULEIA DEVELOPMENT CORPORATION
JUNE 1986

By



Mokuleia
Public Facilities Map Amendment

DGP Form 101
(For Privately Funded Projects)
(Revised December 17, 1985)

DEVELOPMENT PLAN PUBLIC FACILITIES MAP
MAJOR AMENDMENT APPLICATION

NOTE: Only "major" projects need to be shown on the Development Plan Public Facilities Maps. See Attachment A of the Instructions for the distinction between "major" and "minor" projects.

I. APPLICANT INFORMATION

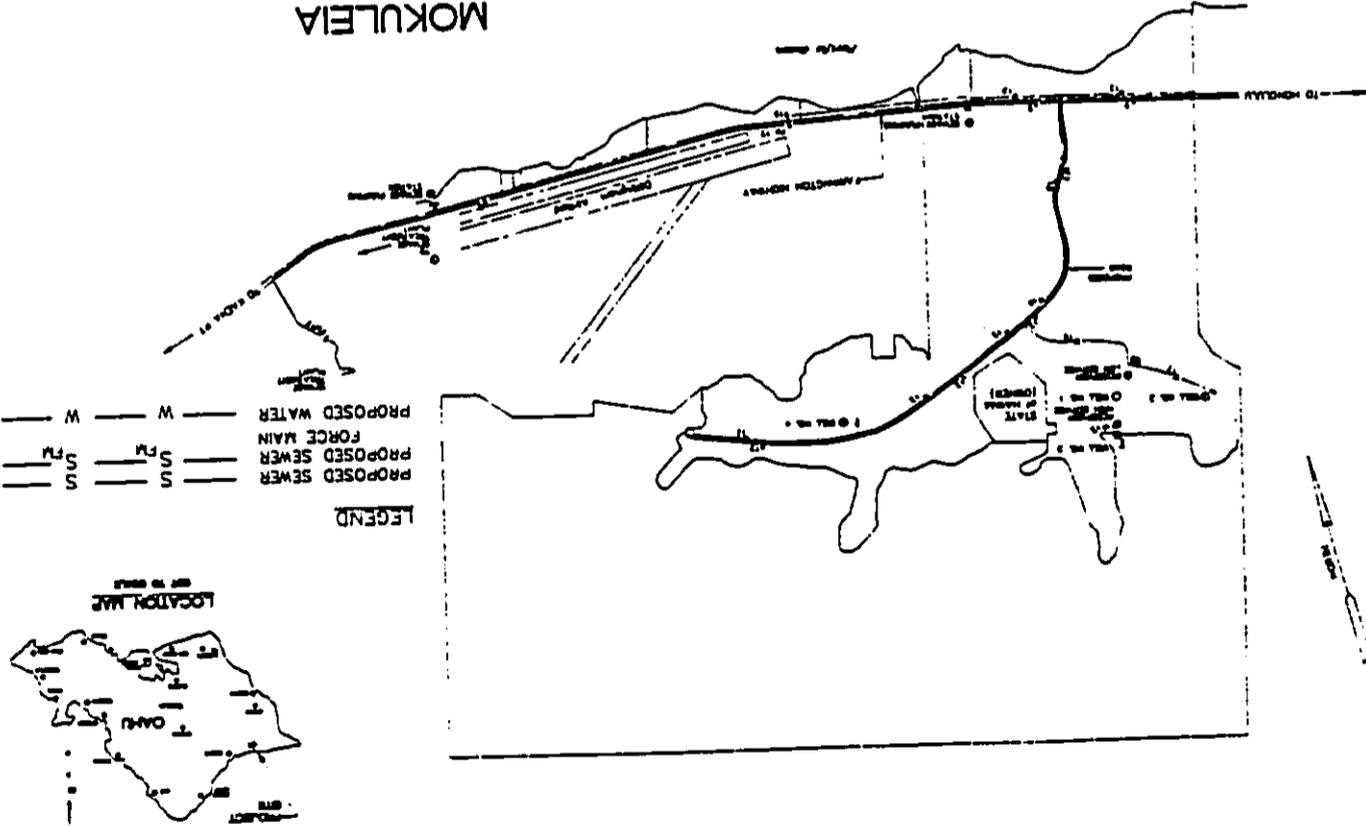
A. Name Mokuleia Development Corporation
 B. Address Pacific Tower, 1001 Bishop Street Suite 979
 C. Contact Person William Hee or Robert Itagaki
 Phone 531 3116 Date Submitted June 1986

II. PROJECT INFORMATION

A. Project Title NEW INTERCEPTOR SEWER LINES
 B. Project Description CONSTRUCT NEW SEWER LINES VARYING IN SIZE FROM 12" TO 18" WITHIN NEW PRIVATELY CONSTRUCTED ROADWAYS AND WITHIN THE EXISTING FARRINGTON HIGHWAY RIGHT OF WAY
 C. Project Location Land situated off Farrington Highway at Mokuleia, Waialua, Oahu, Hawaii. Being portions of Land Court Applic 824, 1107, 1810, and being portion of Grant 338 to Hikiau and Kana, and Portion of Grant 333 to Madana and Huku.

Tax Map Key 1st Div 6-8-02 and 03
 Neighborhood Board Area North Shore
 Name North Shore
 Number 27
 Census Tract(s) 99.01
 DP Area(s) North Shore
 D. Type of Amendment Request (mark "X")
 Add xx Delete Change

MOKULEIA
NORTH SHORE PUBLIC
FACILITIES MAP AMENDMENT
EXHIBIT 3
JUNE 2, 1986



E. Basis for Amendment in serve the proposed development by Hokuella Development Corporation

F. DP Public Facilities Reference No. (Assigned by DGP)

G. Maps Attached (mark "x")

Location Map
 Site Plan
 Service Area Map

H. Start of Land Acquisition (year) _____
 Start of Construction (year) _____

I. Estimated Project Costs (in thousands of dollars)

	Within 6 Years	Beyond 6 Years
1. Land Acquisition		
2. Planning & Engineering (P&E)	103,000.	
3. Construction	1,710,000.	
4. Beautification		
5. Inspection		
6. Furniture, Fixtures, Equipment		
7. Relocation		
8. Other		
9. Total	1,813,000.	

III. DP MAP STATUS

A. Current Public Facilities Map Status

1. Is project on the current PF Map?
 Yes No (If no. skip to 65.)

2. Current Project Description

3. Site Location on PF Map

a. Site Location Determined (Tax Map Key)

b. Location Undetermined (THK to smallest detail possible)

4. Timing (mark "x")

"Within 6 years" _____

"Beyond 6 years" _____

Programmed by increments? Yes _____ No _____

5. Current DP Land Use Map Designation(s) Underlying the Project Site (mark "x")

Preservation _____ Agriculture _____ XX
 Residential _____ Apartment _____
 Commercial _____ Resort _____
 Industrial _____ Military _____
 Park _____ Public Facility _____
 Quasi Public _____

B. Proposed Public Facilities Map Status (Skip if request is to "delete" a project.)

1. Proposed Site Location
 Site Location Determined (Tax Map Key)
 FARRINGTON HIGHWAY CONTIGUOUS TO THK:
 8-8-03: 6, 10, 14, 22, 19

Location Undetermined (THK to smallest detail possible)

2. Timing (mark "x")

"Within 6 years" _____ XX

"Beyond 6 years" _____

3. Has project or any portion of this project been previously considered for inclusion on the PF Map? No Yes

If yes, what were previous DGP Public Facility Application No(s)? _____

4. Is there a concurrent land use amendment being processed to which this project relates? No Yes

If yes, what is concurrent DGP Land Use Application No.? _____

IV. IMPACT ON PUBLIC FACILITY SYSTEMS

A. Additional Load or Demand

1. Sewage
 - a. 1.5 mgd, average flow to nearest 0.1 mgd
 - b. 4.6 mgd, peak flow to nearest 0.1 mgd
2. Water
 - a. _____ mgd, average flow to nearest 0.1 mgd
 - b. _____ mgd, peak flow to nearest 0.1 mgd

3. Traffic

_____ Average Daily Traffic (ADT)
_____ Peak Hour Volume

4. Other

B. Explain the basic PF demand or load flow(s) underlying the above. USED THE CITY'S DESIGN CRITERIA OF 1.5 MGPD PER ACRE OF FLOW.

C. How will this project interface with the public system? Describe and include map. THERE IS NO PUBLIC SYSTEM CURRENTLY AVAILABLE IN THE AREA. THE CITY IS PLANNING A SEWAGE DISPOSAL SYSTEM FOR THE WATALOA AREA. PORTIONS OF THE SYSTEM MIGHT BE COMPLETED WITH THE CITY'S WORK ON A PARTICIPATING BASIS.

D. Are public facilities adequate to handle additional load? Yes _____ No

Explain and attach letters from impacted agencies indicating commitment to handle the additional loads. WILLINGNESS TO PARTICIPATE IN THE DEVELOPMENT OF THE SEWAGE FACILITY WAS MADE AT A JOINT MEETING WITH THE DEPT OF PUBLIC WORKS, WITH DETAILS TO BE RESOLVED LATER.

E. Will this facility be dedicated to the City? Yes No

When is this dedication anticipated? _____

V. GROWTH IMPACTS

A. Indicate the basic type(s) of development this project supports (residential, resort, commercial, industrial, etc. Resort, Commercial, Residential)

B. Indicate the size of the development this project supports.

Land Area 1,019 acres 700 Single Family units
Population (residential or resort) 3,300 Hotel & Condomin. units
Floor Area (commercial or industrial) 100,000 sq ft.

C. Is this project oversized to accommodate future development? Yes _____ No _____

Explain. _____

D. Will future development require DP land use amendment? (Attach location map.) Yes _____ No _____

E. Indicate the ultimate size of the development.

Land Area _____
Population (residential or resort) _____
Floor Area (commercial or industrial) _____

Mokuellia
Public Facilities Map Amendment

DGP Form 101
(For Privately Funded Projects)
(Revised December 17, 1985)

DEVELOPMENT PLAN PUBLIC FACILITIES MAP
MAJOR AMENDMENT APPLICATION

NOTE: Only "major" projects need to be shown on the Development Plan Public Facilities Map. See Attachment A of the Instructions for the distinction between "major" and "minor" projects.

I. APPLICANT INFORMATION

A. Name Mokuellia Development Corporation
 B. Address Pacific Tower, 1001 Bishop Street Suite 979
 C. Contact Person William Hee or Robert Itagaki
 Phone 531 3116 Date Submitted June 1986

II. PROJECT INFORMATION

A. Project Title CONSTRUCT SEWAGE LIFT STATIONS (2)
 B. Project Description CONSTRUCT NEW SEWAGE LIFT STATIONS TO
 PUMP THE WASTE WATER TO THE TREATMENT PLANT.

C. Project Location Land situated off Farrington Highway at
 Mokuellia, Waialua, Oahu, Hawaii, being portions of Land Court Applic
 824 1107, 1810, and being portion of Grant 339 to William and Kana,
 and portion of Grant 333 to Manana and Hulu.

Tax Map Key 1st Div 6-8-02 and 03

Neighborhood Board Area

Name North Shore
 Number 27

Census Tract(s) 99-01

DP Area(s) North Shore

D. Type of Amendment Request (mark "x")

Add xx Delete Change

E. Basis for Amendment to serve the proposed development by Mokuellia Development Corporation

F. DP Public Facilities Reference No.
(Assigned by DGP)

G. Maps Attached (mark "x")

Location Map x

Site Plan x

Service Area Map

H. Start of Land Acquisition (year)

Start of Construction (year)

I. Estimated Project Costs (in thousands of dollars)

	Within 6 Years	Beyond 6 Years
1. Land Acquisition		
2. Planning & Engineering (P&E)	46,000	
3. Construction	800,000	
4. Beautification		
5. Inspection		
6. Furniture, Fixtures, Equipment		
7. Relocation		
8. Other		
9. Total	846,000	

III. DP MAP STATUS

A. Current Public Facilities Map Status

1. Is project on the current PF Map?

Yes No x (If no, skip to #5.)

3. Has project or any portion of this project been previously considered for inclusion on the PF Map? No Yes
 If yes, what were previous DGP Public Facility Application No(s)? _____
 4. Is there a concurrent land use amendment being processed to which this project relates? No Yes
 If yes, what is concurrent DGP Land Use Application No.? _____

2. Current Project Description _____

 3. Site Location on PF Map _____
 a. Site Location Determined _____ (Tax Map Key)
 b. Location Undetermined (THK to smallest detail possible)

4. Timing (mark "x")
 "Within 6 years" _____
 "Beyond 6 years" _____
 Programmed by increments? Yes _____ No _____
 5. Current DP Land Use Map Designation(s) Underlying the Project Site (mark "x")
 Preservation _____ Agriculture _____ xx
 Residential _____ Apartment _____
 Commercial _____ Resort _____
 Industrial _____ Military _____
 Park _____ Public Facility _____
 Quasi Public _____

B. Proposed Public Facilities Map Status (Skip if request is to "delete" a project.)
 1. Proposed Site Location 6-P-02: 10
 Site Location Determined 6-R-03: 11 (Tax Map Key)
 Location Undetermined (THK to smallest detail possible)
 2. Timing (mark "x")
 "Within 6 years" _____ xx
 "Beyond 6 years" _____

IV. IMPACT ON PUBLIC FACILITY SYSTEMS

A. Additional Load or Demand
 1. Sewage
 a. 1.5 mgd, average flow to nearest 0.1 mgd
 b. 4.6 mgd, peak flow to nearest 0.1 mgd
 2. Water
 a. _____ mgd, average flow to nearest 0.1 mgd
 b. _____ mgd, peak flow to nearest 0.1 mgd
 3. Traffic
 _____ Average Daily Traffic (ADT)
 _____ Peak Hour Volume
 4. Other _____

B. Explain the basis for demand or load figures where the above. USE THE CITY'S DESIGN CRITERIA TO DETERMINE THE QUANTITY OF FLOW.

C. How will this project interface with the public system? Describe and include map. THERE IS NO PUBLIC SYSTEM CURRENTLY AVAILABLE IN THE AREA. THE CITY IS PLANNING A SEWAGE DISPOSAL SYSTEM FOR THE MAIALUA AREA. PORTIONS OF THE SYSTEM MIGHT BE COMPLETED WITH THE CITY'S WORK ON A PARTICIPATING BASIS.

DEVELOPMENT PLAN PUBLIC FACILITIES MAP
MAJOR AMENDMENT APPLICATION

NOTE: Only "major" projects need to be shown on the Development Plan Public Facilities Map. See Attachment A of the Instructions for the distinction between "major" and "minor" projects.

I. APPLICANT INFORMATION

A. Name Mokuleia Development Corporation
 B. Address Pacific Tower, 1001 Bishop Street Suite 979
 C. Contact Person William Hec or Robert Itagaki
 Phone 531 3116 Date Submitted June 1986

II. PROJECT INFORMATION

A. Project Title NEW WASTEWATER TREATMENT PLANT AND APPURTENANCES
 B. Project Description CONSTRUCT NEW WASTE WATER TREATMENT PLANT INJECTION WELLS AND APPURTENANCES TO TREAT WASTEWATER FROM THE MOKULEIA DEVELOPMENT AND POSSIBLY FROM WAIALUA TOWN

C. Project Location Land situated off Farrington Highway at Mokuleia, Waialua, Oahu, Hawaii. Being portions of Land Court Applic 624, 1107, 1810, and being portion of Grant 138 to Hiliama and Mana, and portion of Grant 333 to Manana and Hulu.

Tax Map Key 1st Div 6-8-02 and 03
 Neighborhood Board Area _____
 Name North Shore
 Number 27
 Census Tract(s) 99.01
 DP Area(s) North Shore

D. Type of Amendment Request (mark "X")

Add _____ Delete _____ Change _____
 X

D. Are public facilities adequate to handle additional load? Yes _____ No XX

Explain and attach letters from impacted agencies indicating commitment to handle the additional loads. WILLINGNESS TO PARTICIPATE IN THE DEVELOPMENT OF THE SAME FACILITY WAS MADE AT A JOINT MEETING WITH THE DEPT OF PUBLIC WORKS, WITH DETAILS TO BE RESOLVED LATER.

E. Will this facility be dedicated to the City? Yes XX No _____

When is this dedication anticipated? _____

V. GROWTH IMPACTS

A. Indicate the basic type(s) of development this project supports (residential, resort, commercial, industrial, etc. Resort, Commercial, Residential)

B. Indicate the size of the development this project supports.

Land Area 1,019 acres 700 Single Family units
 Population (residential or resort) 3,300 Hotel & Condo. units
 Floor Area (commercial or industrial) 100,000 sq ft.

C. Is this project oversized to accommodate future development? Yes _____ No _____
 Explain. _____

D. Will future development require DP land use amendment? (Attach location map.) Yes _____ No _____

E. Indicate the ultimate size of the development.

Land Area _____
 Population (residential or resort) _____
 Floor Area (commercial or industrial) _____

E. Basis for Amendment to serve the proposed development by Manuelita Development Corporation

F. DP Public Facilities Reference No. _____
(Assigned by DGP)

G. Maps Attached (mark "x")
 Location Map x
 Site Plan x
 Service Area Map _____

H. Start of Land Acquisition (year) _____
 Start of Construction (year) _____

I. Estimated Project Costs (in thousands of dollars)

	Within 6 Years	Beyond 6 Years
1. Land Acquisition	_____	_____
2. Planning & Engineering (P&E)	1,020,000.	_____
3. Construction	8,500,000.	_____
4. Beautification	_____	_____
5. Inspection	_____	_____
6. Furniture, Fixtures, Equipment	_____	_____
7. Relocation	_____	_____
8. Other	_____	_____
9. Total	9,520,000.	_____

III. DP MAP STATUS

A. Current Public Facilities Map Status

1. Is project on the current PF Map?
 Yes x No _____ (if no, skip to #5.)

2. Current Project Description _____

3. Site Location on PF Map _____

a. Site Location Determined _____ (Tax Map Key)
 b. Location Undetermined _____ (THK to smallest detail possible)

4. Timing (mark "x")
 "Within 6 years" _____
 "Beyond 6 years" _____

Programmed by increments? Yes _____ No _____

5. Current DP Land Use Map Designation(s) Underlying the Project Site (mark "x")

Preservation	_____	Agriculture	_____
Residential	_____	Apartment	_____
Commercial	_____	Resort	_____
Industrial	_____	Military	_____
Park	_____	Public Facility	_____
Quasi Public	_____		_____

B. Proposed Public Facilities Map Status (Skip if request is to "delete" a project.)

1. Proposed Site Location 6-9-01:33
 6-9-01:36
 Site Location Determined _____ (Tax Map Key)

Location Undetermined _____ (THK to smallest detail possible)

2. Timing (mark "x")

"Within 6 years" xx
 "Beyond 6 years" _____

3. Has project or any portion of this project been previously considered for inclusion on the PF Map?

No Yes

If yes, what were previous DGP Public Facility Application No(s)?

4. Is there a concurrent land use amendment being processed to which this project relates?

No Yes

If yes, what is concurrent DGP Land Use Application No.?

IV. IMPACT ON PUBLIC FACILITY SYSTEMS

A. Additional Load or Demand

1. Sewage

- a. 1.5 mgd, average flow to nearest 0.1 mgd
b. 4.6 mgd, peak flow to nearest 0.1 mgd

2. Water

- a. mgd, average flow to nearest 0.1 mgd
b. mgd, peak flow to nearest 0.1 mgd

3. Traffic

Average Daily Traffic (ADT)

Peak Hour Volume

4. Other

B. Explain the basis for demand or load figures under the above. USED THE CITY'S DESIGN CRITERIA TO DETERMINE THE QUANTITY OF FLOW.

C. How will this project interface with the public system? Describe and include map. THERE IS NO PUBLIC SYSTEM CURRENTLY AVAILABLE IN THE AREA. THE CITY IS PLANNING A SEWAGE DISPOSAL SYSTEM FOR THE WAIALUA AREA. PORTIONS OF THE SYSTEM MIGHT BE COMBINED WITH THE CITY'S WORK ON A PARTICIPATING BASIS.

D. Are public facilities adequate to handle additional load? Yes No

Explain and attach letters from impacted agencies indicating commitment to handle the additional loads. WILLINGNESS TO PARTICIPATE IN THE DEVELOPMENT OF THE SEWAGE FACILITY WAS MADE AT A JOINT MEETING WITH THE DEPT OF PUBLIC WORKS, WITH DETAILS TO BE RESOLVED LATER.

E. Will this facility be dedicated to the City? Yes No

When is this dedication anticipated?

V. GROWTH IMPACTS

A. Indicate the basic type(s) of development this project supports (residential, resort, commercial, industrial, etc. Resort, Commercial, Residential)

B. Indicate the size of the development this project supports.

Land Area 1,019 acres 700 Single Family units
Population (residential or resort) 3,300 Hotel & Condo. units
Floor Area (commercial or industrial) 100,000 sq ft.

C. Is this project oversized to accommodate future development? Yes No

Explain.

D. Will future development require DP land use amendment? (Attach location map.) Yes No

E. Indicate the ultimate size of the development.

Land Area
Population (residential or resort)
Floor Area (commercial or industrial)

2. Current Project Description _____

3. Site Location on PF Map _____

a. Site Location Determined _____ (Tax Map Key)
 b. Location Undetermined _____
 (THK to smallest detail possible)

4. Timing (mark "x")
 "Within 6 years" _____
 "Beyond 6 years" _____
 Programmed by increments? Yes _____ No _____

5. Current DP Land Use Map Designation(s) Underlying the Project Site (mark "x")

Preservation	_____	Agriculture	XX
Residential	_____	Apartment	_____
Commercial	_____	Resort	_____
Industrial	_____	Military	_____
Park	_____	Public Facility	_____
Quasi Public	_____		

B. Proposed Public Facilities Map Status (Skip if request is to "delete" a project.)

1. Proposed Site Location _____
 Site Location Determined 6-R-03:5,6,34 _____ (Tax Map Key)
 Location Undetermined _____
 (THK to smallest detail possible)

2. Timing (mark "x")
 "Within 6 years" XX _____
 "Beyond 6 years" _____

3. Has project or any portion of this project been previously considered for inclusion on the PF Map?
 XX _____
 No _____ Yes _____

If yes, what were previous DGP Public Facility Application No(s)? _____

4. Is there a concurrent land use amendment being processed to which this project relates?
 No _____ Yes XX _____

If yes, what is concurrent DGP Land Use Application No.?

IV. IMPACT ON PUBLIC FACILITY SYSTEMS

A. Additional Load or Demand

1. Sewage
 a. _____ mgd, average flow to nearest 0.1 mgd
 b. _____ mgd, peak flow to nearest 0.1 mgd

2. Water
 a. 2.1 _____ mgd, average flow to nearest 0.1 mgd
 b. 6.3 _____ mgd, peak flow to nearest 0.1 mgd

3. Traffic
 _____ Average Daily Traffic (ADT)
 _____ Peak Hour Volume

4. Other _____

B. Explain the basis for demand or load figures under A. above. THE STANDARDS OF THE BOARD OF WATER SUPPLY, CITY AND COUNTY OF HENRIETTA WERE USED.

C. How will this project interface with the public system? Describe and include map. THERE IS CURRENTLY NO PUBLIC SYSTEM IN THE VICINITY. THIS PROJECT WILL STAND ALONE. THE NEAREST PUBLIC WATER MAIN IS ABOUT 1,400 FEET AWAY. THERE ARE NO CURRENT PLANS TO INTERCONNECT THE SYSTEMS.

DEVELOPMENT PLAN PUBLIC FACILITIES MAP
MAJOR AMENDMENT APPLICATION

NOTE: Only "major" projects need to be shown on the Development Plan Public Facilities Map. See Attachment A of the Instructions for the distinction between "major" and "minor" projects.

I. APPLICANT INFORMATION

A. Name Mokuellia Development Corporation
 B. Address Pacific Tower, 1001 Bishop Street Suite 979
 C. Contact Person William Hee or Robert Itagaki
 Phone 531 3116 Date Submitted June 1986

II. PROJECT INFORMATION

A. Project Title NEW WATER RESERVOIRS AND LIFT STATION
 B. Project Description CONSTRUCT TWO RESERVOIRS. ONE AT THE LOW SERVICE LIMITS THE OTHER AT THE HIGH SERVICE (405) TOGETHER WITH THE REQUIRED WATER LIFT STATION AND APPURTENANCES.

C. Project Location Land situated off Farrington Highway at Mokuellia, Waialua, Oahu, Hawaii. Being portions of Land Court Applic 875, 1107, 1810, and being portion of Grant 118 to Hillman and Kana, and Portion of Grant 111 to Manana and Huku.

Tax Map Key 1st Div 6-8-02 and 03
 Neighborhood Board Area _____
 Name North Shore
 Number 27
 Census Tract(s) 99.01
 DP Area(s) North Shore

D. Type of Amendment Request (mark "x")
 Add _____ Delete _____ Change _____
 X

D. Are public facilities adequate to handle additional load? Yes _____ No XX

Explain and attach letters from impacted agencies indicating commitment to handle the additional loads.

E. Will this facility be dedicated to the City?
 Yes XX No _____

When is this dedication anticipated? _____

V. GROWTH IMPACTS

A. Indicate the basic type(s) of development this project supports (residential, resort, commercial, industrial, etc. Resort, Commercial, Residential)

B. Indicate the size of the development this project supports.

Land Area 1,019 acres 700 Single Family units
 Population (residential or resort) 3,300 Hotel & Condomin. units
 Floor Area (commercial or industrial) 100,000 sq ft.

C. Is this project oversized to accommodate future development? Yes _____ No _____
 Explain. _____

D. Will future development require DP land use amendment? (Attach location map.) Yes _____ No _____

E. Indicate the ultimate size of the development.

Land Area _____
 Population (residential or resort) _____
 Floor Area (commercial or industrial) _____

E. Basis for Amendment to serve the proposed development by Maluelia Development Corporation

F. DP Public Facilities Reference No. _____
(Assigned by DGP)

G. Maps Attached (mark "x")

Location Map
 Site Plan
 Service Area Map _____

H. Start of Land Acquisition (year) _____
 Start of Construction (year) _____

I. Estimated Project Costs (in thousands of dollars)

	Within 6 Years	Beyond 6 Years
1. Land Acquisition	_____	_____
2. Planning & Engineering (P&E)	129,000.	_____
3. Construction	1,290,000.	_____
4. Beautification	_____	_____
5. Inspection	_____	_____
6. Furniture, Fixtures, Equipment	_____	_____
7. Relocation	_____	_____
8. Other	_____	_____
9. Total	1,419,000.	_____

III. DP MAP STATUS

A. Current Public Facilities Map Status

1. Is project on the current PF Map?

Yes No _____ (if no, skip to 65.)

2. Current Project Description _____

3. Site Location on PF Map _____

a. Site Location Determined _____ (Tax Map Key)

b. Location Undetermined (THK to smallest detail possible)

4. Timing (mark "x")

"Within 6 years" _____
 "Beyond 6 years" _____

Programmed by increments? Yes _____ No _____

5. Current DP Land Use Map Designation(s) Underlying the Project Site (mark "x")

Preservation _____ Agriculture
 Residential _____ Apartment _____
 Commercial _____ Resort _____
 Industrial _____ Military _____
 Park _____ Public Facility _____
 Quasi Public _____

B. Proposed Public Facilities Map Status (Skip if request is to "delete" a project.)

1. Proposed Site Location 6-8-03:5,6

Site Location Determined _____ (Tax Map Key)

Location Undetermined (THK to smallest detail possible)

2. Timing (mark "x")

"Within 6 years"
 "Beyond 6 years" _____

3. Has project or any portion of this project been previously considered for inclusion on the PF Map?
No Yes

If Yes, what were previous DGP Public Facility Application No(s)? _____

4. Is there a concurrent land use amendment being processed to which this project relates?
No Yes

If Yes, what is concurrent DGP Land Use Application No.? _____

IV. IMPACT ON PUBLIC FACILITY SYSTEMS

A. Additional Load or Demand

1. Sewage

a. _____ mgd, average flow to nearest 0.1 mgd

b. _____ mgd, peak flow to nearest 0.1 mgd

2. Water

a. 2.1 mgd, average flow to nearest 0.1 mgd

b. 6.3 mgd, peak flow to nearest 0.1 mgd

3. Traffic

_____ Average Daily Traffic (ADT)

_____ Peak Hour Volume

4. Other _____

B. Explain the basis for demand or load figures under A. above. THE STANDARDS OF THE BOARD OF WATER SUPPLY, CITY AND COUNTY OF HONOLULU WERE USED.

C. How will this project interface with the public system? Describe and include map. PROJECT WILL STAND ALONE. THE NEAREST PUBLIC WATER MAINS ARE ABOUT 1,000 FEET AWAY. THERE ARE NO CURRENT PLANS TO INTERFERE WITH THE SYSTEMS.

D. Are public facilities adequate to handle additional load? Yes No

Explain and attach letters from impacted agencies indicating commitment to handle the additional loads.

E. Will this facility be dedicated to the City?
Yes No

When is this dedication anticipated? _____

V. GROWTH IMPACTS

A. Indicate the basic type(s) of development this project supports (residential, resort, commercial, industrial, etc. Resort, Commercial, Residential)

B. Indicate the size of the development this project supports.

Land Area 1,019 acres

Population (residential or resort) 700 Single Family units
3,300 Hotel & Condomin. units

Floor Area (commercial or industrial) 100,000 sq ft.

C. Is this project oversized to accommodate future development? Yes No

Explain. _____

D. Will future development require DP land use amendment? (Attach location map.) Yes No

E. Indicate the ultimate size of the development.

Land Area _____

Population (residential or resort) _____

Floor Area (commercial or industrial) _____

Mokueia
Public Facilities Map Amendment

DGP Form 101
(For Privately Funded Projects)
(Revised December 17, 1985)

DEVELOPMENT PLAN PUBLIC FACILITIES MAP
MAJOR AMENDMENT APPLICATION

Note: Only "major" projects need to be shown on the Development Plan Public Facilities Maps. See Attachment A of the Instructions for the distinction between "major" and "minor" projects.

I. APPLICANT INFORMATION

A. Name Mokueia Development Corporation
 B. Address Pacific Tower, 1001 Bishop Street Suite 979
 C. Contact Person William Hee or Robert Itagaki
 Phone 531 3116 Date Submitted June 1986

II. PROJECT INFORMATION

A. Project Title WATER TRANSMISSION MAIN
 B. Project Description CONSTRUCTION OF WATER TRANSMISSION MAINS OF VARIOUS SIZES TO BE BUILT IN PRIVATE AND PUBLIC ROADWAYS.
 C. Project Location Land situated off Farrington Highway at Mokueia, Waialua, Oahu, Hawaii. Being portions of Land Court Applic 824, 1107, 1810 and being portion of Grant 118 to Hiliu and Kapa, and portion of Grant 333 to Hanana and Hui.

Tax Map Key 1st Div 6-8-02 and 03

Neighborhood Board Area

Name North Shore

Number 27

Census Tract(s) 99.01

DP Area(s) North Shore

D. Type of Amendment Request (mark "x")

Add Delete Change

E. Basis for Amendment to serve the proposed development by Mokueia Development Corporation

F. DP Public Facilities Reference No. _____
(Assigned by DGP)

G. Maps Attached (mark "x")

Location Map
 Site Plan
 Service Area Map _____

H. Start of Land Acquisition (year) _____

Start of Construction (year) _____

I. Estimated Project Costs (in thousands of dollars)

	Within 6 Years	Beyond 6 Years
1. Land Acquisition	_____	_____
2. Planning & Engineering (P&E)	80,000.	_____
3. Construction	1,010,000.	_____
4. Beautification	_____	_____
5. Inspection	_____	_____
6. Furniture, Fixtures, Equipment	_____	_____
7. Relocation	_____	_____
8. Other	_____	_____
9. Total	1,090,000.	_____

III. DP MAP STATUS

A. Current Public Facilities Map Status

1. Is project on the current PF Map?

Yes No (If no. skip to #5.)

2. Current Project Description _____

3. Site Location on PP Map _____
a. Site Location Determined _____ (Tax Map Key)
b. Location Undetermined _____ (TKM to smallest detail possible)

4. Timing (mark "x")
"Within 6 years" _____
"Beyond 6 years" _____
Programmed by increments? Yes _____ No _____

5. Current DP Land Use Map Designation(s) Underlying the Project Site (mark "x")
Preservation _____ Agriculture XX
Residential _____ Apartment _____
Commercial _____ Resort _____
Industrial _____ Military _____
Park _____ Public Facility _____
Quasi Public _____

8. Proposed Public Facilities Map Status (Skip if request is to "delete" a project.)
1. Proposed Site Location 6-8-03: 5, 6, 11, 19, 31, 33, 38, 39, 40
Site Location Determined _____ (Tax Map Key)
Location Undetermined _____ (TKM to smallest detail possible)

2. Timing (mark "x")
"Within 6 years" XX
"Beyond 6 years" _____

3. Has project or any portion of this project been previously considered for inclusion on the PF Map?
XX No _____ Yes _____
If Yes, what were previous DGP Public Facility Application No(s)? _____
4. Is there a concurrent land use amendment being processed to which this project relates?
No _____ Yes XX _____
If Yes, what is concurrent DGP Land Use Application No.? _____

IV. IMPACT ON PUBLIC FACILITY SYSTEMS

A. Additional Load or Demand
1. Sewage
a. _____ mgd, average flow to nearest 0.1 mgd
b. _____ mgd, peak flow to nearest 0.1 mgd
2. Water
a. 2.1 mgd, average flow to nearest 0.1 mgd
b. 6.3 mgd, peak flow to nearest 0.1 mgd
3. Traffic
_____ Average Daily Traffic (ADT)
_____ Peak Hour Volume
4. Other _____

B. Explain the basis for demand or load figures under A. above. THE STANDARDS OF THE BOARD OF WATER SUPPLY, CITY AND COUNTY OF HENRIETTA WERE USED.

C. How will this project interface with the public system? Describe and include map. THERE IS CURRENTLY NO PUBLIC SYSTEM IN THE VICINITY. THIS PROJECT WILL STAND ALONE. THE NEAREST PUBLIC WATER MAIN IS ABOUT 1,000 FEET AWAY. THERE ARE NO CURRENT PLANS TO INTERCONNECT THE SYSTEMS.

DEVELOPMENT PLAN PUBLIC FACILITIES MAP
MAJOR AMENDMENT APPLICATION

NOTE: Only "major" projects need to be shown on the Development Plan Public Facilities Maps. See Attachment A of the instructions for the distinction between "major" and "minor" projects.

D. Are public facilities adequate to handle additional load? Yes No

Explain and attach letters from impacted agencies indicating commitment to handle the additional loads.

E. Will this facility be dedicated to the City?

Yes No

When is this dedication anticipated? _____

V. GROWTH IMPACTS

A. Indicate the basic type(s) of development this project supports (residential, resort, commercial, industrial, etc. Resort, Commercial, Residential)

B. Indicate the size of the development this project supports.

Land Area 1,019 acres 700 Single Family units

Population (residential or resort) 3,300 Hotel & Condomin. units

Floor Area (commercial or industrial) 100,000 sq. ft.

C. Is this project oversized to accommodate future development? Yes No

Explain. _____

D. Will future development require DP land use amendment? (Attach location map.) Yes No

E. Indicate the ultimate size of the development.

Land Area _____

Population (residential or resort) _____

Floor Area (commercial or industrial) _____

I. APPLICANT INFORMATION

A. Name Mouelua Development Corporation

B. Address Pacific Tower, 1001 Bishop Street Suite 979

C. Contact Person William Hee or Robert Itagaki

Phone 531 3116 Date Submitted June 1986

II. PROJECT INFORMATION

A. Project Title FARRINGTON HIGHWAY IMPROVEMENTS

B. Project Description MISCELLANEOUS PAVEMENT WIDENING AND SHOULDER IMPROVEMENTS AND LEFT TURN SAC. RECONSTRUCTION AND LENGING OF ONE BRIDGE. RAISING THE ROADWAY GRADE TO PROVIDE ADEQUATE FLOOD CLEARANCE UNDER THE BRIDGE. MISC HIGHWAY LIGHTING

C. Project Location Land situated off Farrington Highway at Mouelua, Waialea, Oahu, Hawaii, being portions of Land Court Applic 82, 1107, 1810, and being portion of Grant 338 to Hikian and Kana, and Portion of Grant 333 to Manana and Huku.

Tax Map Key 1st Div 6-8-02 and 03

Neighborhood Board Area _____

Name North Shore

Number 27

Census Tract(s) 99.01

DP Area(s) North Shore

D. Type of Amendment Request (mark "x")

Add Delete Change

3. Has project or any portion of this project been previously considered for inclusion on the PF Map?
No XX Yes

If yes, what were previous DGP Public Facility Application No(s)?

4. Is there a concurrent land use amendment being processed to which this project relates?
No Yes XX

If yes, what is concurrent DGP Land Use Application No.?

IV. IMPACT ON PUBLIC FACILITY SYSTEMS

A. Additional Load or Demand

1. Sewage

a. mgd, average flow to nearest 0.1 mgd

b. mgd, peak flow to nearest 0.1 mgd

2. Water

a. mgd, average flow to nearest 0.1 mgd

b. mgd, peak flow to nearest 0.1 mgd

3. Traffic

6,000 Average Daily Traffic (ADT) YEAR 2000 ON

700 Peak Hour Volume THE WEEK DAY

4. Other

B. Explain the basis for demand or load figures under A. above. EXTRACTED FROM A PRELIMINARY TRAFFIC ASSESSMENT BY PARSONS BRINCKERHOFF QUADRE AND DOUGLAS, MAY BE TAKING TRAFFIC VOLUMES FROM ANNUAL FIELD COUNTS AND PROJECTING THE VOLUMES EXPECTED FROM THIS PROJECT.

C. How will this project interface with the public system?
Describe and include map. FARRINGTON HIGHWAY HAS A 20 FT. WIDE PAVEMENT. THE PROJECT WILL WIDER THE PAVEMENT BY 4 FEET, PROVIDE FOR SOME LIGHTING, PROVIDE A LEFT TURN LANE, AND IMPROVE THE STORM DRAINAGE OUTLET ACROSS THE HIGHWAY. GENERALLY THE PROJECT WILL IMPROVE THE EXISTING ROADWAY CONTIGUOUS TO ITS FRONTAGE.

D. Are public facilities adequate to handle additional load? Yes No XX

Explain and attach letters from impacted agencies indicating commitment to handle the additional loads. THE HIGHWAY RIGHT OF WAY IS SUFFICIENT TO ACCOMMODATE THE IMPROVEMENTS. IMPROVEMENT COSTS TO BE BY PRIVATE FUNDS.

E. Will this facility be dedicated to the City?
Yes XX No

When is this dedication anticipated? INDETERMINATE

V. GROWTH IMPACTS

A. Indicate the basic type(s) of development this project supports (residential, resort, commercial, industrial, etc.). Resort, Commercial, Residential

B. Indicate the size of the development this project supports.

Land Area 1,019 acres

Population (residential or resort) 700 Single Family units
3,300 Hotel & Condomin. units

Floor Area (commercial or industrial) 100,000 sq ft.

C. Is this project oversized to accommodate future development? Yes No

Explain.

D. Will future development require DP land use amendment? (Attach location map.) Yes No

E. Indicate the ultimate size of the development.

Land Area

Population (residential or resort)

Floor Area (commercial or industrial)

3. Has project or any portion of this project been previously considered for inclusion on the PF Map?
 No xx Yes
 If yes, what were previous DGP Public Facility Application No(s)?
 4. Is there a concurrent land use amendment being processed to which this project relates?
 No Yes xx
 If yes, what is concurrent DGP Land Use Application No.?

2. Current Project Description

 3. Site Location on PF Map
 a. Site Location Determined (Tax Map Key)
 b. Location Undetermined (TKM to smallest detail possible)
 4. Timing (mark "x")
 "Within 6 years"
 "Beyond 6 years"
 Programmed by increments? Yes No

IV. IMPACT ON PUBLIC FACILITY SYSTEMS
 A. Additional Load or Demand
 1. Sewage
 a. mgd, average flow to nearest 0.1 mgd
 b. mgd, peak flow to nearest 0.1 mgd
 2. Water
 a. mgd, average flow to nearest 0.1 mgd
 b. mgd, peak flow to nearest 0.1 mgd
 3. Traffic
 a. 6,900 Average Daily Traffic (ADT) YEAR 2000 ON THE WEEK DAY
700 Peak Hour Volume
 4. Other

5. Current DP Land Use Map Designation(s) Underlying the Project Site (mark "x")
 Preservation Agriculture xx
 Residential Apartment
 Commercial Resort
 Industrial Military
 Park Public Facility
 Quasi Public
 B. Proposed Public Facilities Map Status (Skip if request is to "delete" a project.)
 1. Proposed Site Location
 Site Location Determined 6-8-03:5,6,11,10,11,10
 (Tax Map Key)
 Location Undetermined (TKM to smallest detail possible)
 2. Timing (mark "x")
 "Within 6 years" xx
 "Beyond 6 years"

B. Explain the basis for demand or load figures under A. above. A PRELIMINARY TRAFFIC ASSESSMENT WAS MADE FOR THIS PROPOSED PROJECT BY PARSONS BRINCKERHOFF QUADE AND DOUGLASS PAX, 1986 TAKING TRAFFIC VOLUMES FROM MANUAL FIELD COUNTS AND PROJECTING THE VOLUMES EXPECTED FROM THE DEVELOPMENT.
 C. How will this project interface with the public system? Describe and include map. THE PROJECT WILL INTERSECT FARRINGTON HIGHWAY AT THE PROJECT AREA WITH AN AT GRADE INTERSECTION.

DGP Form 101
(For Privately Funded Projects)
(Revised December 17, 1985)

DEVELOPMENT PLAN PUBLIC FACILITIES MAP
MAJOR AMENDMENT APPLICATION

NOTE: Only "major" projects need to be shown on the Development Plan Public Facilities Maps. See Attachment A of the Instructions for the distinction between "major" and "minor" projects.

I. APPLICANT INFORMATION

A. Name Mokuleia Development Corporation
B. Address Pacific Tower, 1001 Bishop Street Suite 979
C. Contact Person William Hee or Robert Itagaki
Phone 531 3116 Date Submitted June 1986

II. PROJECT INFORMATION

A. Project Title DELETE PARKSITE, DETERMINED
B. Project Description DELETE A DETERMINED PARKSITE WHICH IS SHOWN ON THE PREVIOUSLY ISSUED BY THE APPLICANT

C. Project Location Land situated off Farrington Highway at Mokuleia, Waialua, Oahu, Hawaii. Being portions of Land Court Applic 824, 1107, 1810, and being portion of Grant 338 to Hikian and Kana, and portion of Grant 333 to Manana and Huia.

Tax Map Key 1st Div 6-8-02 and 03
Neighborhood Board Area North Shore
Name North Shore
Number 27
Census Tract(s) 99.01
DP Area(s) North Shore

D. Type of Amendment Request (mark "x")

Add Delete XX Change

D. Are public facilities adequate to handle additional load? Yes No XX

Explain and attach letters from impacted agencies indicating commitment to handle the additional loads. THESE IS NO PUBLIC ROADWAY WITHIN THE PROJECT. THIS WILL BE DEVELOPED FOR PUBLIC USE AND CONVEYED TO THE CITY. NO PUBLIC FUNDS WILL BE USED.

E. Will this facility be dedicated to the City? Yes No

When is this dedication anticipated? INDETERMINATE

V. GROWTH IMPACTS

A. Indicate the basic type(s) of development this project supports (residential, resort, commercial, industrial, etc.) Resort, Commercial, Residential

B. Indicate the size of the development this project supports.

Land Area 1,019 acres 700 Single Family units
Population (residential or resort) 3,300 Hotel & Condomin. units
Floor Area (commercial or industrial) 100,000 sq ft.

C. Is this project oversized to accommodate future development? Yes No

Explain.

D. Will future development require DP land use amendment? (Attach location map.) Yes No

E. Indicate the ultimate size of the development.

Land Area
Population (residential or resort)
Floor Area (commercial or industrial)

2. Current Project Description _____ PARKSITE, LOCATION _____
 PERMITTING _____

 3. Site Location on PF Map _____ 6--8-02-01
 a. Site Location Determined _____ (Tax Map Key)

b. Location Undetermined (THK to smallest detail possible)
 4. Timing (mark "x") _____ X
 "Within 6 years" _____
 "Beyond 6 years" _____
 Programmed by increments? Yes _____ No _____

5. Current DP Land Use Map Designation(s) Underlying the Project Site (mark "x")
 Preservation XX _____ Agriculture _____
 Residential _____ Apartment _____
 Commercial _____ Resort _____
 Industrial _____ Military _____
 Park _____ Public Facility _____
 Quasi Public _____

B. Proposed Public Facilities Map Status (Skip if request is to "delete" a project.)
 1. Proposed Site Location _____
 Site Location Determined _____ (Tax Map Key)
 Location Undetermined (THK to smallest detail possible)

2. Timing (mark "x") _____
 "Within 6 years" _____
 "Beyond 6 years" _____

E. Basis for Amendment to serve the proposed development by Motueira Development Corporation _____
 F. DP Public Facilities Reference No. (Assigned by DGP) _____

G. Maps Attached (mark "x")
 Location Map _____ X
 Site Plan _____ X
 Service Area Map _____

H. Start of Land Acquisition (Year) _____
 Start of Construction (Year) _____
 I. Estimated Project Costs (in thousands of dollars)

	Within 6 Years	Beyond 6 Years
1. Land Acquisition	_____	_____
2. Planning & Engineering (P&E)	_____	_____
3. Construction	_____	_____
4. Beautification	_____	_____
5. Inspection	_____	_____
6. Furniture, Fixtures, Equipment	_____	_____
7. Relocation	_____	_____
8. Other	_____	_____
9. Total	_____	_____

III. DP MAP STATUS
 A. Current Public Facilities Map Status
 1. Is project on the current PF Map?
 Yes XX _____ No _____ (If no, skip to #5.)

3. Has project or any portion of this project been previously considered for inclusion on the PF Map?

No Yes

If yes, what were previous DGP Public Facility Application No(s)?

4. Is there a concurrent land use amendment being processed to which this project relates?

No Yes

If yes, what is concurrent DGP Land Use Application No.?

IV. IMPACT ON PUBLIC FACILITY SYSTEMS

A. Additional Load or Demand

1. Sewage

a. _____ mgd, average flow to nearest 0.1 mgd

b. _____ mgd, peak flow to nearest 0.1 mgd

2. Water

a. _____ mgd, average flow to nearest 0.1 mgd

b. _____ mgd, peak flow to nearest 0.1 mgd

3. Traffic

_____ Average Daily Traffic (ADT)

_____ Peak Hour Volume

4. Other

B. Explain the basis for demand or load figures under A. above.

C. How will this project interface with the public system? Describe and include map. THE PROJECT WILL BE DEVELOPED AROUND A RECREATION THEME. PARKLIKE FACILITIES ARE PLANNED LOCATING THEM IN A COMPREHENSIVE PROJECT SCHEME FOR BETTER UTILIZATION OF THE LAND AND FACILITIES.

D. Are public facilities adequate to handle additional load? Yes No

Explain and attach letters from impacted agencies indicating commitment to handle the additional loads.

E. Will this facility be dedicated to the City? Yes No

When is this dedication anticipated?

V. GROWTH IMPACTS

A. Indicate the basic type(s) of development this project supports (residential, resort, commercial, industrial, etc. Resort, Commercial, Residential)

B. Indicate the size of the development this project supports.

Land Area 1,019 acres

Population (residential or resort) 3,300 Hotel & Condo units

Floor Area (commercial or industrial) 100,000 sq ft.

C. Is this project oversized to accommodate future development? Yes No

Explain.

D. Will future development require DP land use amendment? (Attach location map.) Yes No

E. Indicate the ultimate size of the development.

Land Area

Population (residential or resort)

Floor Area (commercial or industrial)

**Mokuueia
Public Facilities Map Amendment**

**DGP Form 101
(For Privately Funded Projects)
(Revised December 17, 1985)**

**DEVELOPMENT PLAN PUBLIC FACILITIES MAP
MAJOR AMENDMENT APPLICATION**

NOTE: Only "major" projects need to be shown on the Development Plan Public Facilities Map. See Attachment A of the Instructions for the distinction between "major" and "minor" projects.

I. APPLICANT INFORMATION

A. Name Mokuueia Development Corporation
 B. Address Pacific Tower, 1001 Bishop Street Suite 979
 C. Contact Person William Hee or Robert Itagaki
 Phone 531 3116 Date Submitted June 1986

II. PROJECT INFORMATION

A. Project Title DELETE PARKSITE, UNDETERMINED
 B. Project Description DELETE AN UNDETERMINED PARKSITE WHICH IS DESIGNATED UPON THE PROPERTY OWNED BY THE APPLICANT.
 C. Project Location Land situated off Farrington Highway at Mokuueia, Waialua, Oahu, Hawaii, being portions of Land Court Applic 874, 1107, 1810, and being portion of Grant 118 to William and Kana, and portion of Grant 333 to Manana and Hulu.

Tax Map Key 1st Div 6-8-02 and 03
 Neighborhood Board Area
 Name North Shore
 Number 27
 Census Tract(s) 99.01
 DP Area(s) North Shore

D. Type of Amendment Request (mark "x")
 Add xx Delete xx Change xx

E. Basis for Amendment To serve the proposed development by Mokuueia Development Corporation

F. DP Public Facilities Reference No. _____
 (Assigned by DGP)

G. Maps Attached (mark "x")

Location Map x
 Site Plan x
 Service Area Map _____

H. Start of Land Acquisition (year) _____
 Start of Construction (year) _____

I. Estimated Project Costs (in thousands of dollars)

	Within 6 Years	Beyond 6 Years
1. Land Acquisition	_____	_____
2. Planning & Engineering (P&E)	_____	_____
3. Construction	_____	_____
4. Beautification	_____	_____
5. Inspection	_____	_____
6. Furniture, Fixtures, Equipment	_____	_____
7. Relocation	_____	_____
8. Other	_____	_____
9. Total	_____	_____

III. DP MAP STATUS

A. Current Public Facilities Map Status

1. Is project on the current PF Map?
 Yes xx No _____ (If no, skip to 05.)

2. Current Project Description PARKSITE, LOCATION
with (fill in)

3. Site Location on PF Map
a. Site Location Determined (Tax Map Key)
b. Location Undetermined 6-H-01-30
(THK to smallest detail possible)

4. Timing (mark "x")
"Within 6 years" XX
"Beyond 6 years"
Programmed by increments? Yes No

5. Current DP Land Use Map Designation(s) Underlying the Project Site (mark "x")
Preservation Agriculture XX
Residential Apartment
Commercial Resort
Industrial Military
Park Public Facility
Quasi Public

B. Proposed Public Facilities Map Status (Skip if request is to "delete" a project.)
1. Proposed Site Location
Site Location Determined (Tax Map Key)
Location Undetermined (THK to smallest detail possible)

2. Timing (mark "x")
"Within 6 years"
"Beyond 6 years"

3. Has project or any portion of this project been previously considered for inclusion on the PF Map?
No Yes
If yes, what were previous DGP Public Facility Application No(s)?

4. Is there a concurrent land use amendment being processed to which this project relates?
No Yes
If yes, what is concurrent DGP Land Use Application No.?

IV. IMPACT ON PUBLIC FACILITY SYSTEMS
A. Additional Load or Demand
1. Sewage
a. mgd, average flow to nearest 0.1 mgd
b. mgd, peak flow to nearest 0.1 mgd
2. Water
a. mgd, average flow to nearest 0.1 mgd
b. mgd, peak flow to nearest 0.1 mgd
3. Traffic
 Average Daily Traffic (ADT)
 Peak Hour Volume

4. Other
B. Explain the basis for demand or load figures under A. above.

C. How will this project interface with the public system? Describe and include map. THE PROJECT WILL BE DEVELOPED AROUND A RECREATION THEME. PARKLIKE FACILITIES ARE PLANNED LOCATING THEM IN A COMPREHENSIVE PROJECT SCHEME FOR RELIEF UTILIZATION OF THE LAND AND FACILITIES.

APPENDIX E

Proposed Tsunami Potential
and
Hurricane Potential Studies
for
Mokuleia Development Area, Oahu

Prepared for
Mokuleia Development Corp.

Prepared by
Charles L. Bretschneider & Associates, Ltd.

July 1986

CHARLES L. BRETSCHNEIDER & ASSOCIATES, LTD.
15 KAHIMAHU DRIVE, HONOLULU, HAWAII
4000 PLACE POINT ROAD, HONOLULU, HAWAII 96816

CHARLES L. BRETSCHNEIDER, LTD.
PRESIDENT
808-737-6086

JOHN THOMAS O'HARA
MANAGER & TREASURER
808-738-8187

**TSUNAMI POTENTIAL AND
HURRICANE POTENTIAL STUDIES**
SUMMARY AND CONCLUSIONS

**PROPOSED TSUNAMI POTENTIAL
AND
HURRICANE POTENTIAL STUDIES
FOR
MOKULEIA DEVELOPMENT AREA, OAHU**

To:
Mr. Tim Yee, Chairman
Mokuleia Development Corporation
1001 Bishop Street
Pacific Tower, Suite 979
Honolulu, Hawaii 96813

Report No. 86-1

July 1986

This report represents a limited study of tsunami and hurricane flooding for the Mokuleia development area. The study at the present time has to be limited because the final grade elevations and roughness conditions are unknown.

However, this study should be very useful for planning or preliminary design for the Mokuleia development area. The latest scientific and ocean engineering principles (listed in the references at the end of this report) have been used in this report.

In summary, the findings for the tsunami elevation 200 feet inland from the coastline are given in Table II, and the worst case hurricane in Table III. The maximum tsunami elevation for 156 years recurrence interval, corresponding to the highest on record at Mokuleia, is 15.1 feet MSL (16 MLLW); and the maximum hurricane wave run-up is less than 8 feet MSL. Therefore, the tsunami is the governing factor in design. The tsunami elevation above ground elevation will flow inland over the terrain to a distance where the water surface elevation, energy grade elevations and the ground elevation intersect. A typical example of these three elevations is shown in Figure 1. An obstruction to the flow will change the water surface profile. If, for example, a vertical wall is placed in the path of the tsunami, the water elevation will rise to the energy grade line.

In view of the above it is recommended that a recurrence interval of no less than 156 years be used for the design tsunami. The design tsunami elevation study should be made after the proposed design elevation and roughness parameter have been established for the Mokuleia development area. The present study gives an indication of the tsunami elevation 200 feet inland from the coastline which may be altered depending on what changes are made in the topographic elevation and roughness parameter.

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results, depending on the corresponding changes in topographic and roughness parameters. The roughness parameters to be used in the calculations will be made by use of the extensive report by Bretschneider et al. (1986). Color photographs with corresponding friction factors are given by 25 typical Hawaiian terrain, as well as a summary of a literature search friction factors for a very wide range of friction factors.

A. TSUNAMI POTENTIAL STUDY

1. Introduction.

A review for the subject area was made of the following:

(a) preliminary plans and copies of the flood insurance maps furnished me by Mr. Barry Okuda, (b) recent topographical survey map loaned to me by Mr. William Hee, (c) on-site visit by myself on the morning of May 16, 1986, at low tide, during which a number of color photographs were taken, (d) gathered pertinent historical data for the 1946, 1952, 1957 and 1960 tsunamis at Mokualea, which are considered to be 200 feet inland from the coastline for the corresponding then existing topographic and roughness conditions.

In addition, frequency and recurrence intervals have been determined for the 1946, 1952, 1957 and 1960 tsunamis, and also for the 50-year, 100-year and 150-year recurrence intervals, corresponding to the chance of 5%, 1% and 0.67% that the tsunami with the given elevation (MSL) 200 feet inland will occur during any particular year.

Finally, it is proposed that the selected tsunami elevation as determined from the results (or other recurrence intervals) be used to determine the tsunami wave elevations and energy grade lines first from 200 feet inland from the coastline to the coastline and then inland over traverses spaced 200 feet apart inland over the beach over the dunes and inland to a distance where the intersection of the ground elevation, tsunami elevation and energy grade line elevation all coincide. This should be done after the proposed grading topographical features and roughness parameters have been established. An increase in topographical elevations and roughness factors will reduce the flooding consequences and a decrease in topographical and roughness parameters will increase the flooding consequences. A combination of the above two factors can have compensating

2. Prediction equations for frequency of occurrence and recurrence intervals.

Calculated or predicted tsunami elevations have been determined by Houston et al. (1977), U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi and used in a manual for Determining Tsunami RUN-UP Profiles on Coastal Areas of Hawaii by U.S. Army Engineer Pacific Ocean Division (1978).

The prediction equation is as follows:

$$1) \quad H = -B - A \log_{10} F$$

where H = elevation of maximum (tsunami) wave crest above Mean Sea Level (MSL) 200 feet inland from the coastline, based upon the then existing topographical and roughness parameters, neither of which were actually known or determined and were not required in the development of Equation 1.

F = frequency per year of occurrence (F equal to or less than 0.05 or for less than a 5% chance in any one year).

A and B are coefficients determined for locations along the shoreline.

An alternate form of Equation 1 can be given as

$$2) \quad H = -B + A \log_{10} R$$

where $R = 1/F$ and is the recurrence interval in years
 ($F = .05$ corresponds to $R = 20$ years, which means
 that H has on the average a recurrence interval of
 once in 20 years)
 $F = .01$ corresponds to $R = 100$ years.

3. Historical Tsunami Data.

The 1946, 1952, 1957 and 1960 tsunamis were the four major tsunamis that occurred at Mokualea. Frequency of occurrence and recurrence intervals can be determined from the inverse of Equation 1 and 2 respectively as follows:

$$3) \log_{10} F = -\frac{H + B}{A}$$

and

$$4) \log_{10} R = \frac{H + B}{A}$$

The A and B coefficients for Mokualea are obtained from Station 6 of the Corps of Engineers report and are $A = 0.3$ and $B = 2.2$. Thus for Mokualea Equation 3 and 4 become

$$3a) \log_{10} F = -\frac{H + 2.2}{0.3}$$

$$4a) \log_{10} R = \frac{H + 2.2}{0.3}$$

The historical tsunami elevations for 1946, 1952, 1957 and 1960 can be found in the detailed report by Bretschneider and Wybro (1975) based in part on the report by Adams (1967), and respectively are as follows: 16, 9, 12, and 11 feet (MLLW), 200 feet inland.

The following Table 1 summarizes the results of calculations.

TABLE 1:
 SUMMARY OF FOUR HISTORICAL
 TSUNAMIS FOR MOKULEIA
 ($A = 0.3$ $B = 2.2$)

YEAR	HI (ft) MLLW	F	R (Years)
1946	16	.0069	145
1952	9	.0447	22
1957	12	.0155	65
1960	11	.0257	39

4. Prediction tsunamis for Mokualea development area.

The subject development area extends from Mokualea westward toward Kawahapai. From the Army Engineers manual, Mokualea Is Station No. 6 and Kawahapai Is Station No. 5. The report by Bretschneider and Wybro (1975) does not give historical tsunami data for Kawahapai. The A and B coefficients for Station 5 are $A = 5.9$ and $B = 1.0$.

Interpolation stations can be made between Station 6 and 5 using the Army Engineers manual. Tsunami elevation predictions for Station 6, 5.5 and 5 are given in Table II.

TABLE II:
PREDICTED TSUNAMI ELEVATIONS
200 FEET INLAND FROM THE COAST FOR
SUBJECT DEVELOPMENT AREA

	MOKULEIA	HALFWAY	KAWAIHAPAI
STATION	6	5.5	5.0
A COEFFICIENT	8.3	7.0	5.9
B COEFFICIENT	2.2	1.6	1.0
R (YEARS)	H (ft)	H (ft)	H (ft)
50	11.9	10.3	9.0
100	14.4	12.4	10.8
150	15.9	13.6	11.8
156 (1946)	16.0	13.8	11.9

In the above table for R = 156 years corresponds to the 1946 tsunami observed at 16 ft (MLLW) for Mokuleia and calculated (or predicted) 14 feet at Halfway and 12 feet at Kawaihapai to the closest foot.

B. HURRICANE POTENTIAL STUDY

1. Introduction.

Since the occurrence of Hurricane Iwa (Nov. 22-25, 1982) the State of Hawaii became fully aware of the potential hurricane damage caused by wind, waves, wave run-up, flooding and inundation. Subsequently the U.S. Army Engineers, Federal Emergency Management Agency in cooperation with Civil Defense and other agencies awarded a contract to Charles L. Bretschneider, with sub-contract to Edward K. Noda and Assoc. The contract included the development of a suitable hurricane model for the verification of Hurricane Iwa data, where existed, and to develop suitable scenario hurricane models for four hurricanes, which were used to determine over water wind and pressure fields, deep water wave height and period fields. A report was prepared and approved, the title of which

was: "Hurricane Vulnerability Study; Limits for Southern Oahu, from Barbers Point to Koko Head."

The four scenario hurricanes, except for the radius of maximum wind, were developed by Pacific Weather, Inc. (1984) for the entire State of Hawaii, including the Island of Oahu. The radius of maximum wind for each scenario hurricane was determined from an empirical equation developed from published data from U.S. East and Gulf Coast and Western Pacific Typhoons. The radius of maximum wind depends on the latitude ϕ , the central pressure reduction from normal AP_0 , the forward speed, V_F and a constant. Thus all pertinent information is available to develop the appropriate scenario hurricane models for the Mokuleia development area. Of the four scenario hurricanes, only two will have direct application to the study area, both of which arrive from the east to southeast and follow a path north of the island chain. The project site will not be affected by the worst condition or the right rear section of the hurricane, where the waves are directed away from the islands. However, the wind and waves from the left rear section of the hurricane will travel in opposite direction to the forward motion of the hurricane and will for a short period of time be directed perpendicular toward the project site.

Based on a preliminary investigation using the data in the above-mentioned report, it is estimated that the maximum winds and offshore deep-water waves directed toward the project site will be as given in Table III below.

TABLE III:
(LEFT REAR QUADRANT)

Scenario Hurricane	ka	kb
V ₁₀ (Max.) ten min. ave wind (KNOTS)	45-55	55-65
H _{1/3} Significant wave height (feet)	20-25	25-30
T _s Wave period (sec.)	9-10	11-12

The above conditions will also increase the tide plus storm surge, wave run up flooding and inundation limits.

Preliminary estimates for storm surge and wave run-up done to the scenario hurricanes can be made by maximizing the conditions and making calculations by use of simple equations. First, it will be assumed that the maximum waves for the worst case hurricane (see Table III) will approach perpendicular to the coastline, minimizing refraction. Thus wave refraction will be neglected. Second, the maximum conditions will occur during higher, high tide, which will be taken approximately as 1.9 feet above MLLW (or 1.0 foot above MSL).

The equation for storm surge elevation is given by

$$5) \quad dT = A_s + S_x + S_y + 1.14 \Delta P + S_w$$

where $A_s = 1.0$ feet tide elevation above MSL

$S_x =$ storm tide due to direct wind stress over the shall water and assuming the wind stress is perpendicular to the coastline.

$S_y =$ storm tide due to wind stress parallel to the coast, and in this case S_y will be zero.

$$6) \quad S_x = \frac{.00178 V_{10}^2 \Delta X}{D + 4 S_x}$$

where $V_{10} =$ wind speed in knots

$\Delta X =$ distance over shallow water in nautical miles

$\bar{D} =$ average depth over shallow reach (mostly reef).

1.14 $\Delta P =$ The inverted barometer storm tide component and is given by the following equation:

$$7) \quad \Delta P = \Delta P_o \frac{R}{r}$$

where $\Delta P_o = P_n - P_o$

$P_n = 29.92$ inches of mercury

$P_o =$ Central pressure at hurricane in inches of mercury

1.14 $\Delta P =$ feet of water, and is known as the inverted barometer effect (or pressure tide).

$$8) \quad S_w = \frac{13.7}{g} \left[\frac{H_B}{T_B} \right]^2$$

where

$S_w =$ wave set-up due to breaking waves (after Munk 1949).

$g = 32.16$ ft/sec²

$H_B =$ breaking wave height in feet

$T_B =$ wave period in seconds.

S_w has a variation of ± 2.75 feet every couple of minutes and should be added to the wave run-up accordingly.

The assumption are as follows:

From Tables III for worst conditions $V_{10} = 65$ knots, $H_{1/3} = 30$ feet $T_B = 12$ seconds. It will be assumed that refraction and shoaling will be negligible, hence $H_B = H_{1/3} = 30$ feet. The depth of breaking will be given by:

$$9) \quad d_B = 1.28 H_B = 38.4 \text{ feet}$$

It will be assumed that $\bar{D} = 2$ feet above the average reef elevation during MLLW tide.

From the above conditions for equation 4, it is found that

$$H_B = 1 \text{ foot}$$

$$S_x = 0.67 \text{ feet}$$

$$S_y = 0$$

$$1.14 \Delta P_o = 0.74 \text{ feet}$$

$$S_w = 2.75 \text{ feet}$$

The simple wave, run-up formula is given by:

$$10) \quad R_u = \sqrt{1.0 H_B} / S$$

where

$R_u =$ wave run-up above

$$(A_s + S_x + 1.14 = 1.0 + .67 + .74 = 2.31 \text{ ft})$$

CITED REFERENCES ON TSUNAMIS AND HURRICANES

$$L_0 = 5.12 T^2 = 5.12 \times 12^2 = 737.3 \text{ ft}$$

1/S = bottom slope assumed a constant from $d_B = 38.4$ feet at $H_B = 30$ feet from the hydrographic chart we assume $1/S = .015$.

Thus run-up is obtained as follows:

$$Ru = \sqrt{30 \times 737.4} \times .015 = 2.23 \text{ feet above } 2.31 \text{ feet MSL } \pm S_v$$

whence

$$Ru = 2.31 \pm 2.23 \pm 2.75$$

thus

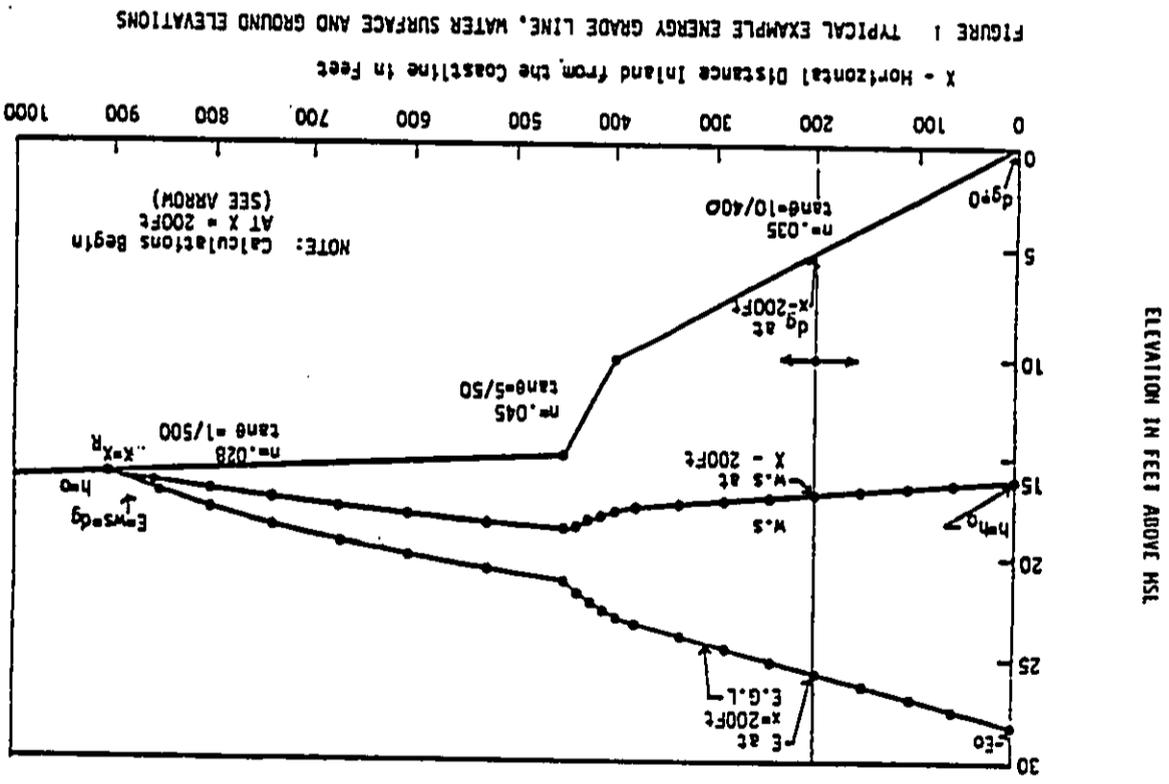
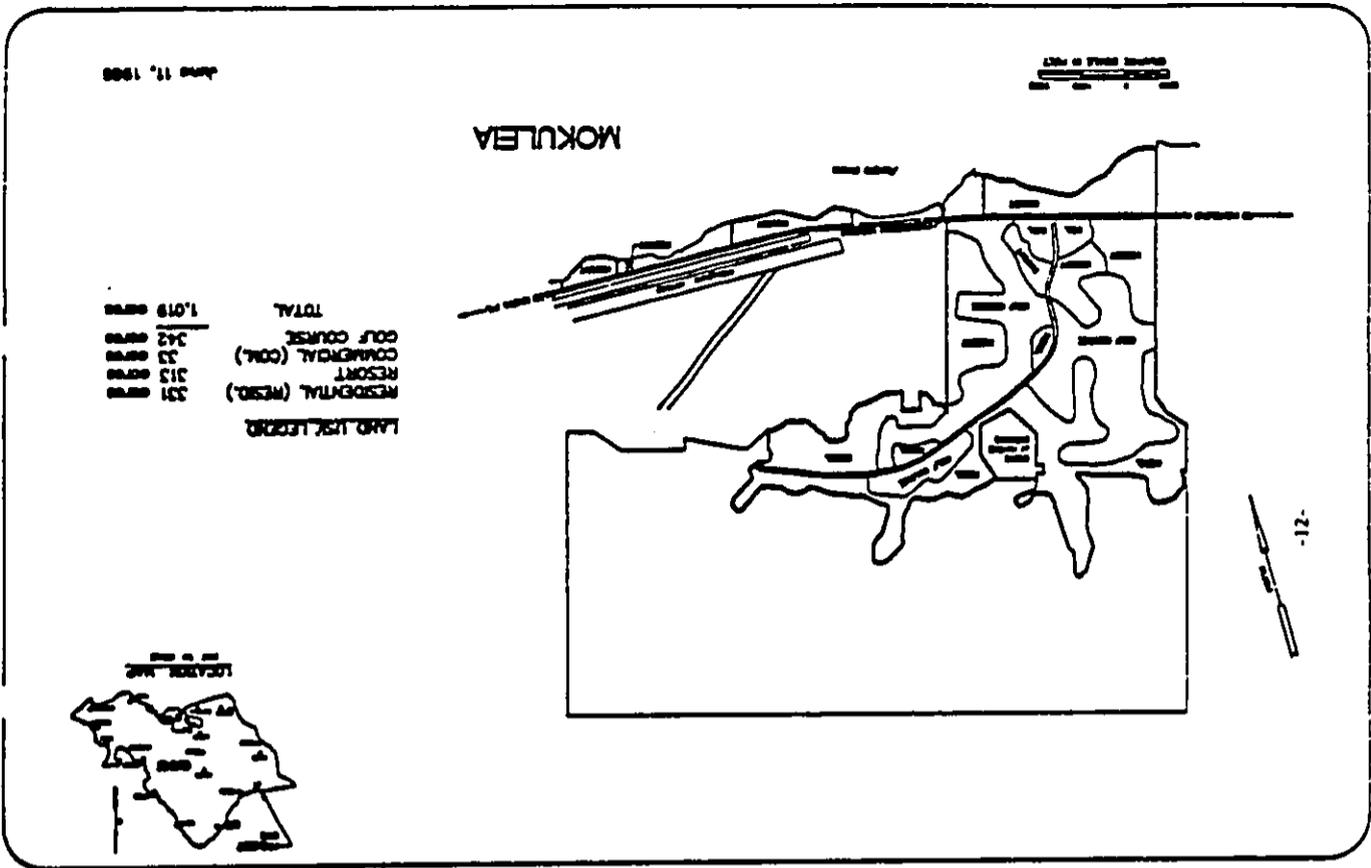
$$\begin{aligned} \text{Max Ru} &= 7.3 \text{ feet above MSL} \\ \text{Min Ru} &= 1.8 \text{ feet above MSL} \end{aligned}$$

therefore, the run-up will be variable from 1.8 to 7.3 feet every few minutes.

CONCLUSION

1. The hurricane maximum wave run-up calculations done herein are crude and only approximate. More accurate hurricane storm surge and wave run-up calculations cannot be made using more sophisticated methods without also having more accurate offshore bottom topography surveys.
2. However, it can be concluded fairly accurately, that the design tsunami wave run-up elevations will exceed the worst case hurricane wave run-up elevation.

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APPENDIX F

A Nearshore Marine Environmental Survey
of
Mokuleia, Oahu, Hawaii

Prepared for
Mokuleia Development Corporation

Prepared by
Oceanit Laboratories, Inc.

June 1986



Oceanit Laboratories, Inc.

coastal & offshore engineering services • research & development

A NEARSHORE MARINE ENVIRONMENTAL

SURVEY OF MOKULEIA, OAHU, HAWAII

Prepared for

The Mokuleia Development Corporation

JUNE 1986

1188 Bishop Street, Suite 1601, Honolulu, Hawaii 96813
TELEX 7431404 PH (HON) 531-3017

EXECUTIVE SUMMARY

The proposed Mokuleia development is located in the Waialua District on the North Shore of Oahu and includes approximately 1.5 miles of coastline.

Water quality conditions along the coastline indicate compliance with the Department of Health marine water quality standards, with the exception of turbidity. However, there is not enough statistical evidence to be concerned with this finding. The high turbidity values are attributed to rough sea and high wind conditions that existed during our sampling. Additional data, taken over time and space, should statistically balance turbidity results so that ambient coastline conditions comply with accepted water quality standards.

The marine life habitats found along the adjacent coastline indicated greater diversity and density in areas that were protected from high wave conditions and had good circulation.

Although current measurements were very peripheral, our survey indicates that the nearshore marine environment is well flushed with wind and wave generated currents. Based on data collected

at six water quality stations along the coastline and general observations, there are various locations along the coastline where fresh water discharges. If we exclude Kai'ahulu Bay, a special case discussed below, the proposed development is not expected to change the discharge of fresh water at the coastline. Therefore, it is not expected to significantly impact the nearshore marine water quality.

Kai'ahulu Bay has accommodated major stream discharge for the Mokuleia coastline for many years. This is apparent from the deep channel that runs through the middle of the bay, directly in front of the Makalena Stream discharge outlet. In addition, the benthic habitat characteristics of the submarine channel indicate that it is subject to periodic stream discharge and high current conditions.

Makalena and Kapala'au Streams have discharge outlets that empty into Kai'ahulu Bay. However, under the current drainage configuration, only Kapala'au is able to discharge the runoff from the adjacent watershed area. An improvement in the Makalena Stream discharge outlet is planned as part of the proposed development.

Currently, Kapala'au Stream is discharging all of the runoff from its adjacent 4000 acre watershed. Although measurements of current were sparse, the channel in front of Makalena Stream is

believed to be the major canal to the open ocean for all waters within Kai'ahulu Bay. Therefore, moving the discharge outlet approximately 330 meters east from Kapala'au to Makalena Stream is expected to have no significant impact on the nearshore marine water quality or environment. In fact it is believed that moving the discharge outlet to the Makalena Stream location will improve the water quality and benthic habitat directly in front of Kapala'au Stream outlet. This is because there is no channel that directly connects Kapala'au Stream discharge to the open ocean.

Based on our measurements and observations, the proposed Mokuleia Resort development is not expected to significantly impact the nearshore marine environment. Conditions along the coastline and within Kai'ahulu Bay are not expected to significantly change.

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The specific objectives of the study include the following:

- 1) Assess nearshore marine environmental conditions along the coast, adjacent to the development.
- 2) Assess the potential nearshore marine environmental impact from the development and from rerouting the discharge of Kapala'au Stream to the Makalena Stream outlet inside Kal'ahulu Bay.

1. INTRODUCTION

A. BACKGROUND

The Mokuleia development, proposed by the Mokuleia Development Corporation, is located in the Waialua District on the North Shore of Oahu and includes approximately 1.5 miles of coastline, as indicated in figure I-1. The Mokuleia coastline faces north with its outer reef exposed to large waves in the winter. Various streams, including the Makalena, Kapala'au, and Polipoli Streams empty into the coastline.

In May of 1986, Oceanit Laboratories, Inc. (hereinafter "OLI") was contacted by the Mokuleia Development Corporation, A division of Northwestern Mutual Insurance Company, to investigate the nearshore marine environment along the coastline and to determine the impact from rerouting the discharge of Kapala'au Stream to the Makalena Stream discharge outlet. An area of special consideration during the study was Kal'ahulu Bay (approximately 0.10 km²), located next to the polo field at Mokuleia where the stream rerouting is to be considered.

OLI performed field work at the Mokuleia site over approximately two weeks. During this time the coastline was exposed to calm wind and sea conditions as well as medium wave and high wind conditions. Data was collected to characterize the coastline with respect to physical conditions and marine habitat types.

B. ACKNOWLEDGEMENTS

Oceanit Laboratories, Inc. would like to acknowledge the contributions made to the study from the following: Dr. Patrick K. Sullivan, Dr. Hans-Jurgen Krock, Mr. Dayananda Vinthangar, Mr. Manfred Zapka, Mr. David Takeyama, Mr. Greg Leiesch, Mr. Randy Campbell and Ms. Jody Miyashiro.

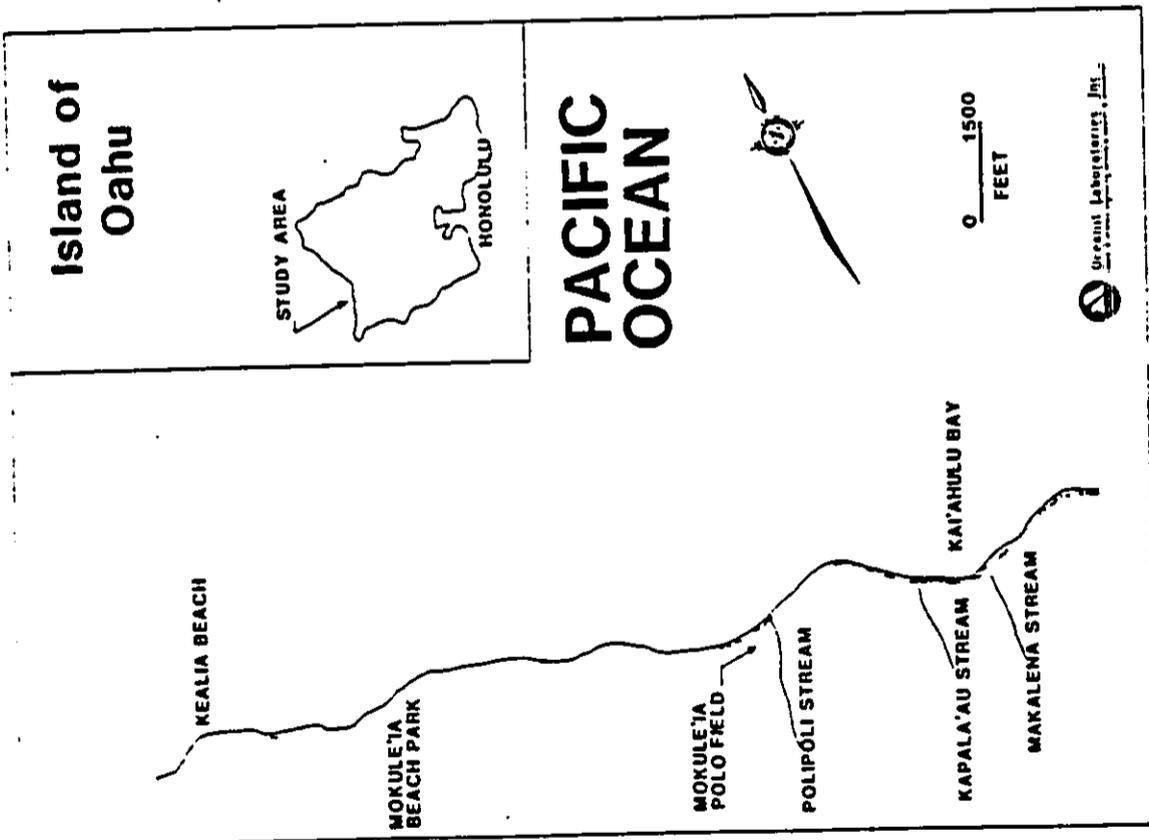


Fig. 1-1 Location of study sites.

II. METHODOLOGY

Various data were collected from May 29 to June 10, 1986 to characterize the coastline along the proposed Mokuleia Development. Physical measurements were performed in the field; chemical analysis of the samples was performed at a local, State of Hawaii certified, water quality laboratory using standard methods [1]. Water quality data were statistically analyzed using methods adopted by the State of Hawaii, Department of Health, as described in "An Ecosystem Approach to Water Quality Standards" and "Public Health Regulations, Chapter 54 of Title 11, Water Quality Standards" [2,3].

A. WATER QUALITY

Water quality measurements were performed at various locations along the coastline, as indicated in figure 11-1. Six stations were used for physical and chemical sampling on May 29, 1986. These measurements included: temperature, salinity, conductivity, turbidity, nutrients, non-filtrable residues, fecal coliforms, dissolved oxygen, pH, and redox potential. A listing of water quality data is provided in appendix A.

Salinity, temperature and conductivity

Salinity, temperature and conductivity measurements were made using a Reckman RS3-5 portable salinometer. Conductivity was calibrated using a standardized circuit of known resistance. Calibration was checked after every other sample.

Dissolved oxygen, pH and Redox potential

Dissolved oxygen was measured in-situ on May 29, 1985 on samples obtained from stations 3 and 4. Due to rough sea conditions, measurements from stations 1, 2, 5 and 6 were made from water samples that were carefully removed from the ocean in a large bucket and brought to shore to be immediately measured. Measurements were performed with a YSI dissolved oxygen meter, model 57. Calibration was frequently checked using fresh water. Several measurements were performed and averaged to get the final dissolved oxygen values.

Measurements of pH were performed on May 29, 1986 using an Orion Model 401 pH meter. Calibration was performed using a buffer solution of pH equal to 8.2. The pH electrode used for measurements was an Orion 91-06 pH electrode.

Redox potential measurements were performed on May 29, 1986, using a high impedance digital voltmeter and an Orion Redox Model electrode.

Turbidity

Turbidity measurements were performed on May 29 with a Turner Model 40 Nephelometer. Calibration was performed using a Turner standard calibration cell of 6 nephelometric turbidity units (NTU). Calibration was checked after every two samples.

Nutrients

Nutrient measurements included total nitrogen, nitrite plus nitrate, total phosphorus, and orthophosphate. These measurements were performed using a Technicon Autoanalyzer II. Samples collected from the five water quality stations were immediately placed in a dark cooler in the field for a few hours before being brought in for analysis.

Chlorophyll *a* and Fecal Coliforms

Chlorophyll *a* was measured from samples collected May 29, 1985 at the six water quality stations. Measurements were made using a spectrophotometer following methods outlined by Strickland and Parsons [1].

Fecal coliforms were determined from samples collected on May 29, 1986 from the six water quality stations. The method of measurement followed standard methods for waste water analysis [5]. Two separate testings were made per 100 ml sample. Results were then averaged to determine the number of colonies per 100 ml.

Non-filtrable residue

Non-filtrable residue measurements were performed on samples collected from the six stations on May 29, 1986. The measurements followed procedures by Strickland and Parsons [4] using a 0.4 um filter.

0. CURRENTS

Water current measurements were performed on May 29 and June 10, 1986 using current drogues. A stopwatch was used to time the movements of drogues, as followed from the shore and a small boat.

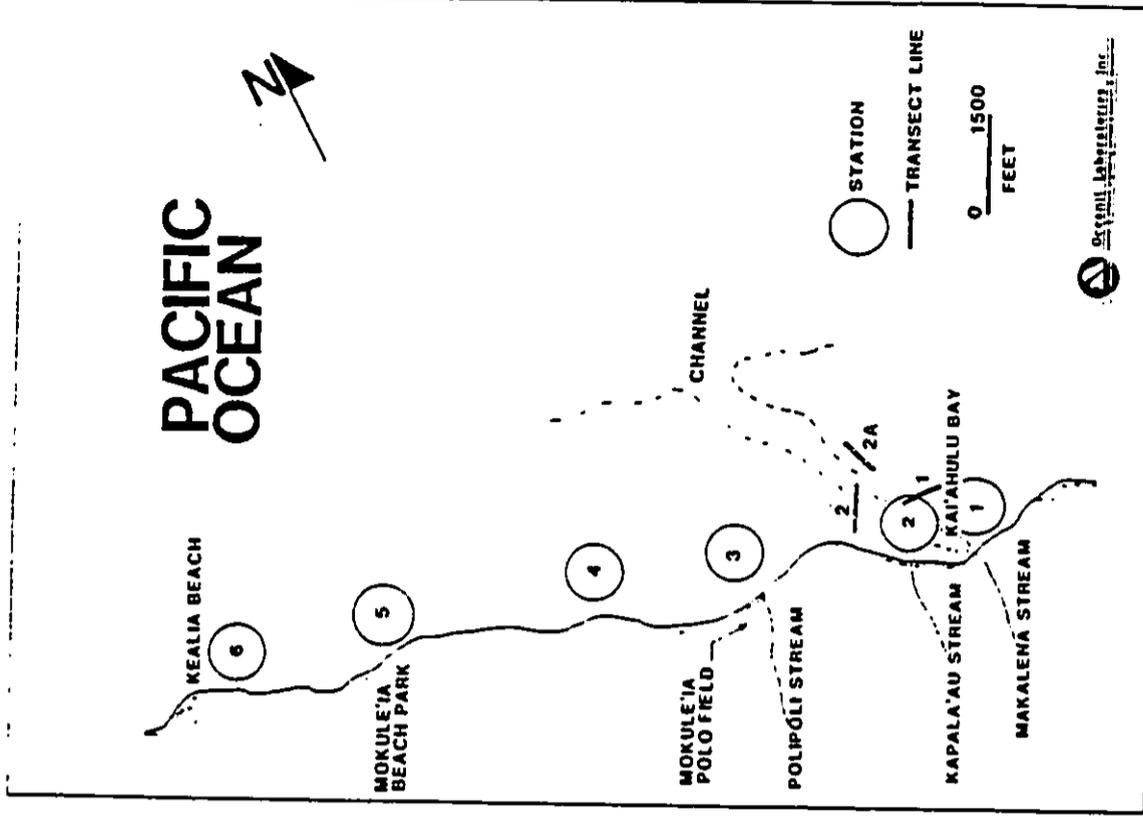


Fig. 11-1 Water quality measurement and marine habitat survey stations.

C. MARINE HABITAT IDENTIFICATION AND SURVEY

A description of the marine life habitats along the Mokuleia coastline was obtained by taking three transects in Kai'ahulu Bay and various 100 meter observational swims along the coastline of the proposed development, as identified in figure II-1. Identification of the habitat zones in Kai'ahulu Bay was obtained from a swimming overview that also resulted in the selection of transects sites.

Divers equipped with snorkel and scuba gear worked in teams of three. A modification of the visual census method was employed [6]. Together, divers unrolled the transect line while following a north heading. After the line was set, the divers waited approximately ten minutes for frightened fish to return to the area. While swimming down the line, divers noted species, estimated the number of individuals, and classified them as large, medium, or small. The reference frame was an area ten meters wide adjacent to the transect line.

It must be noted that information collected by the visual census method yields only rough estimates. Discrepancies between actual and recorded length of individual fish, total biomass, and population sizes can be attributed to (1) several families of nocturnal fishes which retreat into the cracks during the day; (2) the behavior and relative abundance of certain cryptic

II-6

species that appear primarily during dawn and dusk periods could be overlooked by a visual census at other times; (3) observers "spooking" fishes out of the area under study; and (4) observers over or underestimating the size of individual fish.

The substrate and algal surveys were done in conjunction with the fish survey at each transect site to allow for the correlation of the three. These surveys were conducted immediately following the fish transect along the same transect line.

The grid method of survey [7] was conducted using scuba on all transects. At ten meter intervals a 0.25 square meter quadrat was positioned on the left hand side of the transect line. For the 75 meter transects a random number between 1 and 10 was generated for each 10 meters. For the 25 meter transect, data collection was taken every 5 meters from a random number between 1 and 5.

The dominant algae and corals occupying each the 16 squares of the quadrat were identified and the percentage of cover was estimated and recorded on data sheets.

Depth measurements and dominant substrate surveys were taken at each meter mark. Substrate types were divided into four major groups: sand, limestone, basalt rock and coral rubble. Coral rubble was further divided into the type of coral rubble (i.e.,

II-7

Porites compressa rubble) or coralline algae rubble (i.e., Porolithon gardineri) [7].

Site one, at the mouth of Makalena Stream, was chosen because of its proximity to the stream discharge outlet and began approximately 30 meters from shore and ran in a northerly direction for 75 meters along the edge of the sand channel.

Site two, at the mouth of the Kapala'au Stream, was chosen for its proximity to the stream discharge outlet and began approximately 30 meters from shore and ran in a northeasterly direction for 75 meters. Site 2-a is representative of the mixing zone of the two streams and is located approximately 205 meters from shore running north for 25 meters.

Swimming observations were performed at stations 1 and 2 (in Kal'ahulu Bay), station 3 at Polipoli Stream, station 4 at Camp Mokule'ia, station 5 at Pu'u O Hekili and station 6 at Mokule'ia Army Beach, as indicated in figure 11-1. A 100 meter observational snorkel was performed at stations 3-6. Notes were taken on substrate, corals, fish, algal and subject/characteristics that differed from station to station.

III. RESULTS

A. WATER QUALITY

Marine water quality at the proposed Mokuleia Development is class "A", identified as "seasonally wet" coastal waters by the State of Hawaii, Department of Health [2]. Water samples were collected to determine various physical and chemical characteristics of the nearshore marine environment. Tables 111-1 to 111-3 provide a view of how the Mokuleia nearshore waters compare to the State of Hawaii water quality standards [3]. Water quality data are tabulated in appendix A.

The State of Hawaii water quality standards were designed so that passing or failing water quality tests does not depend on a single number determined from a single day of sampling. Moreover, it was designed so that the natural variations in water quality could be statistically balanced to indicate the water quality condition based on several samples collected during a variety of environmental conditions [8,9].

Temperature, salinity and conductivity data indicate that fresh water is discharged into the coastline from the adjacent streams. This effect is primarily noticed in front of station 1, directly in front of the Makalena Stream discharge outlet. Although the mouth of the outlet is covered with sand, underground water apparently intrudes. Data from the other stations also indicates the presence of fresh water. This is to be expected because measurements were taken during an intermittent rain, one of the streams along the coastline was discharging.

Dissolved oxygen data ranged from 6.7 to 9.3 parts per million (ppm), indicating saturated to supersaturated conditions. The highest value measured, in front of station 5, was very high probably because of the wave action in the area -- forcing more oxygen into the water. In addition, a high dissolved oxygen level is expected when large amounts of fresh water, identified from the salinity measurements, are present. Redox and pH measurements indicate values that are expected for seawater.

All fecal coliform measurements were found to average less than one colony per 100 ml except for station 2, in front of Kapala'au Stream discharge outlet. Here we measured three coliforms. The stream was not discharging; therefore, the coliforms probably came from nearby human recreational activity.

III-2

Turbidity measurements ranged from 0.65 to 1.49 nephelometric turbidity units (NTU). The relatively high values were probably a result of rough sea and high wind conditions. Stations 1 and 2, located in Kai'ahulu Bay had the largest turbidities. This probably resulted from the silty material that was previously discharged into the bay by Makelana and Kapala'au Streams -- it became resuspended during the rough weather conditions. In addition, currents converge at the center of the bay and bring in fine particulate material. Moreover, the overall water clarity exceeds the geometric mean for a seasonally wet coastline, but does not exceed the 90 percentile criteria. It is anticipated that if additional data were taken under different environmental conditions, i.e., over time and space, the statistics would show lower values of turbidity.

Non-filtrable residue (NFR) measurements indicate that there are particulate materials in the water column at Kai'ahulu Bay. Data from station 2, in front of Kapala'au Stream, are nearly two times those measured at the other stations. However, all of the values are low with respect to the geometric mean value for a wet or dry coastline.

III-3

Total Kjeldahl nitrogen and total nitrogen were measured and found to be within values expected. The values measured at station 5 were slightly higher than the other stations. This is probably because of the fresh water, also identified from the salinity measurements.

Total phosphorus and orthophosphate were measured and found to be within expected values. However, total phosphorus values appear to be low for a nearshore coastal area. This could be explained in a variety of ways (e.g., the formation of phosphate compounds); however, without additional data an explanation would be too speculative.

TABLE III-1

WATER QUALITY RESULTS
Geometric mean

	Temp. deg-C	Diss O ₂ ppm	Turb. NTU	Non-f.res. mg/L	Sal o/oo	Cond mho/cm
Oceanit Lab. Inc	24.2	7.7	1.00	2.93	33.9	50.8
S * wet	---	---	0.50	20.00	---	---
S * dry	---	---	0.20	10.00	---	---

* State of Hawaii Water Quality Standards [3]

TABLE III-2

WATER QUALITY RESULTS
Geometric mean

	Chlor. ^a ug/L	Fec. Col #col/100ml	pH	Redox mv
Oceanit Lab. Inc	0.44	0.6	8.4	187.8
S * wet	0.30	---	7.6-8.6	---
S * dry	0.15	---	7.6-8.6	---

* State of Hawaii Water Quality Standards [3]

TABLE III-3

WATER QUALITY RESULTS
Geometric mean

	TKN ugN/L	NH ₄ ugN/L	NO ₂ /NO ₃ ugN/L	TN ugN/L	OP _P ugP/L	TP ugP/L
Oceanit Lab. Inc	136	1.3	2.3	141	6.8	7.1
S * wet	150	3.5	5.0	---	7.0	20.0
S * dry	110	2.0	3.5	---	5.0	16.0

* State of Hawaii Water Quality Standards [3]

B. CURRENTS

Current patterns along the Mokuleia coastline are a result of tide, wind and wave influences. Drogue data, taken in the nearshore areas, indicated a significant influence from wind driven currents. Offshore currents are mainly tidal driven and are predominantly in the westerly direction most of the year.

The waves coming from offshore are refracted and broken at the outer reef flat. When convergence occurs rip currents are formed that run perpendicular to the shoreline, usually extending beyond the breaker zone.

Local currents are dependent on the nearshore bathymetry which is dominated by pockets of sand, coral and sandstone reefs. Beaches run in an east-west direction and feature small undulations, depending on the adjacent depth contours. Beach areas closest to deep nearshore waters show signs of erosion, indicated by concave beach shapes. Beach areas adjacent to protected shallow reefs show signs of accretion, indicated by their convex shapes. The east part of the beach is sandy and has medium grain size sand. The western beaches are fringed on the sea side with partly exposed reef and sand.

III-6

The main features in the nearshore area are two deep trenches. The first one is located at the Makalea Stream outlet and runs at a northwesterly direction reaching depths of 15 meters. The other trench is located west of the Mokuleia Beach Park and runs almost perpendicular to the coastline. The area between the two trenches is a shallow reef flat with a maximum depth of 3.6 meters. The flat is about 366 meters wide in widest area and narrows down to about 243 meters at the central part.

In the area between the beach and the breakers, local currents are modified due to the mass transport of breaking waves, the longshore component of the momentum from the waves and the variation of the longshore bathymetry.

Data from current measurements are illustrated in figure III-1. Wave induced currents of approximately 52 centimeters per second towards the east at the west end were measured during the field survey on May 30, 1986. Currents were measured to be approximately thirty centimeters per second offshore near the trench at the east end.

III-7

Currents measured in the trench on June 10 varied from 3.6 centimeters per second to 1.5 centimeters per second. Longshore currents were measured in Kal'ahulu Bay and were found to vary from 0.6 to 15 centimeters per second.

The flat reef area dissipates wave energy and acts as the main mixing zone for runoff from the stream. The diluted runoff is carried by the dominant currents at the time.

Available data indicates that circulation in Kal'ahulu Bay can be divided into two cells: (1) water entering the littoral area due to waves breaking over the reef flat; and, (2) the longshore flow. Although current data is scarce, it is believed that in both cases water returns offshore through the trench. However, the erratic flow caused by scattered patches of coral is superimposed on the average circulation. Therefore, runoff entering the coastal area is mixed in the breaker zone as well as on the reef flat before it is transported to the circulation currents and discharged to offshore waters with the return current.

Mokuleia beaches are exposed to waves arriving from the west through the north to northeast. Under ordinary conditions waves coming from the northeast dominate; however large swells reach this area from north and northeast approximately 2.0% of the time (based on data from Haleiwa) [10]. These 10 to 20 foot height

waves have periods of up to 18 seconds. Waves come from the northeast approximately 5% of the time and are generally less than 2.1 meters high with periods of about 12 seconds. The wave climate is usually mild from April through August, and harsh during the winter season due to northern swells (based on data from Haleiwa) [10].

PACIFIC OCEAN

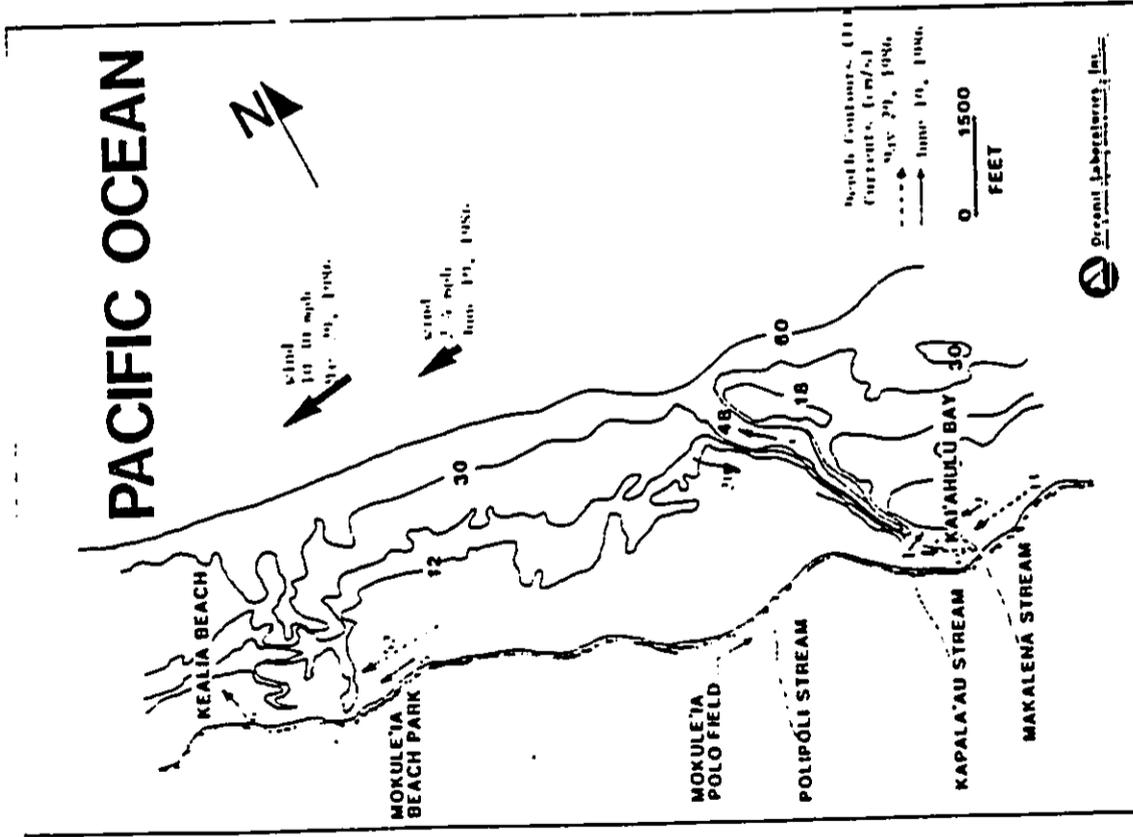


Fig. 111-1 Currents measured along the coast line.

C. MARINE HABITAT IDENTIFICATION AND SURVEY

Water quality stations 1 and 2 were located in Kai'ahulu Bay in front of Makalena and Kapala'au Streams, respectively. In order to give special attention to environmental concerns that result from the rerouting of discharge from Kapala'au to Makalena Streams, special consideration was given to Kai'ahulu Bay. Here we identified three habitat types, as illustrated in figure 111-2. Survey findings are included in appendix B. Stations 3 to 6, identified in figure 11-1, were then surveyed separately. The three habitat types identified in Kai'ahulu Bay, located around stations 1 and 2, are described below.

HABITAT 1 - Silt-sand bottom (channel)

Substrate in this habitat consisted of a large sand bottom (99%), approximately 150 m wide, that divided Habitat 2. The area was found to be generally flat through the mid-sections with slight rolling valleys next to the adjoining limestone of Habitat 2. Depth gradually increased from the shoreline to 12-14 meters at about 200 meters offshore in a northwest direction. Except for sand ripples caused from high energy waves, the bottom of the channel (12-14 meters) was found to be flat.

Only one species of fish (a single Purvagor spiliosoma) was sighted in this area, indicated in appendix B. At 75 meters to about 45 meters shoreward, small sporadic clumps of encrusting coral (i.e., P. lobata), approximately 2.5-7.6 centimeters, were found. Along the perimeter of Habitat 1 and 2 and within 15 meters of the shore, T. ornata was found to be sparsely scattered.

HABITAT 2 - Limestone reef flats

Survey results indicated that Habitat 2 is covered with approximately 57% sand and 31% limestone. Porites compressa rubble and lesser amounts of coralline algae were found. The depth in this area ranged from 1.5 to 7.6 meters.

Our visual census indicated twelve species of fish. The most numerous were T. duperrey and Stegastes fasciolatus. Most of the fish observed were juveniles. Hard corals were found to cover about 4.6 percent of quadrat transect lines 1 and 2. The most abundant corals were P. lobata, Pavona varians and P. compressa, respectively. Montipora flabellata and Leptastrea bottae were also present in smaller amounts. (Scattered heads of P. meandrina were found in the area, but were not represented on the transect line.) The majority of the corals observed (including the P. lobata) were encrusting; this may be an adaptation to the

heavy wave action during the winter. Algae cover was 7.6 percent, as determined by grid transects of Habitats 1 and 2. A total of 13 algal species were seen. An abundance of Padina sp. and T. ornata was observed from the shore to 10 meters offshore but neither species were observed in the grid transect that started 30 meters offshore. Very little green algae was found (only Dictyosphaeria versluysii). Of the large invertebrates, only one Echinometra mathaei, 2 mollusks (Drupa sp.) and 2 brittle stars Ophiocoma sp.) were found. Holothuria atra and Actinopyga mauritiana were also found in this area.

HABITAT 3 - Wave Surge Habitat (Transect 2A)

Limestone substrate covered approximately 88 percent of the transect in Habitat 3. Basalt type stone covered approximately 8 percent and was found in deep crevasses/potholes in the limestone. A small percentage of sand was found in groove/trough indentations in the substrate. Depths ranged from 1 to 1.5 meters. This habitat is exposed to strong surge and wave energy that creates a poor environment for delicate corals, fleshy algae, or permanent residence fish.

The only fish sighted was a T. balleui. Therefore no assertion of dominant species can be made. Only 6.8 percent of the total transect was live coral. The predominant species of corals were

P. lobata (5.8%), P. compressa (0.8%), and P. evermanni (0.2%). P. lobata and P. evermanni were present in small patches of encrusting coral approximately 5-10 centimeters. P. compressa were present in compact two-finger 5 centimeter tall tufts. The dominant algae were I. orzata (6.2%) and Dictyopteris sp. (1%). Zoanthidae sp. (1.6%) was found on a dead head of P. meandrina. The Zoanthidae sp. appeared in several 5-8 centimeter radial tufts.

Outside of the surge zone in Kai'ahulu Bay (about 450 meters offshore, due north of the Makalea Stream outlet), visibility was better. Small arches of limestone 1.2-3.0 meters high were observed along the sides of the channel.

Station 3 was located in front of the Poli-Poli Stream area which is protected from wave action by the limestone flats found approximately 30 meters directly offshore. Inshore visibility was poor, i.e., 1.5-2.5 meters. Silt and coarser materials covered the substrate. Round basalt (river rock) was found directly in front of the mouth of the stream. Further out we found sand and limestone. Overcast, rainy and windy conditions contributed to poor visibility. Consequently, fish observability was impeded; few species of fish were sighted. Additional information on corals, algae, fish and invertebrates can be found in appendix B.

III-14

Station 4 was located in front of Camp Mokuieia. Again, due to overcast and rainy conditions visibility was poor. Our sampling site was located approximately 30 meters east from the stream mouth. We found a greater abundance of fish and algae and less sedimentation with respect to station 3. Generally, the shoreline was found to be unprotected from wave action. A large population of E. methel was observed within 3 meters from the shore. Additional information can be found in appendix B.

Station 5 was located in front of Pu'u O Heckili Park. Here we found a large diversity of habitat types; however, limestone was dominant. Visibility was poor (2 to 3 meters) and became clearer (3 to 6 meters) about 100 meters offshore. On shore we found beach rock and sand, and an abundance of Pandina sp. growing in the nearshore groves. Additional information can be found in appendix B.

Station 6 was located in front of the Mokuieia Army Beach. This area was found to dominantly consist of limestone flats covered with sand. The shoreline was not protected from wave action. In depths of 0.5 to 1 meter, coralline algae and coral rubble were found. The surf break was observed to be approximately 100 meters offshore. Additional information can be found in appendix B.

III-15

IV. DRAINAGE MODIFICATIONS AT KAI'AHULU BAY

A. EXISTING DRAINAGE SYSTEM

Currently, the drainage system at the proposed Mokuleia resort development serves to discharge the runoff from five basins, indicated in figure IV-1. Drainage basin areas are tabulated in table IV-1.

TABLE IV-1
TRIBUTARY AREAS FOR DRAINAGE

Basin	Area (acres)
1	3770
2	230
3	1400
4	750
5	370

During our field studies a local resident who lives close to Kai'ahulu Bay reported that in the mid 1970's Dillingham Ranch made changes in the drainage to Makalea Stream. Under existing conditions runoff from basins 1 and 2 discharge via Kapala'au Stream. The peak discharge is approximately 9000 cfs from basin 1 and about 500 for basin 2 during high intensity storms [11]. Areas for basins 1 and 2 are 3770 and 230 acres, respectively. Kapala'au Stream, the present point of discharge, is approximately 330 meters west of Makalea Stream, the original

IV-1

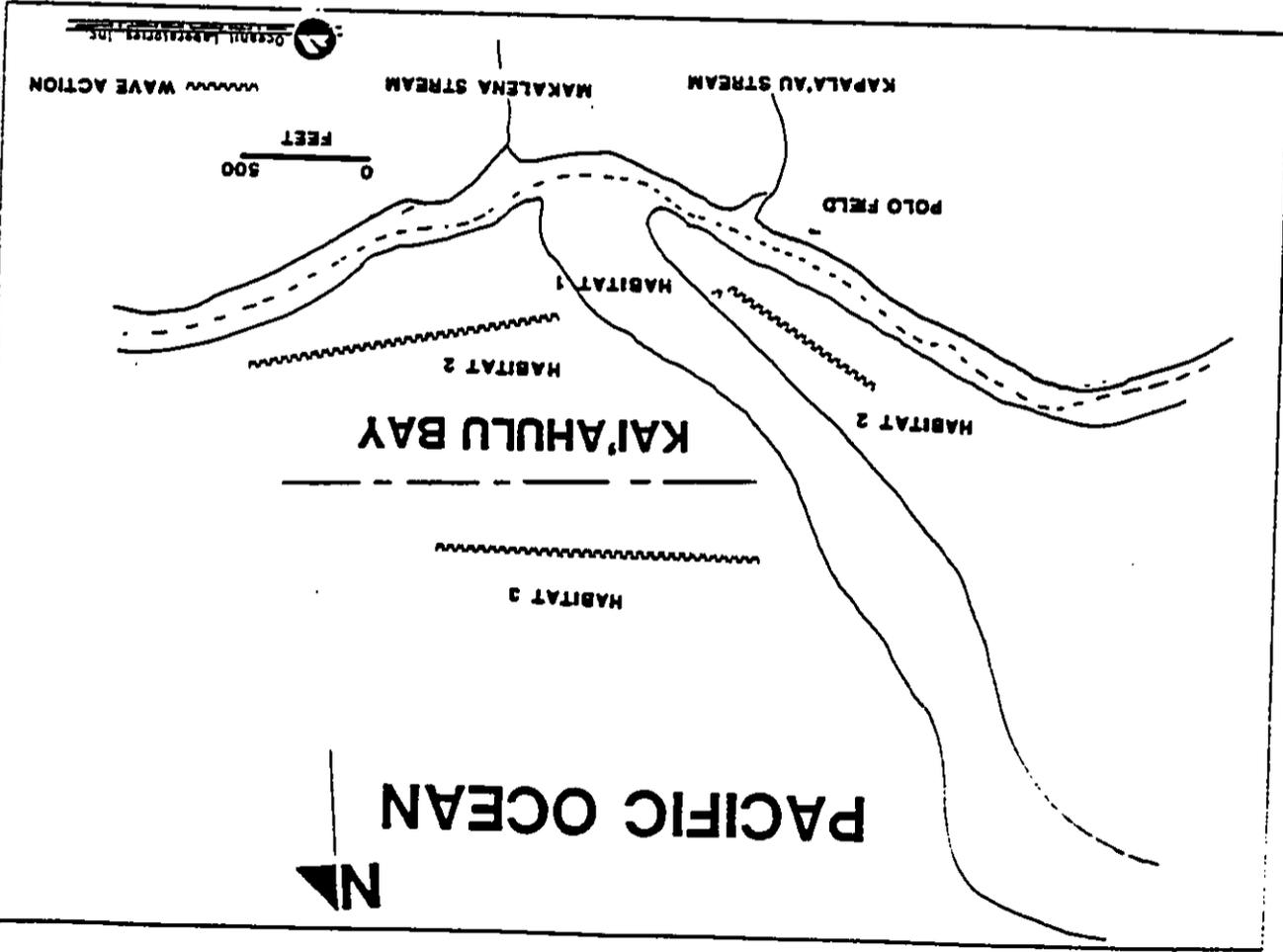


Fig. 111-2. Habitats identified in Kai'ahulu Bay.
111-1c

discharge outlet. Currently, all of the storm water from drainage basins 1 and 2 is discharged at the Kapala'au Stream.

B. PROPOSED DRAINAGE MODIFICATIONS

The modification to Makalela Stream at the proposed Mokulela development will move the discharge location from Kapala'au Stream east 330 meters to its original discharge location at Makalela Stream. The runoff from basin 2 will be diverted to a retention basin that will be constructed to receive runoff from both drainage basins 1 and 2. The retention basin will retain the lower intensity storm runoff and will function as a settling area for trapping debris and silt from higher intensity storm runoff. The retention basin will be connected to the sea by a major drainage channel that is an improvement of the Makalela Stream discharge outlet.

TABLE IV-2
STORM DISCHARGE
FOR BASINS 1 AND 2

Recurrence Interval	Runoff Quality (cfs)
1	1960
2	2560
5	3170
10	3770
25	4070
50	4520
peak discharge	9500

IV-2

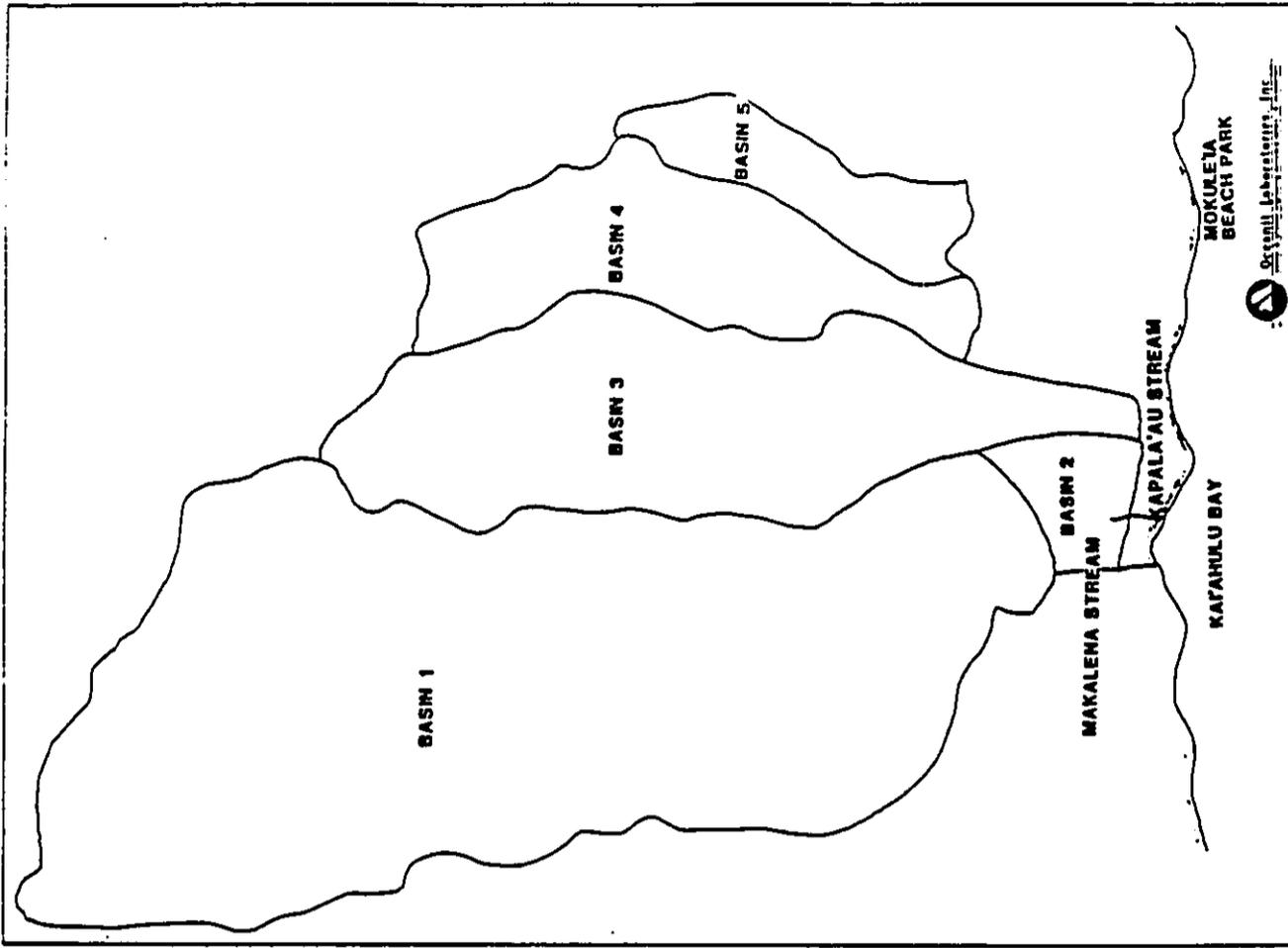


Fig. IV-1. Drainage map for study site.
IV-3

C. DISCHARGE LOADING IN KAI'AHULU BAY

Nutrients and suspended solids currently discharged at Kapala'au Stream outlet will be moved to the previous location, 330 meters east, at the Makalea Stream discharge outlet. This will also transfer the nutrients, suspended solids, fresh water and temperature shock that accompanies a major discharge. However, the new location will still mix and disperse the discharged effluent in Kai'ahulu Bay.

Nutrient and suspended solid loading in the bay is not expected to change as a result of stream rerouting. However, for completeness we will calculate loading under the 10, 50 and peak storm discharge flow rates.

Nutrient loading is dependent on the characteristics of the adjacent watershed areas. For example, range land is expected to have different characteristics than rural areas [12]. In addition, stream flow concentrations of nutrients and suspended solids change during discharge. It is reported that total phosphorus changes from 0.2 - 0.4 mg/l during low flows but increases to a maximum of 2.4 - 4.0 mg/l during high storm runoff. Concentrations of nitrogen, measured as nitrate, are reported to range from 0.2 - 4.2 mg/l at low flow levels and increase to to maximums of 40 mg/l - 45 mg/l during high storm runoff conditions [12].

The characteristics of runoff are site specific and depend on environmental and agricultural conditions. In seawater, the dominant form of nitrogen is found as Kjeldahl nitrogen; however, in general the following trends are reported for terrestrial runoff [12]:

- 1) Areas undisturbed by civilization have a lower concentration than highly utilized areas, e.g., farmed areas.
- 2) Fertile cropland areas can contribute greater amounts of nitrogen than other areas.
- 3) Concentrations of total phosphorus are generally at least an order of magnitude lower than concentrations of nitrogen.
- 4) Nitrogen in the form of nitrate is the major contributor in rural runoff, except under runoff when sediment is lost.

If we had specific hydrographic and nutrient/suspended solid data, we could use pertinent unit hydrographs and nutrient/suspended solid concentration flow rate curves to calculate loading that occurs in Kai'ahulu Bay during storm conditions. However, since we do not have the detailed data required for these calculations, we will use data from Dugan [13] for average storm runoff for the West Beach Project on leeward, Oahu. Dugan's calculations were made for 640 acres of land. Average values for nitrogen, phosphorus and suspended solids are given in table IV-3. Furthermore, since we do not have information regarding storm duration, total volume of discharge and the effective time of loading of the discharge stream, we

will use factors from the Kullima resort development on the North Shore, Oahu [14]. Discharge loading must follow equation IV-1.

TABLE IV-3

AVERAGE NUTRIENTS AND SUSPENDED SOLIDS FOR LEeward OAHU [11]

	Nitrogen NO ₂ (mg/l)	Phosphorus PO ₄ (mg/l)	Suspended Solids (mg/l)
Undeveloped land	1.10	0.11	1500
Developed land	0.60	0.57	250

$$Q_m = f_1 \cdot D \cdot L \cdot f_2 \cdot K = \text{Total load (g/event)}$$

Eqn IV-1

Q_m = discharge during the particular storm (cfs)
 f₁ = discharge coefficient
 D = duration of storm (seconds)
 L = loading (mg/l). Given in table IV-3
 f₂ = loading coefficient
 K = 28 liters per cubic foot

If we follow the assumptions made for the Kullima resort development [11], we find that f₁f₂D = 10.89. We can then use equation IV-1 to calculate the loading for 10, 50 and peak discharge storms in Kai'ahulu Bay. This is presented in table

IV-4. These numbers were used for approximate calculations only -- actual values are site specific.

TABLE IV-4
 RUNOFF FROM UNDEVELOPED LAND

Storm	Q _m (cfs)	Nitrogen NO ₃ (kg/event)	Phosphorus PO ₄ (g/event)	Suspended Solids (kg/event)
10 yr	3770	1.26	126	1700
50 yr	4520	1.52	151	2067
peak disch	9000	3.02	301	4117

If basins 1 and 2 become developed, we would expect runoff characteristics to change, indicated in table IV-5.

TABLE IV-5

RUNOFF FROM DEVELOPED LAND

Storm	Q _m (cfs)	Nitrogen NO ₃ (kg/event)	Phosphorus PO ₄ (g/event)	Suspended Solids (kg/event)
10 yr	3770	0.62	585	256
50 yr	4520	0.87	785	344
peak disch	9000	1.65	1564	686

These numbers are estimates based on several assumptions. However, they give a general indication of loading in Kal'ahulu Bay. If more accurate calculations are required, further studies that are site specific will be needed.

V. DISCUSSION AND RECOMMENDATIONS

Conditions in the nearshore marine environment adjacent to the proposed Mokuleia development are typical of a class "A" nearshore coastal body of water. Several streams periodically discharge into the coastline during rainfall. The water clarity at the time of observation was slightly more turbid than generally expected. However, this is believed to be due to the rough sea and high wind conditions at the time of sampling.

Although measurements were sparse, currents along the coastline are principally wave and wind driven and can become very strong depending on the weather conditions. As a result, the nearshore marine environment is well mixed.

Various general observations of the Mokuleia coastline were made during our survey. In areas where wave action was less intense, i.e., station 3 (protected by reef), the coral was less restricted in its growth and formed large heads of P. lobata, P. compressa, and Murolidithon Gardineri. There was greater diversity in coral and algal species at stations 3-6 than at stations 1 and 2, within Kal'ahulu Bay. This is attributed to greater circulation that results from microcurrents formed on the reefs by the breaking waves and the periodic stream discharge into Kal'ahulu Bay.

A. KAI'AHULU BAY

The water found in Kai'ahulu Bay during our study was acceptable for recreational purposes and environmental considerations; however, it was more turbid, showed greater amounts of fresh water, showed higher non-filtrable residues and had more coliform colonies than the rest of the stations visited. This is most likely due to the fact that it is a major site for stream discharge with respect to the rest of the coastline. The coliform colonies found are attributed to nearby human activity because neither of the stream outlets in Kai'ahulu Bay were open or discharging at the time of our study.

Although current measurements were sparse, it is believed that circulation within the bay forces discharged stream effluent to seek the open ocean via the channel located in the bay, in front of the Makalena Stream outlet. This is believed true for both streams; however, the path is much more direct in front of Makalena Stream. As waves increase in height, the rip current moving through the channel should become stronger -- increasing with the square of the wave heights.

The deep sand channel leading from the mouth of Makalena Stream out beyond the wave/surge zone, clearly illustrates the effect that fresh water has had on the reef over a long period of time.

Sediments suspended and/or settled on the coral decrease the amount of light reaching the photosynthetic zoanthellae within the coral heads. Such a limitation on the photosynthetic activity of zoanthellae inhibits growth. Algae, also photosynthetic, is adversely affected by water turbidity. Occasional heavy sedimentation can seriously affect the reef. This is why there was very little live coral or algae leading from the stream mouths into the bay.

Outside the wave/surge areas of the coast there was a greater diversity of habitats (limestone arches and sand trenches) that were available to flora and fauna. In the areas outside the wave/surge zone, we saw a greater diversity and density of fish and coral with respect to that found inshore. The decrease in turbidity corresponded with an increase in complexity of habitats.

Most of the corals found within the bay were encrusting (even much of the P. lobata). In addition, most of the live substrate were comprised of species of coral and coralline algae that could withstand heavy wave action. This is probably because the bay is exposed to heavy wave action during winter, resulting in the

proliferation of more hardy species. The same conditions seem to exist in the wave/surge zone and immediately beyond since there is a high proportion of encrusting coral and encrusting algae (as opposed to more delicate types of coralline algae such as P. gardineri). Furthermore, there was little P. compressa in the outer bay; the zone normally occupied by compressa seemed to be "replaced" by sturdier corals such as P. duerdini and M. verrucosa.

It is evident from our survey that the condition of the reef flats in Kai'ahulu Bay is a result of stream discharge over a long period of time. The incursion of fresh water and sediments has impeded reef growth and development. This has resulted in a channel that extends from directly in front of Makalena Stream to the open ocean. It is believed that rerouting discharge from Kapala'au Stream to the Makalena Stream will not have a significant impact on the environment in its present condition.

Rerouting the discharge to the Makalena Stream site is believed to be an improvement over the present system which discharges onto the reef before longshore currents take it into the bay's channel. While discharged material occupies the reef, damage may result. If periodic discharging occurs over a long period of

time, another channel could develop in the reef; thus, changing the natural circulation and littoral process along the nearby coastline.

B. DRAINAGE MODIFICATIONS

In general, storm effluent discharging into a nearshore marine environment can affect the local water quality and the benthic communities. Currently, the water quality conditions within Kai'ahulu Bay and along the Mokuieia coastline are typical of a nearshore "coastal water" environment. However, Makalena and Kapala'au Streams have been discharging into Kai'ahulu Bay for many years; therefore, water quality within Kai'ahulu Bay and nearby areas is not expected to change as a result of the proposed rerouting. Concentrations of nutrients are expected to depend on the degree of development of the drainage tributaries. However, these changes are not expected to significantly impact the water quality of the bay because it is a well flushed. In addition, during high surf conditions, strong currents pump through the channel.

Generally, the impacts from runoff on nearshore marine benthic communities result from low salinity levels, high levels of suspended solids, and changes in the algal populations due to

increased nutrients. However, because of the channel found in Kai'ahulu Bay is a habitat that is suited for the disposal of storm effluent, no obvious adverse impact to the nearshore marine benthic communities is anticipated.

Furthermore, based on our water quality measurements, general observations and peripheral current measurements, it appears that Makalena Stream is a superior discharge outlet compared to Kapala'au Stream. This is because the deep channel that runs directly to the open ocean is found in front of the Makalena outlet. In addition, water that is currently discharged at Kapala'au is probably impeding reef growth directly in front of the stream outlet.

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13 Dugan, G.L. and Chun, M.J., West Beach Resort Project, Water Pollution Implications of Project Storm Runoff, prepared for the West Beach Development Project, July (1979).

14 Kuilima Resort Expansion, Draft Environmental Impact Statement, prepared by Group 70, Aug (1985).

APPENDIX A

TABLE A-1

MOKULEIA WATER QUALITY DATA TAKEN ON MAY 29, 1986

Sta No.	Cond.	Sal o/oo	Temp degC	Turb NTU	NH3 mg/l	NH4 mg/l	NH2 mg/l	TN mg/l	TKN mg/l	OrtP mg/l	TP mg/l	FC col	Chl ug/l	NFR
1	49.62	33.12	24.2	1.49	.001	.002	.123	.120	.006	.007	1	0.50	2.6	
2	50.47	33.98	23.9	1.42	.002	.004	.141	.135	.009	.009	3	0.75	5.4	
3	50.84	34.30	23.8	0.88	.002	.003	.149	.144	.007	.007	1	0.40	3.3	
4	51.25	34.26	24.3	0.65	.001	.001	.145	.142	.006	.007	1	0.31	2.2	
5	51.14	33.80	24.8	0.81	.001	.003	.152	.148	.007	.007	1	0.27	1.8	
6	51.24	34.10	24.5	1.05	.001	.002	.136	.133	.006	.006	1	0.55	3.5	

NI+2=Nitrate+Nitrite, TN=Total Nitrogen, TKN=Total Kjeldahl Nitrogen
 OrtP=Orthophosphate, TP=Total Phosphorus, FC=Fecal Coliforms
 Chl=Chlorophyll a, NFR=Non-filtrable Residue
 * less than 1

TABLE A-2

MOKULEIA WATER QUALITY DATA TAKEN ON MAY 29, 1986

Sta No.	D.O. ppm	pH	Redox mv
1	7.1	8.4	182
2	7.3	8.4	184
3	6.7	8.4	192
4	7.5	8.5	193
5	9.3	8.5	187
6	8.4	8.5	180

D.O.= Dissolved Oxygen, Turb=Turblidity
 Redox=Oxidation Reduction Potential

APPENDIX B

TABLE B-1

DENTHIC SURVEY RESULTS OF TRANSECT 1. QUADRAT CENSUS RESULTS (AS PERCENT COVER) ARE LISTED IN SECTION A. RESULTS OF THE POINT ANALYSIS ARE PRESENTED IN SECTION B.

	Quadrat Number			
	1	2	3	4
A. QUADRAT CENSUS				
SAND LIMESTONE/RUBBLE				
CORAL				
<u>Porites lobata</u>				
<u>Porites compressa</u>				
<u>Leptastrea botata</u>				
<u>Palythoa tuberculosa</u>				
ALGAE				
<u>Peyssonellia rubra</u>	1.2	1.2	1.2	
<u>Porolithon onkodes</u>	0.6			
<u>Porolithon gardineri</u>	0.9		0.6	
<u>Halimeda discoides</u>	3.6		0.6	
<u>Dictyota spp.</u>	1.8			
<u>Pterocladia spp.</u>	0.6			
<u>Zoanthus nitidus</u>				
<u>Amanzia glomerata</u>				
<u>Wrangelia spp.</u>				
<u>Galaxaura spp.</u>				
<u>Dictyosphaeria versluysi</u>				

TABLE B-1 CONT.

	Quadrat Number			
	5	6	7	8
SAND LIMESTONE/RUBBLE				
	51.9	41.9	63.0	76.3
CORAL				
<u>Porites lobata</u>	5.6	8.8	19.4	9.4
<u>Porites compressa</u>	3.8		1.9	
<u>Leptastrea botata</u>				
<u>Palythoa tuberculosa</u>				
ALGAE				
<u>Peyssonellia rubra</u>	2.5	4.3	1.9	3.1
<u>Porolithon onkodes</u>	1.9			
<u>Porolithon gardineri</u>	3.8	0.6	3.8	
<u>Halimeda discoides</u>	0.6	17.5		
<u>Dictyota spp.</u>				
<u>Pterocladia spp.</u>	0.6		10.0	0.6
<u>Zoanthus nitidus</u>	29.3	23.8		
<u>Amanzia glomerata</u>		3.1		
<u>Wrangelia spp.</u>				
<u>Galaxaura spp.</u>				
<u>Dictyosphaeria versluysi</u>				

B. SUMMARY OF TRANSECT 1 percent

Corals	6.8
Algae	15.7
Sand	29.0
Rubble	48.5

TABLE B-2

BENTHIC SURVEY RESULTS OF TRANSECT 2. QUADRAT CENSUS (AS PERCENT COVER) ARE LISTED IN SECTION A. EACH QUADRAT REPRESENTS 0.25 m². POINT ANALYSIS RESULTS ARE PRESENTED IN SECTION B. OTHER INVERTEBRATES SEEN ARE LISTED IN SECTION C.

	Quadrat Number			
	1	2	3	4
SAND				
LIMESTONE/RUBBLE	80.0	88.8	88.4	81.4
CORAL				
Porites lobata				
Porites varians				
Montipora flabellata	1.3		4.0	8.8
Lepastrea bottae		0.3		
ALGAE				
Porolithon onkodes		0.6		
Zostera nitida	8.1	0.6		
Amansia glomerata			6.3	7.5
Galaxaura spp.	5.6	5.3	1.3	
Dictyosphaeria versluysi	2.5	1.3		
Jania spp.	0.6			1.0

D. SUMMARY OF TRANSECT SITE 2 percent

Corals	3
Algae	7
Sand	33
Rubble	57

C. INVERTEBRATE CENSUS

Species	Number
Ophiocoma spp.	2
Echinometra mathaei	1
Drupe	1

TABLE B-3

BENTHIC SURVEY RESULTS FROM TRANSECT 2A. QUADRAT CENSUS RESULTS (AS PERCENT COVER) ARE LISTED IN SECTION A. EACH QUADRAT REPRESENTS 0.25 m². RESULTS OF THE POINT ANALYSIS ARE PRESENTED IN SECTION B.

	A. QUADRAT CENSUS				
	1	2	3	4	5
LIMESTONE/RUBBLE					
DEAD P. meandrina	94	88	83	79	48
CORAL					
Porites lobata		9	10	8	2
Porites compressa	4				
Porites evermanni					1
ALGAE					
Dictyopteris spp.	2	1	2	1	5
Zostera nitida		2		12	14
Turbinaria ornata			5		

B. SUMMARY OF TRANSECT SITE 2A percent

Corals	7
Algae	9
Sand	0
Rubble	84

TABLE B-1

SNORKEL SURVEY OUTSIDE HABITATS 1, 2 AND 3

Coral: *N. verrucosa* - plates
P. duerdeni - downward slope of substrate was replaced at about 20-25 ft depth (by *P. duerdeni*)

Some *Zoanthus nitidus* seen in this area, but not as abundant as inshore areas.

Fish: much diversity.
S. perspicillatus - large
M. flavolineatus
C. multinctus - large
P. forsteri
P. multifasciatus
N. alger
P. arcatus
L. philliphus
C. gaimard adult
C. venustus
Gomphus varians
S. sordidus
Acanthurus olivaceus
C. strigosus

Invertebrates: *Panulirus penicillatus*
Molothuria alba
Actinopyga mauritiana

TABLE B-5

FISHES SIGHTED DURING 7 VISUAL CENSUSES ALONG THE WOKULEIA COASTLINE, OAHU

Species	Station/Location						
	1	2	2A	3	4	5	6
<i>Acanthurus nigrofuscus</i>	5			1	8	3	
<i>Acanthurus mata</i>	4						
<i>Acanthurus triostegus</i>				1	1	3	2
<i>Aulostomus chinensis</i>	1				1		
<i>Rhinacanthus rectangulus</i>	1						
<i>Chaetodon auriga</i>				1			
<i>C. lunula</i>							
<i>C. milleri</i>							
<i>C. multinctus</i>	1						
<i>Paracirrhites arcatus</i>	1	1					
<i>Anampus cuvier</i>							
<i>Gomphosus varius</i>			1				
<i>Thalassoma ballieu</i>	17	8			5	7	11
<i>Thalassoma duperrey</i>	1				1	6	5
<i>Pervagor spiliosoma</i>							
<i>Parupeneus porphyreus</i>							
<i>Ostracion meleagris</i>							
<i>P. imparipennis</i>	7	15			1	1	1
<i>Stegastes fasciolatus</i>							
<i>Scarus sp.</i>	3						
<i>C. jactator</i>	1						

STATION 3

The Poi-Poi stream area is protected from wave action by limestone flats that are approximately 30 meters from shore. Inshore visibility was poor; 2-3 meters. There was heavy silt suspension and sediment covering substrate. Round basalt (river rock) was seen directly in front of the stream mouth.

TABLE B-6

DESCRIPTION OF STATION 3

Coral: P. compressa - some large dead heads covered by sediments.

P. lobata - 1 meter size head also dead.
P. damicornis

Algae: P. gardneri - individual clumps
Dictyota sp. - patches live at 2-3 meters
Coralline algae - large clumps more abundant
U. reticulata
Laurencia sp.
D. verticillata
H. discoides - not as abundant as site #2

Fish: Few species of fish sighted probably due to overcast and rain visibility poor.

C. fremblii
T. duferrey
Acanthurus nigroris
L. phthirophagus
P. forsteri
P. spilosoma
Canthigaster jactator

Invertebrates: Echinometra methel

STATION 4

Due to overcast and rainy conditions at Camp Mokuieia visibility was poor. There was less sedimentation in his area and a relative abundance of fish and algae. The shoreline was unprotected from wave action. A large population of E. methel was observed one to ten meters from shore.

TABLE B-7

DESCRIPTION OF STATION 4

Coral: P. lobata
P. onkodes
U. flavellata
U. verucosa
P. damicornis

Algae: Acanthophora sp. - many
Neomeris - abundant app. 30 meters from shore
T. ornata
Dictyota sp.
Padina sp.
Sargassum
U. reticulata
U. fasciata
C. sinuosa
R. panguensis

Fish: A. triostegus
A. nigroris - large
A. nigrofuscus
P. spilosoma
P. forsteri

Invertebrates: Echinometra methel - large population
E. oblongata
Diadema paucispinum

STATION 5

At Pu'u O Hekeili Park we found a large diversity in habitats with a predominant limestone substrate. Nearshore visibility was poor (2-3 meters). Visibility became clearer at about 100 meters from shore (3-6 meters). Beach rock on shore was interspread with sand channels.

TABLE B-8

DESCRIPTION OF STATION 5

Corals: (Mostly encrusting species)

M. verrucosa
L. botiae
P. lobata
P. compressa
M. flaveolata
P. meandrina - scattered heads
P. varians

Algae:

T. ornata
D. caverdosa
Gracilaria
Lyngbya
P. onkodes
H. formosa
R. panguensis
Gilaxaura sp.

Fish:

Abundant species
Z. cornutus
C. unimaculata
C. quadrimaculatus
C. gaimard (Jr)
G. varians
M. unicoloris
T. duperrey
A. sandvicensis
P. forsteri
P. spilargentea
Gymnodon zebra (zebra monkey)

Invertebrates:

Echinometra mathaei
Conus sp. - (3)
Actinopyga sp.

STATION 6

Mokuleia Army Beach is predominantly limestone flats covered with sand. The shoreline was not protected from wave action. At a depth of about 1 meters coralline algae and coral rubble were present.

TABLE B-9

DESCRIPTION OF STATION 6

Corals: P. compressa

P. meandrina
P. lobata - encrusting
H. verilli

Fish: G. gaimard (Jr)

T. duperrey
P. forsteri
P. spilargentea

APPENDIX G

Proposed Mokuleia Development:
Impact on Agriculture and Aquaculture

Prepared for
Mokuleia Development Corp.

Prepared by
Decision Analysts Hawaii, Inc.

May 1986

**PROPOSED MOKULEIA DEVELOPMENT:
IMPACT ON AGRICULTURE AND AQUACULTURE**

Decision Analysts Hawaii, Inc.

May 1986

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EXECUTIVE SUMMARY

that it is extremely difficult to identify new export crops and develop them into new and profitable industries.

Livestock operations are another possibility, but the returns are low from cattle grazing; the trends are not favorable for increased dairy, egg, and swine and pork operations; and little land is required for poultry operations.

Problems with freshwater prawns include low profitability, a saturated local market, and an export market of doubtful potential. Other potential freshwater aquaculture activities suffer from low prices, stiff competition from the mainland, a small local market, unsuitable climate, and/or other problems.

The potential for brackish and saltwater aquaculture, particularly shrimp, is regarded as more promising. However, brackish and saltwater aquaculture is still in a research-and-development stage, with profitability for large-scale operations yet to be proven. Also, various land-use policies and regulations make profitability difficult to achieve, and limit development. Finally, concerns over salt contamination of prime agricultural lands and the groundwater supply argue against brackish and salt-water aquaculture for most Mokuleia lands.

Increasing demand for agricultural land in Hawaii as a result of land shortages on the mainland should not be anticipated, since such mainland land shortages are not expected. On the mainland, as in Hawaii, there is a large supply of fallow agricultural land. Furthermore, this supply is expected to increase given genetic engineering advances which promise higher yields for crops, increased resistance to diseases and pests, and increased tolerance to variations in climate.

LAND SUPPLY

An enormous and growing supply of Hawaii's prime agricultural land has been freed from sugar and pineapple production. Since 1970 over 42,000 acres of land have been freed from sugar production (about 8,600 acres on Oahu and 33,600 on the Neighbor Islands), and over 39,000 acres freed from pineapple production (11,800 acres on Oahu and over 27,500 on the Neighbor Islands).

Some of the land freed from sugar and pineapple production has or will be converted to urban, diversified agriculture, and aquaculture uses. Also, some of the land freed from pineapple use on Oahu was converted to sugar production. Making allowances for the various conversions, uncommitted acreage which remains available to diversified agriculture and aquaculture amounts to many tens of thousands of acres, with a large share of this on Oahu. Even though considerable agricultural land is available, it should be noted that the supply of parcels for small-scale farmers is

EXECUTIVE SUMMARY

INTRODUCTION

The proposed Mokuleia development will require converting about 1,000 acres of land—now used primarily for grazing—to resort, housing, and recreation uses. About 440 acres of this are prime agricultural lands, and about 360 acres are other agricultural lands. The remaining lands have very severe limitations which make them unsuited or generally unsuited for agriculture. The impact of developing these lands on the growth of agriculture and aquaculture in Hawaii is addressed below.

LAND DEMAND

In order to accommodate all diversified agriculture and aquaculture activities that are agronomically suited for the Mokuleia area and to provide the hope (but not the expectation) of profitable operations, the acreage required is surprisingly small. To increase Hawaii's self-sufficiency in produce crops to a realistic level, and to accommodate resident-plus-visitor population growth to the year 2000, less than 1,200 acres of additional land would be required.

A large market exists for feed crops, but most of these crops are not commercially feasible for Hawaii. A possible exception is corn silage to feed cattle in feedlots. However, less than 2,600 acres would be needed Statewide to feed all cattle in feedlots, even with an increase in cattle operations. Experiments with corn silage and other feed crops have been performed, but returns per acre have been low.

Regarding export crops, papaya is a possibility being explored for Oahu lands, although the acreage requirement for increased production is relatively small; total Statewide plantings amount to a little over 2,000 acres, primarily on the Big Island. Almond nuts offer the potential of absorbing a significant amount of agricultural land, but increasing overseas competition indicates that this is a high-risk venture unable to compete in those areas where other economic activities offer higher land rents. Other existing export crops are not agronomically suited for the Mokuleia area and/or require very little land. Finally, efforts in Hawaii for over a century indicate

limited. This is partially because of County regulations which require electrical power, paved rather than gravel roads, and buried rather than surface water lines. These requirements are appropriate for rural estates, but are unnecessary for agricultural use of the lands. The added expense for these items makes it uneconomical for large land owners to subdivide their land into small agricultural lots.)

The supply of fallow prime agricultural land probably will increase given the unfavorable outlook for sugar prices. In fact, some unprofitable mills remain in operation temporarily only because of lease and/or energy agreements. Furthermore, some plantations continue as land-holding operations with their lands available for other uses when and if profitable activities arise.

Many of the lands freed or to be freed from sugar and pineapple production have excellent agricultural qualities and climatic conditions, and are well-suited for crop and aquaculture production. Also, water is available for most of these lands, particularly lands freed from sugar production. Further, some additional land has been made available to diversified agriculture in government-sponsored agricultural parks throughout the State.

OUTLOOK FOR DIVERSIFIED AGRICULTURE AND AQUACULTURE

It is extremely doubtful that the Mokuieia development will affect adversely or the statewide growth of diversified agriculture or aquaculture, either immediately or over the long term. This conclusion derives from the following: an enormous amount of prime agricultural land and water has been freed from sugar and pineapple production in recent years (including much land on Oahu); there is a very real possibility that additional sugar acreage and water will be freed, given the outlook for low sugar prices; and diversified agriculture and freshwater aquaculture will require a comparatively modest amount of additional land and water for expansion, particularly in the Mokuieia area given its particular conditions.

PROPOSED MOKULEIA DEVELOPMENT: IMPACT ON AGRICULTURE AND AQUACULTURE

The proposed Mokuieia development will require converting about 1,000 acres of land now used primarily for grazing to resort, housing, and recreation uses. Addressed in this report is the impact of this action on the growth of agriculture and aquaculture in Hawaii.

AGRICULTURAL CONDITIONS OF MOKULEIA

Soil Quality

The lands for the Mokuieia development can be divided into three general categories: beachfront, coastal-plain, and foothill lands. The beachfront lands consist of about 100 acres of Jaucas sand, which has very severe limitations for agriculture because the soil is loose and lacks stability for heavy equipment, and is subject to wind erosion (U.S. DOA, Soil Conservation Service).

The coastal-plain lands of the Mokuieia development cover about 820 acres. Of this, about 440 acres are prime agricultural lands having few limitations for agriculture, or only moderate limitations because of some stoniness or vulnerability to erosion. These are level or gently sloping lands consisting of Pulehu clay loam, Kawihapi clay loam, and Mokuieia clay loam. About 360 acres are other agricultural lands having severe limitations for agriculture. Problems include stoniness, vulnerability to erosion, and poor drainage. Slopes are as high as 12 percent, and the soils include Kaena clay, Kaena stony clay, Ewa silty clay loam, and Ewa stony silty clay. Finally, about 20 acres of the coastal-plain lands have poorly drained Pearl Harbor clay that has very severe limitations for agriculture.

The foothill lands of the development cover about 100 acres of the lower slopes and gulches of the Waianae Range. The soils include Kaena very stony clay, Halauna silt loam, Kemon silty clay, Helemano silty clay, and rock land. These soils have very severe limitations which make them unsuited or generally unsuited for agriculture. Problems include stoniness, undesirable texture (too sticky and plastic), very steep slopes, and vulnerability to severe erosion.

PROPOSED MOKULEIA DEVELOPMENT:
IMPACT ON AGRICULTURE AND AQUACULTURE

PROPOSED MOKULEIA DEVELOPMENT:
IMPACT ON AGRICULTURE AND AQUACULTURE

Most of the coastal-plain lands are also categorized as prime and secondary lands for aquaculture (slopes of less than 5 percent and, for prime lands, clay, loam, or clay loam soils) (Hawaii Aquaculture Planning Program).

Water

Annual rainfall in the area is about 30 to 35 inches per year, and somewhat higher for the mauna lands. Ample groundwater supplies are available for irrigating crops.

CROPS FOR THE HAWAII MARKET
Competitive Advantages of Mokuleia

Prospective farmers who would locate in Mokuleia would have to compete with other farmers on Oahu and the Neighbor Islands in supplying the Hawaii market. As with many other areas, Mokuleia provides year-round subtropical climatic conditions excellent for growing a great many crops. On the other hand, the area is unsuited climatologically for crops which require cool and/or moist conditions commonly found at higher elevations or on the wet windward side of an island.

Farmers in Mokuleia would have a significant economic advantages over Neighbor Island farmers because of their location. Mokuleia farmers could easily truck at their convenience products to the large Honolulu market where about 80 percent of the State's population resides. In addition, most supplies and equipment are readily available from a large selection of suppliers, and usually at costs lower than on the Neighbor Islands. In contrast, growers located on the Neighbor Islands who wish to sell or buy goods in the Honolulu market must absorb inter-island transportation costs. Also, farmers in the Kahuku area on Oahu encounter somewhat longer trucking distances and correspondingly higher trucking costs.

Disadvantages for all farmers in Hawaii are the small and easily glutted local market, and high costs for labor and imported supplies.

Fresh Produce

Fruits and vegetables which are judged to be agronomically and possibly economically feasible for Mokuleia are listed in Table 1. The judgment is based largely

Unless otherwise noted, data in this Appendix are from Statistics of Hawaiian Agriculture 1983.

Table 1.— HONOLULU CONSUMPTION, AND ACTUAL AND POTENTIAL SHARE SUPPLIED BY HAWAII OF PRODUCE CROPS FEASIBLE FOR MOKULEIA: 1983

Crop	Honolulu Wholesale Supply (1,000 lbs)	Hawaii Production for the Honolulu Market (1,000 lbs)	Actual Market Share (percent)	Potential Market Share (percent)
Import Substitution Potential: Increasing Production Trend				
Bananas, Chinese	11,954	1,958	16	80
Broccoli	3,392	114	3	10
Corn, Sweet	342	138	40	90
Peppers, Sweet	2,262	645	29	70
Squash, Italian	1,706	455	27	50
Watermelon	7,598	2,365	31	70
Import Substitution Potential: Flat or Decreasing Production Trend				
Beans, Snap	857	758	88	95
Cucumbers	3,981	2,531	64	90
Eggplant, Round	418	300	72	90
Limes	456	45	10	50
Peas, Chinese	300	27	9	75
Squash, Togan	185	116	63	50
Taro	1,020	227	22	50
Tomatoes	12,287	4,302	35	50
Unlikely Import Substitution				
Avocados	1,454	851	59	60
Bittermelon	150	149	99	99
Cabbage, Kai Choy	840	834	99	100
Daikon	1,583	1,582	100	98
Dasheen	242	238	98	100
Eggplant, Long	567	565	100	90
ginger Root	1,412	1,239	88	100
Lettuce, Semi-head	1,291	1,291	100	20
Onions, Dry	1,097	1,097	100	90
Onions, Green	12,576	607	5	40
Pumpkins	807	204	25	31
Raisins	204	194	95	95
Sweet potatoes	1,755	1,723	98	75
TOTAL	70,292	24,055	34	59

Source: Hawaii State Department of Agriculture, "Honolulu Unloads: 1983," Market News Service.

upon those crops which are already grown commercially in Hawaii in areas having a climate similar to that of Mokuia. The crops are categorized by those which have (1) significant import-substitution potential, and the production trends are increasing (an indicator of profitability), (2) significant import-substitution potential, but the production trends are flat or decreasing (an indicator of marginal profitability), and (3) little or no import-substitution potential.

Crops excluded from Table 1 and the reasons for the exclusion include:

- citrus other than limes, Chinese head cabbage, head cabbage, carrots, cauliflower, celery, head lettuce, romaine lettuce: require cool temperatures or other climatic conditions not found in Mokuia.
- long- and medium-day onions: require longer days for proper growth and curing, and prices are too low for profitability.
- mangoes: a subsistence crop priced too low to justify commercial farming.
- papaya: treated as an export crop in the following section.
- potatoes: Hawaii's major food import (nearly 38 million pounds in 1983), but repeatedly proven unprofitable in Hawaii; requires cool temperatures.
- summer squash other than zucchini, and melon other than watermelon: insect and disease infestations.

The first column of Table 1 shows the 1983 Honolulu wholesale supply for the crops listed, based on the amount sold in the wholesale market. These quantities provide a crude estimate of the current demand for these products. The estimates are crude because the data for Honolulu are for aggregates of similar products. For example, all types of bulb onions are listed as "dry onions," and both oriental and American types of cucumbers are listed as "cucumbers." Also, in some instances, imports and produce grown locally may be imperfect substitutes. An example could be sweet peppers; although identical in appearance, the flesh on the imported peppers is thicker than on the locally grown peppers. These quantities will therefore reflect an overestimate of the demand for local products, since local products are not all identical to imports.

The second column of Table 1 gives the amount of Honolulu consumption which is produced in Hawaii, including amounts from the islands of Hawaii, Kauai, Maui, Molokai, and Oahu. The percentage ratio between local production and Honolulu consumption gives the market shares shown in Column 3.

The last column of Table 1 presents the estimated potential market share based on import substitution. Factors included when developing the estimates were:

- The mix of products contained within each product group.
- As mentioned above, dry onions include all types of bulb onions, and cucumbers include both oriental and American types. Also local sweet peppers have thicker skins than mainland ones. For these cases, local varieties are imperfect substitutes for certain mainland varieties.

-The extent of overseas competition.

For certain crops, Hawaii can supply all or nearly all of the local demand because of weak or nonexistent mainland competition; for those crops, Hawaii's market share can approach or reach 100 percent. But for those crops which face competition from the mainland, the rule of thumb is that prices will start to be depressed when local production increases the market share beyond about 70 percent. With lower prices, growing of the particular crop becomes less profitable, and some farmers begin to switch to alternative crops.

-Seasonal variation of overseas competition, and local demand and production.

Summer crops from California and elsewhere supply the Honolulu market with many fruits and melon at very low prices—prices that are too low for profitable operations by Hawaii farmers. When this occurs, Hawaii's market share approaches or reaches zero percent. But even though prices are stronger in the winter, the quality and yield of Hawaii's winter crops may be less than that of summer harvests (i.e., tomatoes).

The potential produce market for Mokuia growers is derived from three sources: displacing production from other areas in the State, displacing imports, and resident-plus-visitor population growth. Estimates of the potential market size due to these three sources for those crops feasible for Mokuia are shown in Table 2. Corresponding land and water requirements are shown in Tables 3 and 4, based on the yield and water assumptions given in Table 5.

The most promising produce crops for Mokuia would be those which have substantial import substitution potential, and show trends of increasing production in Hawaii (an indicator of profitability). These crops include Chinese bananas, brussels, sweet corn, sweet peppers, Italian squash, and watermelon. Crops with no recent history of profitable production in Hawaii offer additional potential. However, the

Table 2. - POTENTIAL HAWAII PRODUCTION FOR THE HONOLULU MARKET OF PRODUCE CROPS FEASIBLE FOR MOKULEIA: 1983 AND 2000 (1,000 pounds)

Crop	Actual Production, 1983	Potential Production Increase Due to:			Potential Production, 2000
		Import Substitution	Population Growth	Total	
Import Substitution Potential: Increasing Production Trend					
Bananas, Chinese	1,958	7,605	1,855	9,460	11,418
Broccoli	114	225	66	291	405
Corn, Sweet	138	170	60	230	368
Peppers, Sweet	645	938	307	1,245	1,891
Squash, Italian	455	398	165	563	1,018
Watermelon	2,365	2,954	1,032	3,986	6,350
Import Substitution Potential: Flat or Decreasing Production Trend					
Beans, Snap	758	56	158	214	972
Cucumbers	2,531	1,052	695	1,747	4,278
Eggplant, Round	300	76	73	149	449
Limes	45	183	44	227	272
Peas, Chinese	27	123	29	152	179
Squash, Togan	116	23	27	50	166
Taro	227	283	99	382	609
Tomatoes	4,302	1,842	1,192	3,034	7,335
Unlikely Import Substitution					
Avocados	851	21	169	190	1,042
Bittermelon	149	--	29	29	178
Cabbage, Kai Choy	834	--	162	162	996
Daikon	1,582	--	307	307	1,889
Dasheen	238	--	46	46	284
Eggplant, Long	565	--	110	110	675
Ginger Root	1,239	32	247	279	1,517
Lettuce, Semi-head	1,291	--	250	250	1,541
Onions, Dry	1,097	1,418	488	1,906	3,003
Onions, Green	607	119	141	119	867
Pumpkins	204	57	51	108	312
Radishes	194	--	38	38	232
Sweet potatoes	1,223	93	255	318	1,572
TOTAL	24,955	17,668	6,095	25,762	49,818

Honolulu Consumption x Potential Market Share) - Actual 1983 Production.
70.1% of (Actual 1983 Production + Potential Production Increase Due to Import Substitution).

Table 3. - POTENTIAL LAND REQUIRED TO SUPPLY HONOLULU MARKET WITH PRODUCE CROPS FEASIBLE FOR MOKULEIA: 1983 AND 2000 (acres)

Crop	Land Required, 1983	Potential Acreage Increase Due to:			Potential Land Required, 2000
		Import Substitution	Population Growth	Total	
Import Substitution Potential: Increasing Production Trend					
Bananas, Chinese	98	380	93	473	571
Broccoli	3	6	2	8	10
Corn, Sweet	12	14	5	19	31
Peppers, Sweet	22	31	10	41	63
Squash, Italian	14	12	5	12	31
Watermelon	158	197	69	266	423
Import Substitution Potential: Flat or Decreasing Production Trend					
Beans, Snap	28	2	6	8	36
Cucumbers	67	28	19	47	114
Eggplant, Round	6	1	1	2	8
Limes	5	20	5	25	30
Peas, Chinese	2	8	2	10	12
Squash, Togan	4	1	1	2	6
Taro	14	18	6	24	38
Tomatoes	72	31	20	51	122
Unlikely Import Substitution					
Avocados	122	3	24	27	149
Bittermelon	6	--	1	1	7
Cabbage, Kai Choy	12	--	2	2	14
Daikon	19	--	4	4	22
Dasheen	9	--	2	2	11
Eggplant, Long	14	--	3	3	17
Ginger Root	40	1	8	9	50
Lettuce, Semi-head	14	--	3	3	16
Onions, Dry	73	95	33	128	200
Onions, Green	20	4	5	9	29
Pumpkins	8	2	2	4	12
Radishes	1	--	--	--	2
Sweet potatoes	51	4	11	15	65
TOTAL	894	858	342	1,200	2,089

Source: Derived from Tables 2 and 5.

Table 4.— POTENTIAL WATER REQUIRED TO SUPPLY
THE HONOLULU MARKET FOR PRODUCE CROPS
FEASIBLE FOR MOKULEIA: 1983 AND 2000
(million gallons per day)

Crop	Water Required, 1983	Potential Water Increase Due to		Total	Potential Water Required, 2000
		Import Substi- tution	Popula- tion Growth		
Import Substitution Potential: Increasing Production Trend					
Bananas, Chinese	0.44	1.70	0.41	2.11	2.55
Broccoli	0.02	0.04	0.01	0.05	0.07
Corn, Sweet	0.05	0.06	0.02	0.08	0.14
Peppers, Sweet	0.10	0.14	0.05	0.19	0.28
Squash, Italian	0.06	0.05	0.02	0.07	0.12
Watermelon	0.35	0.44	0.15	0.59	0.95
Import Substitution Potential: Flat or Decreasing Production Trend					
Beans, Snap	0.13	0.01	0.03	0.04	0.16
Cucumbers	0.27	0.11	0.07	0.18	0.46
Eggplant, Round	0.02	0.01	0.01	0.02	0.04
Limes	0.02	0.09	0.02	0.11	0.14
Peas, Chinese	0.01	0.04	0.01	0.05	0.05
Squash, Togan	0.02	--	--	--	0.02
Taro	0.11	0.14	0.05	0.19	0.30
Tomatoes	0.32	0.14	0.09	0.23	0.55
Unlikely Import Substitution					
Avocados	0.54	0.01	0.11	0.12	0.66
Bittermelon	0.03	--	--	--	0.03
Cabbage, Kai Choy	0.10	--	0.02	0.02	0.12
Daikon	0.12	--	0.02	0.02	0.15
Dashen	0.03	--	0.01	0.01	0.04
Eggplant, Long	0.06	--	0.01	0.01	0.08
Ginger Root	0.16	--	0.03	0.03	0.20
Lettuce, Semi-head	0.12	--	0.02	0.02	0.15
Onions, Dry	0.16	0.21	0.07	0.28	0.45
Onions, Green	0.09	0.02	0.02	0.04	0.13
Pumpkins	0.03	0.01	0.01	0.02	0.05
Radishes	0.02	--	--	--	0.02
Sweet potatoes	0.23	0.02	0.05	0.07	0.29
TOTAL	3.61	3.24	1.31	4.55	8.20

Source: Derived from Tables 3 and 5, using 1 acre-foot per year = 0.000027 Mgd.

Table 5.— YIELDS AND WATER REQUIREMENTS OF
PRODUCE CROPS FEASIBLE FOR MOKULEIA

Crop	Yield			Water (ft/crop)
	Yield per Crop (lbs/acre)	Crops per Year	Yield per Year (lbs/acre)	
Import Substitution Potential: Increasing Production Trend				
Bananas, Chinese	20,000	1	20,000	5
Broccoli	10,000	4	40,000	2
Corn, Sweet	4,000	3	12,000	1.67
Peppers, Sweet	15,000	2	30,000	2.5
Squash, Italian	11,000	3	33,000	1.5
Watermelon	15,000	1	15,000	2.5
Import Substitution Potential: Flat or Decreasing Production Trend				
Beans, Snap	9,000	3	27,000	1.67
Cucumbers	12,500	3	37,500	1.5
Eggplant, Round	27,000	2	54,000	2.5
Limes	9,000	1	9,000	5
Peas, Chinese	5,000	3	15,000	1.67
Squash, Togan	15,000	2	30,000	2.5
Taro	20,000	0.8	16,000	11
Tomatoes	30,000	2	60,000	2.5
Unlikely Import Substitution				
Avocados	7,000	1	7,000	5
Bittermelon	13,000	2	26,000	2.5
Cabbage, Kai Choy	12,000	6	72,000	1.67
Daikon	17,000	5	85,000	1.5
Dashen	26,000	1	26,000	4.25
Eggplant, Long	20,000	2	40,000	2.5
Ginger Root	34,000	0.9	30,600	3
Lettuce, Semi-head	15,800	6	94,800	1.67
Onions, Green	10,000	3	30,000	1.67
Onions, Dry	15,000	1	15,000	2.5
Pumpkins	13,500	2	27,000	2.5
Radishes	11,000	12	132,000	1
Sweet potatoes	12,000	2	24,000	2.5

Excludes production during the season when consumption is supplied primarily by cheaper mainland imports.

PROPOSED MOKULEIA DEVELOPMENT:
IMPACT ON AGRICULTURE AND AQUACULTURE

- Various pests have presented a major problem—particularly birds which have eaten major portions of crops before harvesting.
- For most feed crops, Hawaii's humidity is too high (less than 12 percent is required) to allow proper drying before harvest.
- Most feed crops are hybrids which have been developed over many decades to adapt to mainland conditions and, although a number of tropical corn-grain hybrids are under development at the University of Hawaii's College of Tropical Agriculture and Human Resources, species suited to Hawaii's particular environmental conditions are yet to be perfected.
- Hawaii's year-round warm weather allows the build-up of pathogens in the soil (on the mainland, pathogens are killed during cold winter periods).
- The length of Hawaii's summer day is too short for proper growth of some crops, in particular soybeans.
- The high cost of land, labor, and imported fertilizers and other supplies makes it difficult to compete with imported feeds.

The production of alfalfa, however, has shown some promise, with Hawaii's only alfalfa farm being a 150-acre operation on Molokai. But large-scale commercial success has yet to be proven.

Another alternative for displacing feed imports is to grow corn silage to feed cattle in feedlots. Until recently, corn silage was grown on the North Shore of Oahu and fed to dairy cows, and there are some small-scale operations on the Ewa plains of Oahu. In 1982, 54,000 cattle were slaughtered in Hawaii, of which 29,400 (54 percent) were fattened in feedlots. Since cattle spend about 4.5 months in a feedlot, the average population within Hawaii's feedlots during 1982 was 11,000 cattle (29,400 x 4.5/12). Assuming that increased production of corn silage and its use in feedlots induce all 54,000 slaughtered cattle to be fattened in feedlots, then the average population in feedlots would increase to about 20,200 cattle (11,000 x 54,000/29,400). Fattening more cattle in feedlots would free pasture land for other cattle (a limiting factor to beef production), and would allow an increase in the herd size by about 12 percent. Thus, the feedlot population can increase to about 22,600 cattle (20,200 + 12%). Since an acre of silage yields about 57 tons per year and feeds about ten cattle, only 2,600 additional acres of corn silage would be needed to supply all of Hawaii's feedlots at the increased level of production plus the 3,500 dairy cattle on the Neighbor Islands (122,000 + 3,500/10).

Expanded corn silage operations would likely locate on Oahu because the State's major feed lot and dairies are located here, and because corn silage, which has a high

PROPOSED MOKULEIA DEVELOPMENT:
IMPACT ON AGRICULTURE AND AQUACULTURE

risk of failure in new activities is high, and most farmers would be unable to provide or would be unwilling to risk the financial resources required to develop appropriate varieties, technology, and farming techniques.

For all fresh produce that has the potential of being profitable in Mokuleia, only about 1,200 additional acres would be required to (1) displace all but the low cost summer imports and achieve realistic levels of self-sufficiency, and (2) accommodate projected resident-plus-visitor population growth to the year 2000. The corresponding water requirement would be only 4.6 MGD. These estimates are high, however, in that they assume market success and profitability for a number of crops for which declining production trends indicate otherwise. On the other hand, the potential would be much greater if potatoes—with which Amfac has experimented near Kunia—were proven to be profitable. Also, the land requirements for produce production in Mokuleia could be increased further if produce production on the Neighbor Islands and elsewhere on Oahu could be displaced.

Feed Crops

A large potential exists for Hawaii production of feed crops by displacing the large volume of animal feed which is now imported. In 1982, imports totaled 167,846 tons, and included corn, barley, wheat, bran, oats, sorghum, alfalfa, cottonseed, soybean meal, beet pulp, whey, yeast, and a number of mixed feeds. The potential for displacing a major portion of grain and alfalfa imports is indicated by year-round growing conditions which have resulted in yields of about 50 percent greater than those obtained on the mainland. Two feeds which have recently been grown commercially in Hawaii are corn and alfalfa. In addition, corn can be substituted for barley. Assuming Hawaii can reach 100-percent self-sufficiency in these crops, then an estimated 15,200 acres could be placed in grain production (assuming crop yields of 6 tons per acre annually to replace 91,276 tons of imported corn, sorghum, barley and mixed feeds), and 2,370 acres could be placed in alfalfa production (assuming a yield of 11 tons per acre annually to replace 26,056 tons of imports).

The market would be even larger if local production of feed were to stimulate livestock production in Hawaii. In 1984, Hawaii was 10-percent self-sufficient in beef and veal, 25-percent self-sufficient in pork and chickens, 76 percent self-sufficient in eggs, and nearly 100 percent self-sufficient in milk.

However, feed grains have yet to be proven as a serious alternative for Hawaii. Unsuccessful results with past commercial attempts to grow grain crops were encountered for a number of reasons:

moisture content, is heavy and can be transported economically only over relatively short distances. This would present a problem for growing corn silage at Mokuleia since the State's principal feedlot is at the opposite end of the island at Barber's Point. However, dairy operations do exist on the North Shore near Haleiwa.

Amfar has in fact experimented with feed and forage crops on lands of Oahu Sugar Co. near Barber's Point. Although yields were favorable, returns per acre were not.

CROP EXPORTS

Competitive Advantages of Hawaii

Because of the huge size of overseas markets compared to Hawaii's market, the financial rewards of successful export crops are far greater than those of crops grown for local consumption. The competitive advantages which Hawaii offers in developing export crops includes a subtropical climate which allows year-round growing conditions and very high yields for some crops. Also, Hawaii is politically stable and has duty-free access to the U.S. mainland market. Frequent and reliable air and shipping service is available to the U.S. mainland and elsewhere. The University of Hawaii College of Tropical Agriculture and Human Resources and the Hawaiian Sugar Planters' Association are recognized worldwide as leaders in tropical agriculture research. Finally, the State and County governments provide strong political support for agriculture.

Repeated attempts have been made for well over a century to develop export markets for a great many commodities. Some of the more notable attempts have included: silk, cotton, white potatoes, wheat, rice, bananas, rubber, sisal, tea, tobacco, and corn (Plasch, Hawaii's Sugar Industry, p. 218). In addition, numerous studies have been conducted over the past 100 years. The limited success with these many attempts illustrates that it is extremely difficult to identify an export crop which has a competitive advantage over other areas, and then to develop that crop into a successful industry.

Reasons for the difficulty in developing export crops are many, and include:

—Many of the tropical and subtropical crops which grow well in Hawaii also grow well in similar areas of the Caribbean, Central and South America, Africa, and Asia, and many of these areas have cheaper labor, land, and water costs.

—Overseas transportation costs for both exports and imports of equipment and supplies are often higher than the corresponding costs for other tropical and subtropical countries which may be closer to major markets, and are not restricted to using expensive American shipping lines.

—Hawaii has tropical fruit flies which cause certain fruits to be banned from the U.S. mainland and Japan, or require expensive treatment and inspection of the fruit.

—Many temperate-climate crops do not grow well in Hawaii.

—Chemical costs in Hawaii are relatively high because Hawaii soils are deficient in nutrients, and there is no cold winter to kill pests as is the case on the U.S. mainland.

In the past, sugar was able to overcome the above and other problems, and compete in an established market partly because yields in Hawaii have been the highest in the world. However, most other crops follow the development strategy of pineapple where the market is developed virtually from scratch at considerable cost and risk of failure. After the technology has been perfected and the market developed, growers in countries having lower production and/or delivery costs typically enter the market to the detriment of Hawaii growers. The export crops which are currently following this strategy with success are papaya, macadamia nuts, and cut flowers (principally anthuriums). For each of these crops, overseas competition is developing. The other diversified agricultural exports from Hawaii include coffee, seed corn, ginger root, green stock, and guava puree. Other crops may be possible for export, but they have yet to be identified and/or their overseas market developed.

Competitive Advantages of Mokuleia

Regarding exports, growers on Oahu, including those who may locate in the Mokuleia area, are at an advantage because of better transportation service than that available to Neighbor Island farmers. Air service is cheaper and more frequent, with direct flights to many cities; similarly, shipping service is more frequent. With frequent airline and shipping service, storage costs are lower, rush deliveries of needed supplies and equipment are quicker, and overseas delivery dates are more easily met before spoilage occurs. Also, the many wide-bodied jets which fly in and out of Honolulu International Airport allow a reduction in packing, handling and transport costs because of the LDD containers used in these aircraft. For Oahu

**PROPOSED MOKULEIA DEVELOPMENT:
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Pineapple

Although pineapple production has declined greatly over the past two decades, the remaining pineapple industry is regarded as economically healthy because of the new focus on the fresh market. However, expansion of the industry is not expected because new plantations designed to supply the U.S. fresh pineapple market east of the Rockies are being developed in Florida, Costa Rica, and the Dominican Republic. But even if acreage for pineapple were needed, ample fallow land is available elsewhere, particularly on Lanai and Molokai, while Mokuleia lands would not be agronomically suited for pineapple.

Papaya

Papaya exports have grown from 1.9 million pounds in 1965 to 45.1 million pounds in 1981, experiencing an average annual growth rate of about 15 percent. However, exports fell to 35.6 million pounds by 1983. In this year, 2,120 acres were harvested in the State. Production is concentrated on the Big Island (96 percent), with Amfac being the largest exporter in the State.

Papaya is not well-suited for Mokuleia for a number of reasons. First, the preferred variety for exports can be grown only in Puna. Second, Oahu has problems of Mosaic virus. Third, low land rents generally favor Neighbor Island areas for growing papaya for export. Nevertheless, Amfac has experimented with plantings of papaya on Oahu lands that have been withdrawn from sugar production.

Guava Puree

Guava puree is a small and, at best, marginally profitable industry with exports of less than \$300,000 (Hawaii DPEI), Hawaii Guava Industry; University of Hawaii CTA & HR, Guava Industry Analysis, 1982). Production is mostly in backward operations of the Big Island, with processing performed only occasionally in expensive plants which mostly process papaya. Without sizeable papaya operations and a papaya processing plant, a guava puree export industry is unlikely to develop in the Mokuleia area.

Of interest, however, is test marketing of cranberry/guava juice being performed by Ocean Spray. The guava puree is supplied by C. Brewer from 100 acres on Kauai.

**PROPOSED MOKULEIA DEVELOPMENT:
IMPACT ON AGRICULTURE AND AQUACULTURE**

farmers supplying the export market, Honolulu also provides a large and convenient standby market whenever production exceeds overseas demand.

A disadvantage of agriculture on Oahu, however, is competition for land by other activities, and resulting higher land prices and rents.

Sugar

Cultivation of sugarcane is a possible use of the prime and secondary agricultural lands which would be required for the proposed Mokuleia development. Until the early 1970s, these lands were in sugar, and lands on each side of the Mokuleia development are still in sugar. However, the future of sugar cultivation in Hawaii is uncertain because of the pessimistic outlook for sugar prices. In the world market, the average price of sugar is expected to remain well below the production costs for all countries. This is because sugar produced in excess of various trade agreements is dumped on the world market, particularly by the European Economic Community (EEC) which, because of generous price supports to local sugar-beet growers and generous trade agreements with former colonies, is a major sugar producer, importer, and exporter—even though the EEC is one of the highest-cost sugar producers in the world, is self-sufficient in sugar and has no need to import it, and must sell its excess sugar on the world market at enormous losses. In the United States, Federal legislation protects sugar from the low world prices by import quotas, tariffs, and import fees. However, U.S. sugar prices are managed by the Federal government so that they are sufficiently low to prevent accelerating the growth of high-fructose corn syrup (HFCS), which costs less to produce than normal sugar. In addition, the new sweetener aspartame is capturing market share and putting additional downward pressure on U.S. sugar prices. (Plasch, Hawaii's Sugar Industry)

Historically, Wainium Sugar Co. has been one of Hawaii's most efficient producers, with the exception of a period during the late 1970s and early 1980s. Nevertheless, low sugar prices prevent profitable operations when depreciation of equipment is accounted for.

Also, it should be noted that ground rents provided by sugar are relatively low, about \$110 per acre per year (based on 16.5 cents per pound, yields of 15 tons per acre per 2-year crop, and rent of 4.5 percent of gross revenues). Nevertheless, these rents are generally higher than those available from diversified agriculture operations that use large amounts of land.

A further difficulty is that substantial acreage must be planted in order to support the necessary processing facilities; otherwise, nuts would have to be shipped off-island for processing. Macadamia nuts also require considerable water—over 7 acre-feet per year.

In view of the high risk and lack of a macadamia nut processing plant on Oahu, macadamia nuts do not appear to be an appropriate crop for Mokuleia at this time.

Coffee

Hawaii's coffee industry is, for most years, marginally profitable, and has experienced declines in production in the past, although the industry has been more profitable and relatively stable in recent years. For the 1983/84 season, production was 2.5 million pounds on 1,800 acres of land centered at high elevations in Kona on the Big Island. Mokuleia has climatic conditions unsuited for coffee production.

Seed Corn and Other Seed Research

The seed corn industry is research oriented, and exports new and improved seeds by air to seed companies, universities, and private and government research organizations located in the United States, France, Canada, South Korea, Germany, Italy, Holland, Yugoslavia, Bulgaria, Japan, and other nations. The research and seeds are provided under proprietary contract arrangements.

The amount of land used for nursery, observation, and seed production has gradually increased since its introduction to Hawaii in the late 1960s, reaching 680 acres in 1983; these lands are distributed among Kauai, Central Oahu, Molokai, and Oahu. However, over half of the State's seed corn industry is located on Molokai where seven companies carry out research or produce seed corn on a permanent basis. During the winter other seed companies produce seed corn in Hawaii on an interim basis.

In addition to seed corn, considerable activity also focuses on the production of genetic material for sorghum, soybeans, and sunflowers; lesser activity focuses on millet, flax, faba beans, sesame, barley, wheat, cotton, kidney beans, black edible beans, tomatoes, cucumbers, and other vegetables. But the major focus is on seed corn, both grain and forage, for two reasons. First, it is the major crop of the United States, with far greater demand for it than exists for other seeds. Second, corn is a hybrid for which new varieties are continually under development. The other non-hybrid seeds breed true, and therefore do not lend themselves to extensive development efforts.

Other Fruits

The recent approval of irradiation of papaya and other fruits in order to kill fruit-fly eggs raises the promise of increased exports to the mainland. Even with substantially increased exports, however, comparatively little land would be required. Assuming that transportation costs will not limit market development and that Hawaii can capture 5 percent of the U.S. market for fruits other than apples, oranges, and bananas—an extremely optimistic assumption—then less than 7,000 acres would be required. This acreage could be accommodated on less than half the lands recently freed by the closing of Puna Sugar Co. However, instead of increasing Hawaii's market for tropical fruits, the approval of irradiation could very well work against Hawaii; Mexico and other tropical and subtropical countries which have cheaper land, labor and transportation costs, but which also have fruit-fly problems, will gain increased access to the U.S. market by building their own irradiation facilities.

Macadamia Nuts

Production of macadamia nuts has grown from 8.5 million pounds in 1965 to 16.3 million pounds in 1983. In terms of acreage, macadamia nuts are Hawaii's largest diversified agriculture industry (15,800 acres in 1983), with practically all production located on Hawaii Island. However, some new orchards have been planted by C. Brewer & Co., Ltd. on about 2,000 acres of former lands of Wailuku Sugar Co. on Maui.

Macadamia nut farms provide a relatively high return once the orchards mature. However, the orchards require a very large financial investment, do not bear fruit for 7 years, and reach full productivity even later. As a result, the return is marginally attractive for an investor. Given growing competition from other areas in Hawaii (C. Brewer & Co., Ltd. is also planting 8,000 acres in macadamia nuts on the Big Island) and from other countries (Brazil, Guatemala, Malaysia, Australia, and possibly Egypt), macadamia nut orchards represent a high-risk investment. This is particularly true for firms which are new to the industry and which may lack the proprietary information on optimal varieties for a given area (assuming they even have access to a supply of cuttings of the proper variety), and on optimum farming practices. If the wrong variety of tree is planted or improper farm practices followed, yields will be low and substantial losses will be suffered.

Seed corn and other seed research is a unique industry which has a clear comparative advantage in its Hawaii site, enabling it to produce during winter months, and to be insulated from diseases that could affect the large production areas on the mainland. Nine to twelve generations of new hybrids can be produced in 3 to 4 years in Hawaii versus the 9 to 12 years required on the mainland. Areas in competition with Hawaii include Mexico (which presents language and political problems), Florida (which has occasional freezes), and Puerto Rico. Hawaii, however, dominates the industry; approximately 75 percent of all the corn produced in the United States can trace its development to Hawaii, and over two-thirds of this to Molokai.

As increased effort is directed to the needs of tropical areas, gradual growth in the seed corn industry is anticipated. However, the growth potential amounts to only a few hundred acres, and most of the growth is expected to occur near Kaunakakai on Molokai where climatic conditions are regarded as the best in the world for conducting seed corn research, and where agricultural land rents are generally much lower than elsewhere in Hawaii.

Ginger Root

Ginger root production for export is a new industry with a promising, but still uncertain, future. Although production is relatively small, it has grown rapidly from 1.9 million pounds in 1979 to 5.1 million pounds in 1983; this production was harvested from 160 acres. However, ginger root is not a major commodity, and so has a limited overseas market; in fact, the market was glutted in 1983, which led to a major price drop.

Ginger root farming is labor intensive, and generally suited for small-scale operations. Also, other areas are competing for the U.S. market, including California and Fiji. Mokuleia offers no locational advantage for ginger root production compared to other areas in Hawaii.

Floral and Nursery Products

Hawaii's floral and nursery industry has expanded rapidly in recent years, with most growth occurring in the sales of potted foliage plants. Because expensive heating is not required in Hawaii as it is on the mainland, it is possible for local producers of floral and nursery products to absorb the transportation costs and compete in the mainland markets. However, this is also true for the competing areas of Puerto Rico, the Caribbean, and Central America.

The outlook for continued growth exports of floral and nursery products is favorable. Expansion will be paced primarily by market development and management expertise. However, relatively little land will be required; the average size of floral and nursery operations in the State is under 3 acres. Also, since several of the agricultural parks under development in the State make specific provisions for nurseries, adequate land is available. One of the larger nurseries in the State was started by Amfac on former sugarcane land at Waikole.

Sweet Corn

New hybrids of sweet corn have been developed recently which are specially suited for Hawaii's climate, and provide promise of exports to the mainland during the winter. Developed by the University of Hawaii College of Tropical Agriculture and Human Resources, Supersweet #10 is a year-round variety which grows rapidly, stores well, is resistant to mosaic and blight diseases, and is tightly husked to help reduce damage caused by earworms. The major question is whether a large number of mainland consumers will be willing to buy high-priced fresh Hawaii corn during the winter versus low-priced frozen and canned mainland corn. Hawaii corn will have to be priced high because of shipping costs. Amfac has 50 acres in corn production at Kunia, and is exploring the export potential.

LIVESTOCK OPERATIONS

Cattle and Grazing

Cattle ranching in Hawaii continues to be an important agricultural activity, with 1983 sales of \$29.3 million. With the reduction in sugar and pineapple operations, some of the land freed has been converted to grazing which, however, provides a low return and low employment per acre. Nevertheless, this is regarded as the best use of this land until a more profitable use can be identified and developed.

The production of beef could be greatly expanded without flooding the market since about 70 percent of the beef consumed in Hawaii is imported. In order to increase beef production, cell grazing (e.g. the Savory system) has been recommended to ranchers by researchers and extension agents from the University of Hawaii, College of Tropical Agriculture and Human Resources. With this approach, which has been used successfully on the Big Island and elsewhere, the land is partitioned like a wagon wheel, with large wedges of land separated by fences. Periodically, cattle are moved from one wedge (cell) to the next, thereby giving the land in the empty wedges

PROPOSED MOKULEIA DEVELOPMENT:
IMPACT ON AGRICULTURE AND AQUACULTURE

prices, stiff competition from the mainland, the small Hawaii market, the unsuitable climate, and other reasons. Problems with these other species are:

- Catfish
Local production faces very stiff competition from low-cost imports from the mainland.
- Trout
Small Hawaii market. Also, trout grows better in cold water as found in some streams on Hawaii, Kauai and Maui.
- Tilapia
Small market and low price of about \$1 per pound, wholesale. Some pond operators on Oahu have found it cheaper to treat tilapia as trash and bury it rather than try to sell it. However, red or golden hybrids command higher prices (about \$2.50 per pound), but the market is small.
- Bull frogs
A favorable price of \$4 to \$5 per pound, but a small market.
- Ornamental koi and carp
Very limited market.

Brackish and Saltwater Aquaculture

The potential for brackish and saltwater aquaculture is regarded as more promising than it is for freshwater aquaculture. However, brackish and saltwater aquaculture is still in a research-and-development stage, with profitability for large-scale operations yet to be proven in Hawaii. Also, various land-use and other regulations make profitability difficult to achieve, and limit development.

Shrimp

The market for shrimp is very large, an estimated 3.4 million pounds for Hawaii in 1980, and 440 and 427 million pounds for the U.S. mainland and Japan, respectively. However, no processing facilities are available to local producers, so the potential market for shrimp is limited to the market for the higher priced fresh product. The current farm price for medium-size fresh shrimp on Oahu is \$5 to \$5.50 per pound (whole animal). However, the size of the market at these higher prices is uncertain; major expansion in sales may require lower prices.

A recent study found that pond production of shrimp in Hawaii is marginally profitable given the prevailing price, existing production technology, and regulatory constraints (Shang, et. al.). Consistent with these findings have been recent failures

PROPOSED MOKULEIA DEVELOPMENT:
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Freshwater Prawns

Following investigations in the late 1960s into techniques for farming freshwater prawns, the State's Aquatic Fisheries Research Center developed a successful "Cooperative Agreement Program" in the early 1970s to encourage people to try prawn farming. This activity experienced steady growth until 1980, and became the dominant aquaculture activity in the State. Since 1980, however, setbacks have occurred.

In 1978, Kilauea Agronomics, a subsidiary of C. Brewer and Company, placed 100 acres in freshwater prawns at Kilauea, Kauai, and had plans to expand to 300 acres. However, yields were lower than expected because of low water temperatures caused by prolonged periods of cloud cover at its north shore location. The decision was made to close operations in 1980 (Governor's Aquaculture Industry Development Committee).

In spite of the experience of Kilauea Agronomics, Amfac Aquatech, a subsidiary of Amfac, Inc., placed 35 acres in freshwater prawns in 1980, with plans to expand to 350 acres. The operation also was located on Kauai, but at Kekaha on the south shore, which is considerably sunnier and hotter than on the north shore. Although yields were above industry averages, operations were closed in 1982 because the U.S. mainland market was thought to be insufficient to justify major corporate investments, and product acceptance was questionable.

Additional closures were experienced by six small prawn farms in 1980 and 1981. Reasons given included a loss of interest, lack of post-larvae, poor site for the pond, and inability to negotiate a long-term lease. Some of these problems reflect the fact that freshwater prawns may be only marginally profitable in Hawaii.

Most of Hawaii's prawn production is sold locally, but some is exported to the mainland. The local prawn market is currently saturated and any increase in production would result in declining prices and decreased returns. Currently the export potential of the prawn industry appears uncertain.

Given the history of prawn production and uncertain market conditions, prawn operations at Mokuleia offer little promise.

Other Freshwater Species

Research has been carried out on a number of other aquaculture species for commercial production, and some have progressed to commercial attempts. However, success for these other aquaculture species has been negative or limited by low

in shrimp operations. In 1979, IKKI Hawaii Aquaculture Co., Ltd., developed 13 acres at Kuluaku, Oahu for the production of Japanese tiger shrimp, with plans for expansion to 50 acres. However, operations closed in 1982 due to technical and regulatory problems.

Nevertheless, shrimp production, which has proven to be profitable in Asia, is believed by some to hold considerable promise for Hawaii. For example, Marine Culture Enterprises, a partnership of the F. H. Priore and W. R. Girace Companies, has established field research facilities in Kahuku to develop a controlled environment method of producing marine shrimp. The research and development is being conducted by the University of Arizona's Environmental Research Laboratory (ERL) through grants from Marine Culture Enterprises. Originally the project was conducted jointly with the University of Sonora, Mexico, but ERL transferred its research facilities to Hawaii in 1981, after a difference of opinion arose over methods of production. High stocking densities are made possible through the use of an airtight plastic-covered aquacell, and production yields of about 65,000 pounds of shrimp tails per acre per year were obtained at the Mexico site. Substantial developmental work remains; nevertheless, major expansion by Marine Culture Enterprises is likely.

In addition, ORCA Sea Farms plans to produce marine shrimp on Molokai, and has already developed a number of ponds, with plans to expand to 100 ponds. Very high yields are projected (20,000 pounds of tails per acre per year) based on the favorable climate offered by Molokai, and continuous monitoring of conditions in the ponds using sensors tied into computers. However, the operation has yet to make the transition from research to commercial production.

Oysters

Major investments have been made in oysters in recent years. Taylor "Tap" Poon's Systemculture Corporation on 165 acres in Kahuku, Oahu, represented an approximate \$11-million-dollar investment in an intensive production system for oysters. Oysters were cultured in trays placed on concrete benches, or raceways. Each raceway was expected to produce over 200,000 oysters per month once full commercial production was achieved, with total production anticipated to be one million oysters per month. Although about 100,000 oysters were produced and marketed per month during the first half of 1982, a number of technical and production problems prevented the attainment of planned output. Financial problems resulted in staffing cutbacks, then changes caused by Hurricane Iwa in late 1982 forced the company into bankruptcy soon afterward.

Brine shrimp

Research also has been carried out on brine shrimp for commercial production. However, brine shrimp has not yet shown to be viable economically; low prices for imports and the small local market forced one local producer to close operations.

Land Use Policies and Regulations

The location of brackish and saltwater ponds is restricted so as not to contaminate the underlying freshwater ground supply—a restriction which would restrict operations to the maui portions of the coastal plain at Mokuleia.

Also, brackish and saltwater ponds are usually located on coastal plains which have limited agricultural potential—a policy which would argue against brackish and freshwater aquaculture development at Mokuleia. The reason for not locating these activities on quality agriculture land is that, in case of reversion, the accumulation of salt in the soil would decrease crop yields.

Brackish and saltwater aquaculture activities that locate in or near the coastal zone also would be subject to a number of regulatory requirements which significantly increase the time, cost and risks required to start coastal aquaculture operations, as well as increase operating costs. These regulations—many of which would apply to aquaculture development at Mokuleia—make profitability difficult to achieve, and will limit development. Such regulations include:

- National Pollutant Discharge Elimination System (NPDES) Permit for effluent discharges from aquaculture facilities that produce in excess of 100,000 pounds of aquatic animals per year or discharge 30 or more days per year;
- U.S. Army Corps of Engineers permit for stream diversions or impoundment, and for projects affecting swamps, marshes and wetlands;
- floodproofing of structures in defined flood and tsunami inundation areas, and Federal flood insurance;
- Federal Environmental Impact Statement (EIS) for projects which require a Federal permit, affect a registered historic site, or involve Federal funds;
- State review for "consistency" with Coastal Zone Management (CZM) goals and objectives for major Federal actions and permits in the CZM area;
- State Underground Injection Control Regulations which control the injection or placement of wastewaters;

- State Permit for Work in Shallowwaters of State required for filling, dredging, construction, or placement of structures in shallowwaters;
- State Conservation District Use Permit for projects within areas zoned Conservation District;
- State Historic Site Review for projects which may affect designated (or eligible for designation) State or Federal historic sites;
- State EIS for major projects significantly affecting the quality of the environment, and for actions involving State or County lands or funds, historic sites, and for projects impacting shoreline or coastal ecosystems;
- State Board of Agriculture permit for importation of certain non-indigenous species;
- State Shellfish Sanitation Certificate required for growing, harvesting, packing or shipping oysters, clams, and mussels;
- County Special Management Area Permit for aquaculture operations determined to result in a significant environmental impact;
- County Grading Permit required for major land clearing projects; and
- County Shoreline Setback Variance required for projects involving disturbances or construction in the zone beginning at the highest wash of the waves and extending 20 or 40 feet inland.

AGRICULTURAL LAND SUPPLY

Regarding the supply of land, an enormous supply of prime agricultural land has been freed from sugar and pineapple production. On Oahu, Oahu Sugar Co., Ltd. freed about 4,200 acres of agricultural land from sugar production in 1982 and 1983, and Waihin Sugar Co. on the north shore of Oahu recently released about 1,400 acres from sugar. On Kauai, Lahu Plantation Co. recently released 1,700 acres from sugar production. On the Big Island, 15,640 acres were released by the closing of Puna Sugar Co. Considerable land also was made available to diversified agriculture as a result of previous reductions in sugar acreage: 3,000 acres released on Oahu in 1971 with the closing of Kilauea Plantation Co.; 12,000 acres released on Kauai in 1971 with the closing of Kilauea Sugar Co.; 4,300 acres released in 1975 with the closing of Kolohe Sugar Co. (Punch, Hawaii's Sugar Industry, HSP A, Hawaii Agricultural Reporting Service).

Also, at least 19,000 acres of land have been freed from pineapple production over the last two decades: 11,000 on Oahu, 7,500 on Kauai, and over 5,000 on Molokai and Lanai (Hawaii Agricultural Reporting Service).

Some of the land freed from sugar and pineapple production has or will be converted to urban, diversified-agriculture, and aquaculture uses. Also, some of the land freed from pineapple use on Oahu was converted to sugar production. Making allowances for the various conversions, uncommitted acreage which remains available to diversified agriculture and aquaculture amounts to many tens of thousands of acres, with a large share of this on Oahu. Furthermore, this supply probably will increase given the unfavorable outlook for sugar prices. In fact, some unprofitable mills remain in operation temporarily only because of lease and/or energy agreements. Furthermore, some plantations continue as land-holding operations with their lands available for other uses when and if profitable activities arise.

Many of the lands freed or to be freed from sugar and pineapple production have excellent agricultural qualities and climatic conditions, and are well suited for crop and aquaculture production. Also, water is available for many of these lands, especially lands freed from sugar production. However, some of these lands are at high elevations where pumping costs are relatively high.

Further, some additional land has been or will be made available to diversified agriculture in government-sponsored agricultural parks throughout the State.

Even though considerable agricultural land is available, it should be noted that the supply of parcels for small-scale farmers is limited. This is partially because of County regulations which require electrical power, paved rather than gravel roads, and buried rather than surface water lines. These requirements are appropriate for rural estates, but are unnecessary for agricultural use of the lands. The added expense for these items make it uneconomical for large land owners to subdivide their land into small agricultural lots.

Of interest, there is also a large supply of fallow agricultural land on the mainland. This supply is expected to increase given genetic engineering advances which give promise of developing crops having higher yields, increased resistance to diseases and pests, and increased tolerance to climatic variations. Thus, increasing demand for agricultural land in Hawaii as a result of land shortages on the mainland should not be expected since mainland land shortages are not expected.

CONCLUSION

It is extremely doubtful that the Mokuleia development will affect adversely the State-wide growth of diversified agriculture or aquaculture, either immediately or in the long term. This conclusion derives from the following: in enormous amount of

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prime agricultural land and water has been freed from sugar and pineapple production in recent years (including much land on Oahu); there is a very real possibility that additional sugar acreage and water will be freed given the outlook for low sugar prices; and diversified agriculture and freshwater aquaculture will require a comparatively modest amount of additional land and water for expansion, particularly in the Mokuleia area given its particular conditions.

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APPENDIX H

ARCHAEOLOGICAL INVESTIGATIONS
AND
RECOMMENDATIONS
FOR
MOKULEIA, O'AHU

Prepared for
Mokuleia Development Corp.

Prepared by
Archaeological Consultants of Hawaii, Inc.

INTRODUCTION

At the request of Mr. K. Tim Yee, Archaeological Consultants of Hawaii, Inc. has conducted a preliminary archaeological investigation of approximately 2,800 acres of land at Mokualeia, Waialua District, O'ahu. This property includes the ahupua'a of Kealia, Kawaihapai and Mokualeia. The tax map listed parcels include TMK 6-8-02; 1,6,10,14; TMK 6-8-03; 5,6,11,15,16,17,19,30,31,33,34,35,39,40; TMK 6-8-08; 22.

The purpose of this report is to provide preliminary information regarding the existence of any archaeological resources within the project area, assess their significance, and, based on these data, to offer recommendations regarding their future treatment.

To this end, a brief field examination was conducted, archival sources reviewed and informant testimony collected. This last exercise was considered to be of particular importance to this report and especially so when one considers the size of the survey area, the limited scope of the present investigation, and the availability of individuals who have lived and worked on the property for more than thirty years.

ARCHAEOLOGICAL INVESTIGATIONS

AND

RECOMMENDATIONS

FOR

MOKULEIA, O'AHU

Prepared for: Mr. K. Tim Yee
Mokualeia Development Corp.
1001 Bishop St. Suite 979
Honolulu, Hawaii

Prepared by: Joseph Kennedy
Archaeological Consultants
of Hawaii, Inc.
3060 Huelani Dr.
Honolulu, Hawaii

PHYSICAL SETTING

The subject property, nearly 2,800 acres, spreads from sea level to almost 1500 ft. Within this area, a wide variety of soil types are in evidence along with a number of differing land forms ranging from ocean front sandy beach parcels, across alluvial plains and up to steep mountain slopes. Named streams occur and run according to rainfall. Floral patterning on the property is also varied and includes cultivated sugar cane (*Saccharum officinarum*), baobab (*Adansonia digitata*), kiawe (*Prosopis pallida*), Christmasberry (*Schinus molle*), and a number of grasses and other introductions.

Much of the property has been subjected to post contact alterations that include farming and ranching activities and there can be little doubt that these developments have had a substantial impact on any above-ground archaeological sites that may have existed here.

At this writing, grazing by cattle and horses is in evidence and linked to Mokuleia and Crowbar Ranches. Modern dwellings associated with this ranching are scattered about the property and are serviced by roads, water tanks, the Kawaihapai Reservoir and a variety of other constructions.

PREVIOUS ARCHAEOLOGICAL WORK

The first archaeological examination of the Mokuleia area was conducted in the 1930's by Gilbert McAllister. He identified seven sites (# 190, 191, 192, 193, 194, 195 and 196) which are on or else very close to the subject property. Some of these sites have been destroyed.

190. Puu O Hekili. An *ahu*, or type of fishing shrine. At this stage, it is undetermined if this site was once within the limits of the subject property - although I think not. This site is not of particular concern as it's surface manifestation has long ago been destroyed and it's function suggests little opportunity for sub-surface data recovery. It is, however, important to list this site as it adds to the overall interpretation of the general area.

191. Kavalooa Heiau. Again, in the absence of a well-defined property boundary, it is difficult to determine if all, or a portion of this site rests within the limits of the property. Furthermore, it is still undetermined if surface remains of this religious structure, or any part of it, still exist. Nevertheless, sub-surface data recovery for this type has promise especially considering the report of associated *kahuna* haig or priests houses. McAllister reports that Kavalooa was an extensive two terraced structure paved with small stones.

192. Hidden Heaia. These consist of four springs which have important legendary associations with the Hawaiian diety Hiiaka. This site is clearly within the subject parcel.

193. Kuahea Fishing Shrine. Most likely contained on the property at one time. Nothing remains of it today and excavations at its former location would not be likely to yield anything of consequence.

194. Heiau Site. Well within the property limits. In Sites of Oahu (Summers and Sterling 1978), it was reported that this site has been destroyed. I am not so sure this is the case. Our partial field examination in the reservoir area, upon which this possibility is based, will be discussed in a later section.

195. Koa Fishing Shrine. Once contained within the property but now destroyed. Sub-surface excavation at former location is not recommended.

196. Village Site. This unnamed village is most likely outside the limits of the property but it's close proximity, undetermined boundary, and research potential combine to make this an area of considerable interest.

In sum then, McAllister's 1933 report lists seven sites for the area. Three of these sites (190, 193, & 195) have been destroyed and site function suggests that sub-surface excavation at their former location would be unnecessary. Three more sites (191, 194, & 196) hold unusual promise and more work is necessary to determine existence, exact location and extent. The remaining site is connected to Hawaiian mythological beliefs and needs further study.

The next archaeological work in the area was conducted by Robert J. Hommon in May of 1982. This reconnaissance covered five select areas some distance east of the subject property towards Waialua. Hommon lists nearly 30 sites of archaeological interest in the general area and added another as a result of his field investigations (site 50-80-04-3400).

It is worthwhile to quote directly from Hommon's report as his observations concerning the archaeology of the Mokuleia region are not without value to conclusions set forth later in this report.

The archaeological record including the in formation on destroyed sites indicates that in precontact times and during the 19th century the economic system in the project region included both wet and dry agriculture as well as aquaculture in at least two ponds. Little is known of the residential pattern... but the population was probably relatively dense, especially along the shore if we may judge from the number of religious sites (nine heiau and four known shrines and alters, now destroyed) that were recorded by McAllister.

(Hommon 1982:7)

In January of this year, William Barrera Jr. conducted an archaeological reconnaissance survey of the subject property. Briefly, Barrera presented word-for-word copies of McAllister's site descriptions and Handy's agricultural accounts; by admission made "...no attempt to locate any of the sites discussed by McAllister." The probable significance or research potential of these sites, and the current state of archaeological research in the Mokuleia area, i.e. what is known and what is needed, were not discussed.

Barrera listed only two sites for the entire area (one stone wall on the end of the ridge south of the Dillingham Ranch and another which is probably part of a historic paddock, southeast of the Kawaihapai Reservoir. There is no site location map in the report and therefore it is difficult to be certain where these sites actually are. For instance, is his 'stone wall' 100 meters SE of the reservoir, just next to it, or some farther distance in the direction of the Kaula Mountains? I believe the stone wall he refers to is the same one that, if followed to term, leads to a set of two platforms that may well be the once-thought destroyed 194 heiau site recorded by McAllister.

In any case, these platforms were missed in his preliminary survey and, if we are talking about the same stone wall, occasioned the mislabeling of it as part of a historic paddock. It would be difficult to believe that more above ground sites are not contained within the study area, although I do agree with Barrera that the number is likely to be low due to the operation of heavy equipment and other ranch/agricultural activity.

Barrera cannot be faulted for not locating every site on a 2,800 acre piece of property in a short two days; however, it is quite clear that a much more detailed survey must take place before one could even consider making the pronouncement that there are only two sites "...of possible archaeological or historical interest" (Barrera 1986:5) on the property.

This problem is compounded by Barrera's own Conclusion section in which he demonstrates an awareness of "...the likelihood that sub-surface evidence of agricultural practices is present on the property," and that previous work "...strongly indicate that habitation sites were present in the vicinity." (ibid). These sites, or the possibility of their existence need to be addressed.

Also, the possibility of maika burial caves (there are documented accounts of such sites in an almost identical environmental setting not more than one mile away), sand burials in the Makai section and heiau-associated burials are additional archaeological areas requiring further research.

METHODOLOGY

Given the short duration of this preliminary study, (two field days), and the realization that full reconnaissance of the entire 2,800 acres would be impossible in that time, it was decided that the most practical approach toward a meaningful overview of the archaeological potentials on this property would involve a heavy reliance on information provided by individuals who have lived and worked on or near the property for the past 30 years.

Mr. Jamie Dowsett and Mr. Tommy Ah Choo of Mokuleia Ranch were most helpful in terms of discussion and taking me directly to places of archaeological interest. With the help of these two individuals and in the company of one assistant, I visited a number of selected spots around the property and was able to familiarize myself with the variety of ecological settings.

No archaeological report can be complete without a complete review of like-work on the property in question and in the immediate area. Accordingly, the archaeological library at the Department of Land and Natural Resources was consulted for archival information as was the State of Hawaii Survey Office, where, with the help of Mr. Charlie Okino, I was able to inspect the J.S. Emerson map of the area, drawn in 1887. At the archaeological library, with the help of Mr. Earl Neller and Agnes Griffin, I was able to review McAllister's 1933 survey report and in particular the section dealing with Mokuleia. In addition, I was able to review the work of Honmon (1982) and Barrera (1986). Other material consulted was Summers and Sterling's *Sites of Oahu* (1978), and Foote et al. (1972). I was also able to locate a site map prepared by the State of Hawaii entitled *Kaena Point State Park Conceptual Plan* which gives approximate locations of archaeological sites on the subject property.

From the above sources in combination with the informant testimony and brief field inspection, I was able to arrive at what I believe to be reasonable and documented conclusions concerning the archaeological potentials on this particular piece of property and offer recommendations that will hopefully insure the proper treatment of cultural resources in this portion of Mokuleia.

RECOMMENDATIONS

After a brief field inspection, the collection of informant testimony, review of archival maps and documents and a reasonable overview of what is known and what still needs to be known regarding Mokuleia, I present the following recommendations.

To begin with, it is important to realize that Mokuleia represents a near blank spot on the archaeological map of O'ahu. McAllister's initial inspection of the area in the 1930's was a good starting point (basic discussion of what sites remained in the area at that time, and a partial list of what had been destroyed); however, it is important to recall that this survey was conducted more than 50 years ago and the advance of archaeological techniques (e.g. radioisotope dating methods and obsidian hydration dating) together with a clearer understanding and definition of the important issues in the interpretation of Hawaiian prehistory, make it essential that substantive follow-up take place.

From this report and the early work of E.C.S. Handy, we do know that Mokuleia was a locus of substantial prehistoric activity and that a considerable amount of this activity centered around terrace agriculture. It is quite clear, I believe, that the development and intensification of agriculture (particularly taro) and the study of this process, is one of the chief indicators of archaeological interpretation in Oceania. In Hawaii, the key to the development and rise of the Chiefly state may well rest in the excavation and interpretation of buried taro terraces. It is important to recall that valuable information may remain underground well after visible above-ground manifestations have disappeared.

At this writing, we have no dates whatsoever for this region of O'ahu and all indications point to Mokuleia as being especially fruitful in this area. Beyond this, the number of religious sites in the area (and most likely habitations sites to go along with them) make the area all the more attractive.

If all this we not enough, tax records indicate no less than 34 Grants for the subject property and so we may be able to learn quite abit about the protohistoric transition period (a subject that has already produced magnificant results in nearby Anahulu Valley).

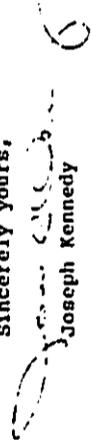
As evidenced earlier in this report, there is also some question as to the extent of remaining above-ground archaeological sites and the true location of those that do remain. Neither Barrera's report or this, or both in combination are sufficient to make an adequate judgement.

Based on the information listed above, I think it important that prior to actual development:

1. A more complete survey be conducted on the subject parcel. This survey should be directed at the presentation of data that would locate and map all known sites (fixing their exact location on a workable map). In addition, representative areas at least, should be surveyed intensively to insure the protection of unknown, but not unexpected additional sites.
2. In addition to this surface survey, a systematic sub-surface examination of representative areas should be undertaken in order to assess the extent and potentials of buried deposits, especially in the agricultural areas outlined in McAllister and Handy. This exercise should be designed to collect soil profiles and, if possible, material that can be subjected to dating techniques.
3. Ethnohistoric and archival material (including tax and Mahele records) should be examined with research questions clearly stated in advance.
4. A final report should be prepared to present the results of the aforementioned recommended activity and this report should conform to the standards for intensive or Phase II survey as issued by the Society for Hawaiian Archaeology.

If there are any questions relating to this report, please feel free to contact me. Until then, I am,

Sincerely yours,


Joseph Kennedy

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APPENDIX I

BIOLOGICAL SURVEY
PROPOSED MOKULE'IA PROJECT
MOKULE'IA, WAI-A-LUA DISTRICT, O'AHU

Prepared for
Mokuleia Development Corp.

Prepared by
Char & Associates
Botanical/Environmental Consultants

June 1986

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BIOLOGICAL SURVEY

PROPOSED MOKULE'IA PROJECT

MOKULE'IA, WAI-A-LUA DISTRICT, O'AHU

by

Winona P. Char
George K. Linney

CHAR & ASSOCIATES
Botanical/Environmental Consultants
Honolulu, Hawaii

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INTRODUCTION

Northwestern Mutual Life Insurance Company, through its Mokuleia Development Corporation, proposes to develop a "free-standing" recreational resort community on its property at Mokule'ia, Wai-a-lua District, Island of O'ahu. The company acquired some 3,000 acres of land from the Dillingham family and proposes to develop roughly 1,000 acres. Tentative plans call for several resorts, residential areas, and condominium units, as well as a small commercial area and two (2) golf courses.

The area proposed for development has long been used for grazing cattle and horses. Traces of an earlier macadamia nut planting can still be seen near the Nike road gate. Sugar cane fields lie on both sides of the project area.

Elevation on the project site ranges from a few feet above sea-level to about 520 feet in the Kapuna Gulch section in the back of the project area. Rainfall is roughly 20 inches per year along the coastal areas and about 30 inches per year further inland on the upper sections of the project area. Habitats range from beach or strand environments to lowland, dry forest environments.

A survey to inventory and describe the major terrestrial plant and vertebrate animal communities found on the project area was conducted on 24 and 25 May 1986.

TERRESTRIAL BOTANICAL SURVEY

No prior record has been found of any extensive botanical survey of the coastal lowlands in or near Mokule'ia. Five projects have been

proposed in the area since environmental assessment has been required. Of these, only the first, a proposal by the Warren Corporation (1973) to mine sand in what is part of the present study area. Generated a full Environmental Impact Statement. A copy of this EIS has not been seen, but review comments indicate that a botanical survey was done, though with some deficiencies noted by Ruth Gay (Botany Department, Univ. of Hawaii).

An Environmental Assessment was prepared (Anonymous, 1976) for a proposed agricultural subdivision of tax key parcels 6-8-06: 01, 09, 14, and 33. For this report only the briefest of floral surveys was made. In its broadest form, it correctly conveys the general aspect of the flora, but there is no check list of species and problems with some of the identities of specific plants listed only by common names arise.

The remaining three projects did not require botanical surveys.

Two detailed floristic studies (Hatheway 1952; Wirawan 1972) have been conducted on a remnant dry forest located on the slopes of a hill in Kapuna Gulch at about 1,180 feet elevation. This area is located on the former Dillingham ranchland just outside the Mokule'ia Forest Reserve fence. It is not in the area proposed to be developed. Hatheway (1952) found that the forest contained 21 species of native trees with 'aulu (*Sapindus oahuensis*) being the most abundant. Two smaller shrubs found here, *Ma'olua* (*Mercurialis angulata*) and *kulu'i* (*Nototrichium villoide*) are listed by the U. S. Fish and Wildlife Service (1980) in their review of endangered or threatened plants.

Wirawan (1972) conducted a survey of Hatheway's plots 20 years later and found most of the species listed by Hatheway. He found the plants in the Kapuna Gulch plot maintaining their populations.

Kapuna (1980) conducted an intensive ecological study of the dry and mesic forests in nearby Pahole Gulch. His study area is located in the forest reserve outside the project area.

Survey Methods

Prior to undertaking the survey, a search was made of the pertinent literature to familiarize the investigators with previous studies conducted in the area.

Existing topographic maps were examined prior to field work to determine access, terrain characteristics, and potential logistical and technical problems which might be encountered during survey work. Later, a recent colored aerial photograph (1" = 1,000') was used to delineate the boundaries of the different vegetation types found on the project area.

An intensive walk-through survey method was used. Particular attention was focused on the less disturbed areas such as the strand and hillside vegetation. Access into the Kapuna Gulch section was by the paved Nike road. Access onto the other areas mauka of Farrington Highway was by paved and unpaved (4-WD) roads. The mauka (or beach) areas are easily accessible from the highway.

Species identifications were made in the field. Plants which could not be positively identified were collected for later determination in the laboratory and herbarium. Notes were made of the species present in each vegetation type. The species recorded are indicative of the time and environmental conditions under which the survey was conducted. A few of the woody annual species had already flowered and died when the survey work had started. A survey taken at a different season and under varying

environmental conditions would no doubt yield slight variations in the species list, especially of the annual species.

Description of Vegetation Types

Eight vegetation types or plant communities are recognized in the study area (Fig. 1). These are based on the species which dominate in a given locale and their structure. A look at the species list would convey little about the distinctiveness of each plant community, due to the general ubiquity of many of the species as trace elements at least. For this reason, in the treatment which follows, only the dominant components of each vegetation type (or otherwise noteworthy plants) are discussed. For the minor elements, reference should be made to the species list.

Certain areas have been excluded from the study. These are areas in current cultivation or landscaped areas adjacent to dwellings. Abandoned plantings and plants escaped from nearby excluded plantings are included. Plants found on rights-of-way are also included because of their potential for undetected presence in, or for subsequent dispersal to, the adjacent study area.

1. Strand assemblage. In the unconsolidated sand of the beach, the dominant plant is naupaka-kahakai (Scaevola taccada), which forms extensive, low, windswept stands, especially on the top of the dune. Only two species extend down the face of the dune toward the water--the exotic Bermuda grass (Cynodon dactylon) and the native beach morning-glory (Ipomoea brasilienensis). Three native plants share the top of the dune with naupaka-kahakai. They are the 'akoko (Euphorbia degeneri), pohihilli (Vigna marina), and

pohinahina (Vitex ovata). The 'akoko is found only near the western-most section of beach within the study site, adjacent to a bench park and heavily traveled by vehicles. The largest patches of pohinahina are found at the eastern-most section of beach, which is relatively remote and little-used. Pohihilli is scattered along the entire length of beach. In addition, New Zealand spinach (Tetragonia tetragonoides) is common throughout.

Where there are not trees immediately behind the beach, the dune-type vegetation extends for some length. In these areas, the back dune vegetation is much richer in both native and exotic species. Most of these are annuals or small, non-woody perennials. Larger shrubby plants are represented mainly by Pluchea indica, Pluchea odorata, and the natural hybrid of the two, Pluchea x fosbergii. Small Christmas berry shrubs (Schinus terebinthifolius) are rare in this zone and are usually found growing among Pluchea or naupaka-kahakai. The ground is covered to a greater or lesser degree by Bermuda grass, New Zealand spinach, 'ilima (Sida fallax), Australian saltbush (Atriplex semibaccata), alena (Boerhaavia diffusa), and pau-ohi'iaka (Jacquemontia sandwicensis). Other major components are golden crownbeard (Verbesina encelioides), weedy heliotrope (Heliotropium procumbens), bur clover (Medicago polymorpha), yellow sweet-clover (Heliotus officinalis), Chenopodium murale, false mallow (Halvastrum coronadellianum), and Spergularia marina. Relatively minor components, which usually are more common farther inland, are wild tomato (Lycopersicon pimpinellifolium), Asystasia gangetica, bristly foxtail (Setaria verticillata), scarlet-fruited passionflower (Passiflora foetida), and hairy merremia (Merremia aegyptia). A couple of noteworthy native plants, huna-kai (Ipomoea stolonifera) and Fihihihi (Polypodium pycnanthum), are found in this

vegetation type, though they appear to be quite rare. Both are fairly characteristic constituents of the strand flora, whose rarity may be attributed to long disturbance by man.

2. Maritime wooded assemblage. Farther back from the beach, or where trees come down to the beach, strand vegetation gives way to plants more common in the dry lowlands. Within the study area, the only tree that tolerates exposure to the elements, especially salt spray, and thrives at the beach is ironwood (Casuarina equisetifolia). It is widely planted and also comes up spontaneously from seed. Although not common, seedlings of another exotic tree, the tree heliotrope (Messerschmidia argentea) can also be found. It is planted in the beach parks adjacent to the study area. Under the ironwood trees the ground is usually littered with fallen "needles," and a few scattered plants of Chenopodium murale may be present.

Away from the trees other plants increase. The vegetation may take three forms--thicket, scrub, or grassland. Thickets are of two kinds: a dense thicket composed of either Pluchea or Christmas berry (Schinus terebinthifolius) which is so dense that little else can grow among or under them, and a semi-open thicket composed of koa-haole (Leucaena leuccephala), which supports a large number of other plants beneath. Around the margins and in openings, Asystasia gangetica and wild tomato (Lycopersicon pimpinellifolium) predominate. The wild tomato is especially noteworthy, as it is frequently a minor component of coastal vegetation types, but it has never been observed as a major component before. Its predominance can be attributed to fruit-eating birds common in the area, especially the red-vented bulbul. This is supported by the almost total

lack of any other berryed plant in the vicinity that would support such large numbers of birds. Other plants of the open areas in and around thickets are milo (Thespesia populnea), castor bean (Ricinus communis), and Lantana (Lantana camara). A number of vines can be found covering the thicket plants; these include wild bittermelon (Momordica charantia), manna-loa (Canavalia cathartica), koali-'avalia (Ipomoea indica), Phaseolus atropurpureus, Phaseolus lathyroides, and passion fruit (Passiflora edulis). Two additional vines deserve special mention. The exotic Calopogonium mucronoides festoons trees and shrubs in the eastern portion to such an extent as to suggest a potential noxious weed problem. The native kupala (Sicyos microcarpus) similarly festoons trees throughout the study area. It is, however, a winter annual that dies in the spring and summer and does not return until the winter rains of the next season. It poses no threat to other vegetation.

There is no assemblage of plants unique to the thickets, only subsets of the vegetation of the surrounding area, tolerant of the proximity of the sea on the one side, and of the dense shade of the trees on the other. As stated earlier, the only large trees of the area are ironwood (Casuarina equisetifolia). Several shorter-statured tree species found in this community include isolated individuals of klave (Prosopis pallida), Chinese banyan (Ficus microcarpa), monkeypod (Gymnocoma sapan), and 'opiuma (Pithecellobium dulce). Several clumps of coconut (Cocos nucifera) remain in places from former plantings. The greatest diversity of trees is found at the eastern end of the study area.

Only koa-haole forms extensive scrub and thickets, while Christmas berry and Pluchea form fairly small, localized thickets, especially in

the western end of the area. A single plant of 'awouwe (Chenopodium oahuense) was found in the undergrowth of a koa-hoole thicket. This is a species characteristic of the sea cliffs behind Moku'e'ia. It is totally unexpected so near the beach. Perhaps some centuries ago, when the islands were still somewhat pristine, it normally occurred all the way down to the beach.

Where koa-hoole is more open, it produces a scrub which grades into grassland with a further decrease in woody cover. In the scrub areas ku (Acacia farnesiana) occurs as an occasional woody shrub. A number of herbs characteristic of the more upland sites are found where the scrub cover is sufficiently open. These include rattlesnake (Crotalaria mucronata), orange lion's-ear (Leonotis nepetalifolia), 'iima (Sida acuta), cheeseveed (Malva parviflora), and wild cucumber (Cucumis dipsaceus).

In places where the woody species do not predominate, Guinea grass (Panicum maximum) and sour grass (Trichane insularis) form grasslands. These are not extensive and grade into, or alternate with, scrub and thicket. In a few places Napier grass (Pennisetum purpureum) forms brakes or small stands, especially where fresh water is at least seasonally abundant. In drainage areas with running water, California grass (Brachiaria mutica) grows in a narrow band adjacent to the water's edge. Wetland areas are discussed in detail in the following section.

1. Wetland areas. These are areas adjacent to standing fresh or slightly brackish water--ponds and drainage ways--whether near the beach or farther inland. Ordinarily they would be expected to have a unique flora of their own, but this is not the case in the study area, as these wet areas have

have been greatly modified by man. The pond areas are former borrow pits from sand mining operations. For the most part, the vegetation in these wetland areas consists of those plants already growing in the adjacent communities, though usually much more lushly than nearby. There are, however, a few plants characteristic of wetland areas. Four species requiring the presence of more or less abundant water are restricted to these areas: cattail (Typha latifolia), umbrellagrass (Cyperus alternifolius), 'aka'akai (Scirpus validus), and primrose willow (Ludwigia octovalvis). In addition, a number of weedy or escaped ornamental species are present in low numbers only around these wet areas.

4. Pasture areas. The vegetation of these areas has been modified by the introduction of range grasses and some legumes for forage and by the grazing of horses and cattle. In addition, a number of weedy plants have also found their way into these areas. In the upper areas the primary forage grass is Guinea grass (Panicum maximum). In the lower areas it is California grass (Brachiaria mutica). Other grass species were found to be more restricted. Hilo grass (Paspalum conjugatum) forms extensive mats in only one area to the east of the Dillingham house, where it occupies a fringe between the maintained lawn of St. Augustine grass (Stenotaphrum secundatum) and an under-grazed paddock of California grass and Caluca grass. Rhode's Grass (Chloris gayana) and kikuyu grass (Pennisetum clandestinum) are found only in the lower portions of the project site, adjacent to areas where horses are worked regularly. Buffel grass (Cenchrus ciliaris) is widely distributed but is not common. Seeded fingergrass (Chloris inflata) and Bermuda grass (Cynodon dactylon) are so common in heavily grazed areas that

their absence would leave the ground largely bare except for scattered shrubs. The Bermuda grass usually occurs in areas where the soil is deeper and retains water during the rainy season; swollen fingergrass occurs in thin, rocky soil, which drains quickly and which supports little else. Patches of sour grass (Triticum inularis) are widespread but do not predominate in open pasture. Goose grass (Elymus indica) is a minor component where the soil has been compacted by vehicular traffic, as along jeep trails.

Besides the grasses, which are the most salient feature of the pasture areas, a number of other plants are significant members of the community. Among the woody plants are kiawe (Prosopis pallida) and Java plum (Syzygium cumini), which occur as scattered individuals, kiawe on the lower, flatter areas, and Java plum on the upper, sloping areas. Klu (Acacia farnesiana) and koa-haole (Leucaena leucocephala) form a very open scrub throughout. In the upper sections of the study area, guava (Psidium guajava), Chinaberry (Melia azadirachta), and silk oak (Grevillea robusta) are occasional. Silk oak becomes much more common on the slopes above the study area. In the area just to the west of the Dillingham house is the remnant of an old macadamia nut (Macadamia ternstroemia) orchard.

A large number of herbaceous plants are to be found in the pastures. Several degrade the quality of the pasture and, as they are avoided by the animals, they tend to take over when the more desirable plants are overgrazed. These highly undesirable plants are spiny amaranth (Amaranthus spinosus), cocklebur (Xanthium strumarium), Solanum apple (Solanum sodanum), lantana (Lantana camara), and an as yet undetermined species of Malvaceae. All of these, except the unknown species, are spiny and quite undesirable

for that reason alone. In addition, however, a number of them are more or less toxic. Other woody species avoided by the grazing animals include false ragweed (Eranthis strigosa), common along waysides and apparently strictly avoided; Golden crownbeard (Verbesina encelioides), which is highly malodorous; European centaury (Centaurium umbellatum), abundant but still a minor constituent because of its small size; and orange lion's-ear (Leonotis nepetifolia).

5. Leucaena scrub. These are areas in which the koa-haole (Leucaena leucocephala) are taller, up to five or six meters tall, and whose crowns meet to form a more or less closed canopy. An infestation of a recently introduced psyllid species (Heteropsylla pos. incisa) has severely damaged koa-haole plants in the islands. Apparently, plants in marginal habitats have even been killed. While large areas of koa-haole scrub on the study site are damaged, it was observed that koa-haole was thriving in several places. Closer examination found high numbers of ladybird beetles (Coccinellidae), which were apparently reducing the psyllid infestations.

Often the areas covered by koa-haole are boulder-strewn. Panic grass (Panicum maximum var. trichoglume), a forage grass, is associated with the koa-haole scrub. It does not seem to do as well in the open. Generally, the closed canopy and solid grass-cover do not allow other plants to establish or persist, except where overgrazing, trampling, or other disturbance opens the ground cover. A native species which seems to do well in this vegetation type is the 'lilie' (Plumbago zeylanica). It is found in boulder-strewn or almost barren rocky areas under the koa-haole scrub. In some areas, the panicgrass has been completely replaced by sour

Grass (Tricachne insularis), apparently due to severe overgrazing. Animals find this grass unpalatable, a point emphasized by the common name of "sour grass." This is particularly noticeable along the Nike road, but it is seen to a lesser degree elsewhere. Where the ground cover has been removed or reduced by disturbance of various kinds, a large number of weedy species have come in.

6. Prosopis woodland. Kiawe (Prosopis pallida) is scattered throughout the study area, but in only two areas does it become a major component. One area is a mixed scrub/forest near the western extreme of the upland portion, the other is an almost pure stand just to the west of the Nike road. In the lower reaches it is clearly an artificial stand with the trees planted in rows. Kiawe wood is harvested in this area. In the upper areas of the project site, the canopy opens up considerably, and the orderly planting of trees is not apparent. At the very top of the study site, the woodland is quite scrubby with koa-haole (Leucaena leucocephala).

In the scrubby areas, it is little different from the preceding Leucaena plant community type. In pure stands, however, it is a distinct community. The canopy is fully closed, but the small leaves of Prosopis admit a great deal of light. There is no formal understory, though koa-haole, Pluchea odorata, lantana (Lantana camara), and Christmas berry (Schinus molle) are scattered here and there. The ground is completely covered with Guinea grass (Panicum maximum) and scattered clumps of sour grass (Tricachne insularis). Along the very bottom margin of the woodland, the most common weed is purple lion's-ear (Leonotis leonurus), a plant not found elsewhere in the study area. Barbash (Triumfetta semitriloba) is

similarly restricted to this woodland but is not very common. Along the jeep roads the same assortment of weeds found in adjacent pasture and scrub are also encountered.

7. Stream bottoms. This vegetation type is of very limited occurrence in the study area. It is also a woodland, extending down the length of every stream with significant seasonal flow, though seldom greater than thirty meters in width. The predominant tree is Java pine (Syzygium cumini), which forms an almost completely closed canopy. What gaps there are in the canopy are filled with kukui (Aleurites moluccana). Williwil (Erythrina sandwicensis), a native tree, is occasional; seedlings and saplings of williwil are found in a number of even the smallest dry streambeds in pasture areas. Although large williwil trees may be found in the upland pasture areas, the very largest trees occur in the stream bottom woodlands.

Two ferns characteristic of stream bottoms are also found here, though the streams are almost too dry to support them during the summer months. They are Blechnum occidentale and downy woodfern (Ciristella parasitica). Flowering plants usually found in this type of habitat include pasakani (Eupatorium riparium), Colombian cuphea (Cuphea carthagenensis), and taro (Colocasia esculenta). In the back of the study area, where the foothills come down to the coastal plain, the influence of the streams can be seen on the hillsides immediately above.

8. Rocky hillsides. In many regards, these are the same as pastures. They do, however, have a number of species unique to them, which would not be expected in the pastures below. For the most part, the hillsides are rockier than the pastures, on steeper slopes, and less heavily grazed.

Shrubs are also more common. Among the species restricted to this community are two dryland ferns which prefer arid banks, Pteris caesia and the gold or silver fern (Pityrogramma calomelanos). Among the flowering plants, there are two native species characteristic of rocky areas. Hebe (Lipochacheta lobata) is locally fairly common along the foothills all the way to Ka'enu Point. 'Ala'ala-wai-nui (Peperomia leptostachya) is virtually restricted to thin pockets of soil on rocky ledges of the steep hillsides. Willuili (Erythrina sandwicensis), while seen occasionally in the pastures and stream bottoms below, is quite common on the hillsides, mostly just outside the study area, although they do extend down into the study area for a short distance. The only other native tree unique to this area is alahe'e (Cantium odoratum). This species was probably once a major component of the native lowland forests, which have largely been replaced by introduced vegetation. It is much more common at slightly higher elevations and, in fact, can be seen to be much more numerous on the slopes immediately above the study area. Two exotic species, Montanoa hibiscifolia and kakalaloa (Caesalpinia bonduc), characteristic of slightly wetter hillsides, are found in the back of the study area where it is more moist. Because of the slightly higher rainfall, Texas sage (Salvia coccinea) and ko'oko'olau (Bidens cf. amplectens) are also present at the very back of the study area. They are more common at higher elevations outside the project area.

Endangered Species

Within the study area no species designated as listed, proposed, or candidate threatened or endangered species (U. S. Fish and Wildlife Service 1980) by the federal and/or state governments were located. In only two

areas were significant occurrences of native plants found. The strand vegetation contains some significant native plants which would be worth preserving or even propagating as potential landscape plants. The hillside below the Mike road holds vestiges of the prehistoric lowland vegetation that probably once characterized this region. In neither case is the land in question particularly suited to development, the strand area coming under the Special Management Area, and the hillside area with slopes greater than 30 degrees. However, it is adjacent to land that could be developed, thereby bringing the plants into jeopardy. On the other hand, neither of these vegetation types is at all pristine, and, as stated above, none of the constituent species is rare, threatened, or endangered, nor likely to be so in the immediate future.

Discussion and Recommendations

There are no plant communities or individual species located in the study site in need of protection. That is not to say that some measure of care should not be exercised if the two areas mentioned above are to be developed. There does not seem to be any botanical impediment to the development of the study area. It has a long history of use and alteration, and little of botanical value remains. All vegetation types on the project area, with the exception of the strand, are dominated by introduced (or exotic) plant species. If development does proceed, it is recommended that landscaping be done, as far as practical, with native plants adapted to the environment. With sufficient leadtime, they can be had as easily as the more overworked and poorly suited landscape plants usually encountered. They should cost no more to procure and less to maintain, and quite a few are of considerable ornamental merit (Fig. 2).

A number of botanic gardens and arboreta in the state, such as the Honolulu Botanic Gardens, Kaima Arboretum, Lyon Arboretum, and Haul Zoological and Botanical Garden, have successfully employed native lowland species in their landscaping and displays. There are also a number of nurseries which specialize in native species.

Plant Species Check List, Mokuleia Project, Oahu

In the plant species list, families are arranged alphabetically within each of the four groups: Ferns, Gymnosperms, Monocotyledons, and Dicotyledons. Taxonomy and nomenclature of the Ferns follows Lamoureux (manuscript in preparation). Taxonomy and nomenclature of the Gymnosperms and flowering plants (Monocotyledons and Dicotyledons) follow St. John (1973) except where more recently accepted names are used. Hawaiian names used are in accordance with Potter (1972) or St. John (1973). The following information is given:

1. Botanical name with author citation.
2. Common English or Hawaiian name, when known.
3. Biogeographic status of the species. The following symbols are used:
 - E = endemic = native only to the Hawaiian Islands
 - I = indigenous = native to the Hawaiian Islands and also to one or more other geographic areas
 - P = Polynesian = plants of Polynesian introduction; all those plants brought by the Polynesian immigrants prior to contact with the Western world
 - X = introduced or exotic = not native to the Hawaiian Islands; brought here intentionally or accidentally after Western contact.
4. Vegetation types. Eight vegetation types are recognized on the project area and are discussed in detail in the text. The number heading each of the columns refers to the following vegetation types:

- 1 = Strand assemblage
 - 2 = Maritime wooded assemblage
 - 3 = Wetland areas
 - 4 = Pasture areas
 - 5 = Leucaena scrub
 - 6 = Prosopis woodland
 - 7 = Stream bottoms
 - 8 = Rocky hillslides
5. Within each of the vegetation types, the relative abundance of each species or its absence (-) is given. These ratings reflect the abundance of the particular species within the project area and are not applicable to areas outside the project. The following symbols are used:
- A = abundant = the major or dominant species in a given vegetation type
 - C = common = distributed throughout a given vegetation type in large numbers
 - L = localized distribution = found in patches where it may occur in large or small numbers in a given vegetation type
 - O = occasional = distributed throughout a given vegetation type in moderate numbers
 - U = uncommon = observed infrequently, not more than 10 times in a given vegetation type
 - R = rare = observed 1 to 10 times in a given vegetation type
 - S = seasonal = present part of the year, absent part of the year

Scientific name	Common name	Status	Vegetation types							
			1	2	3	4	5	6	7	8
DICOTYLEDONS										
ACANTHACEAE (Acanthus Family)										
<i>Asystasia gangetica</i> (L.) T. Anders.	asystasia	X	R	C	LC	-	-	-	C	-
AIZOACEAE (Carpetweed Family)										
<i>Tetragonia tetragonioides</i> (Pallas) Ktze.	New Zealand spinach	X	A	C	-	-	-	-	-	-
AMARANTHACEAE (Amaranth Family)										
<i>Achyranthes aspera</i> L.	khaki weed	X	R	U	U	U	C	C	U	C
<i>Alternanthera pungens</i> HBK.		X	-	C	-	U	-	-	-	-
<i>Alternanthera</i> sp.		X	-	-	-	R	-	-	-	-
<i>Amaranthus spinosus</i> L.	spiny amaranth,									
	pakai-kuku	X	U	C	C	A	C	C	C	C
<i>Amaranthus viridis</i> L.	slender amaranth	X	-	U	-	-	-	-	-	-
<i>Gomphrena celosioides</i> Mart.	weedy gomphrena	X	-	LC	-	-	-	-	-	-
ANACARDIACEAE (Mango Family)										
<i>Mangifera indica</i> L.	mango	X	-	-	U	U	-	-	-	-
<i>Schinus terebinthifolius</i> Raddi	Christmas berry	X	U	LC	U	U	U	U	C	U
APOCYNACEAE (Periwinkle Family)										
<i>Catharanthus roseus</i> (L.) G. Don	Madagascar periwinkle	X	-	-	R	-	-	-	-	-
BIGNONIACEAE (Signonia Family)										
<i>Spathodea campanulata</i> Beauv.	African tuliptree	X	-	R	R	O	C	C	C	O
BORAGINACEAE (Heliotrope Family)										
<i>Heliotropium anomalum</i> H. & A. var. <i>argenteum</i> Gray	hinahina-ku-kahakai	E	U	-	-	-	-	-	-	-
<i>Heliotropium procumbens</i> P. Mill.	weedy heliotrope	X	C	C	U	U	-	-	-	-
<i>Mosserschmidia argentea</i> (L. f.) Johnston	tree heliotrope	X	R	-	-	-	-	-	-	-
CACTACEAE (Cactus Family)										
<i>Opuntia megacantha</i> Salm-Dyck	panini	X	-	-	-	-	-	-	-	R
CARICACEAE (Papaya Family)										
<i>Carica papaya</i> L.	papaya	X	-	R	R	-	-	-	-	-

Scientific name	Common name	Status	Vegetation types							
			1	2	3	4	5	6	7	8
CASUARINACEAE (Ironwood Family)										
<i>Casuarina equisetifolia</i> L.	ironwood	X	C	C	C	-	-	R	-	-
CHENOPODIACEAE (Goosefoot Family)										
<i>Atriplex semibaccata</i> R. Br.	saltbush	X	C	U	-	-	-	-	-	-
<i>Chenopodium ambrosioides</i> L.	Mexican tea	X	-	-	LC	-	-	-	-	-
<i>Chenopodium murale</i> L.		X	C	C	C	LC	-	-	-	-
<i>Chenopodium oahuensis</i> (Neyen) Aellen	'auaeveo	E	-	R	-	-	-	-	-	-
COMPOSITAE (Sunflower Family)										
<i>Ageratum conyzoides</i> L.	ageratum	X	-	U	U	U	U	U	U	C
<i>Bidens cf. amplexans</i> Sherff	Ko'oko'olau	E	-	-	-	-	-	-	-	R
<i>Bidens pilosa</i> L. var. <i>pilosa</i>	Spanish needle	X	C	C	C	C	LC	LC	-	C
<i>Bidens pilosa</i> L. var. <i>minor</i> (Bl.) Sherff	Spanish needle	X	C	C	-	-	-	-	-	-
<i>Calypocarpus vialis</i> Less.	hierba del caballo	X	-	U	U	LC	LC	LC	-	-
<i>Conyza bonariensis</i> (L.) Cronq.	hairy horseweed	X	-	U	U	C	U	U	U	C
<i>Conyza canadensis</i> (L.) Cronq.	Canada fleabane	X	-	U	U	U	-	-	-	U
<i>Crassocephalum crepidioides</i> (Benth.) A. Moore	crassocephalum	X	-	U	U	U	U	U	-	U
<i>Eclipta alba</i> (L.) Hassk.	false daisy	X	-	U	-	-	-	-	-	-
<i>Emilia fosbergii</i> Nicolson	Flora's paintbrush	X	-	U	U	U	U	U	-	U
<i>Euphatorium riparium</i> Regel	pamakani	X	-	-	-	-	-	-	-	LC
<i>Franseria strigulosa</i> Rydb.	false ragweed	X	-	LC	LC	C	C	C	-	O
<i>Gnaphalium japonicum</i> Thunb.	cudweed	X	-	-	-	LC	-	-	-	-
<i>Lipochaeta lobata</i> (Gaud.) DC.	lipochaeta, nehe	E	-	-	-	-	-	-	-	LC
<i>Montanoa hibiscifolia</i> (Benth.) C. Koch.	montanos	X	-	-	-	-	-	-	-	R
<i>Pluchea indica</i> (L.) Less.	pluchea	X	U	U	U	U	-	-	-	-
<i>Pluchea odorata</i> (L.) Cass.	pluchea	X	U	C	O					
<i>Pluchea x fosbergii</i> Cooperrider & Galang	pluchea hybrid	X	R	R	R	-	-	-	-	-
<i>Sonchus asper</i> (L.) Hill	spiny sow thistle	X	C	C	U	-	-	-	-	-
<i>Sonchus oleraceus</i> L.	sow thistle	X	R	U	U	U	U	U	-	U
<i>Synedrella nodiflora</i> (L.) Gaertn.	synedrella	X	-	-	-	U	U	-	-	-
<i>Tridax procumbens</i> L.	coat buttons	X	-	C	-	U	U	U	-	U
<i>Verbesina encelioides</i> (Cav.) B. & H. ex Gray	golden crownbeard	X	-	C	C	C	C	C	-	C
<i>Vernonia cinerea</i> (L.) Less.	ironweed	X	-	U	U	C	C	C	-	C
<i>Xanthium strumarium</i> L.	cocklebur	X	-	U	-	C	C	C	-	C

Scientific name	Common name	Status	Vegetation types							
			1	2	3	4	5	6	7	8
CONVOLVULACEAE (Morning-Glory Family)										
<i>Ipomoea alba</i> L.	koali-pehu	X	-	R	-	-	-	-	-	-
<i>Ipomoea brasiliensis</i> (L.) Sweet	pohuehue	I	C	-	-	-	-	-	-	-
<i>Ipomoea cairica</i> (L.) Sweet	koali	I	-	R	-	R	R	-	R	-
<i>Ipomoea indica</i> (Burm.) Merr.	koali-'awahia	I	-	U	-	-	-	U	-	U
<i>Ipomoea obscura</i> (L.) Kar-Gawl	bindweed	X	-	C	-	-	-	-	-	-
<i>Ipomoea stolonifera</i> (Cyrill.) J. F. Gmel.	huna-kai	I	R	-	-	-	-	-	-	-
<i>Ipomoea triloba</i> L.	pink bindweed	X	-	-	LC	-	-	-	-	-
<i>Jacquemontia sandwicensis</i> Gray	pa'u-o-Hi'i'aka	E	C	C	-	-	-	-	-	-
<i>Nerremia aegyptia</i> (L.) Urban	hairy merremia									
	koali-kua-hulu	I	R	U	-	-	O	O	-	O
Unknown species		X	-	R	-	-	U	U	-	-
CRUCIFERAE (Mustard Family)										
<i>Coronopus didymus</i> (L.) Smith	wart cress	X	-	-	R	-	-	-	-	-
<i>Lepidium</i> sp.	peppergrass	X	-	U	U	U	U	U	-	-
CUCURBITACEAE (Squash Family)										
<i>Cucumis dipsaceus</i> Spach.	wild cucumber	X	-	R	-	O	O	O	-	-
<i>Momordica charantia</i> L. var. <i>pavel</i> Crantz	wild bitter melon	X	R	C	C	-	U	U	-	-
<i>Sicyos microcarpus</i> Mann	sicyos, kupala	E	-	SA	-	-	SO	O	-	U
EUPHORBIACEAE (Spurge Family)										
<i>Aleurites moluccana</i> J. R. & G. Forst	kukui	P	-	-	-	R	O	O	C	O
<i>Euphorbia degeneri</i> Sherff	'akoko	E	LU	-	-	-	-	-	-	-
<i>Euphorbia glomerifera</i> (Millsp.) L. C. Wheeler	spurge	X	-	-	-	-	-	-	-	C
<i>Euphorbia hirta</i> L.	hairy spurge	X	U	C	-	C	C	C	-	C
<i>Euphorbia prostrata</i> Ait.	prostrate spurge	X	-	U	-	-	-	-	-	-
<i>Phyllanthus debilis</i> Klein ex Willd.	phyllanthus	X	-	-	U	U	-	U	-	-
<i>Ricinus communis</i> L.	castor bean	X	U	C	C	C	C	C	C	C
GENTIANACEAE (Gentian Family)										
<i>Centaurium umbellatum</i> Gilib.	European centaury	X	R	U	-	C	C	C	-	C
GOODENIACEAE (Naupaka Family)										
<i>Scaevola taccada</i> (Gaertn.) Roxb.	naupaka-kahakai	I	C	U	-	-	-	-	-	-

Scientific name	Common name	Status	Vegetation types							
			1	2	3	4	5	6	7	8
LABIATAE (Mint Family)										
<i>Hyptis pectinata</i> (L.) Poit.	comb hyptis	X	-	C	C	C	C	C	C	C
<i>Leonotis leonurus</i> (L.) R. Br.	purple lion's-ear	X	-	-	-	-	LA	-	-	-
<i>Leonotis nepetaefolia</i> (L.) Ait.	orange lion's-ear	X	U	C	C	C	C	C	-	C
<i>Ocimum gratissimum</i> L.	wild basil	X	-	R	-	C	C	C	-	C
<i>Salvia coccinea</i> (Juss.) Murr.	Texas scarlet sage	X	-	-	-	-	-	-	-	LC
<i>Salvia occidentalis</i> Sw.	West Indian sage	X	-	R	-	-	-	-	-	-
<i>Stachys arvensis</i> L.	staggerweed	X	-	-	-	-	-	-	-	LC
LEGUMINOSAE (Pea Family)										
<i>Acacia farnesiana</i> (L.) Willd.	klu, huisache	X	R	O	-	C	C	C	-	C
<i>Albizia</i> sp.		X	-	-	R	-	-	-	-	-
<i>Caesalpinia bonduc</i> (L.) Roxb.	kakalaioa	I	-	-	-	-	-	-	U	U
<i>Calopogonium mucunoides</i> Desv.	calopogonium	X	-	LC	LC	-	-	-	-	-
<i>Canavalia cathartica</i> Thouars	mauna-loa	X	-	U	-	-	-	-	-	-
<i>Cassia bicapsularis</i> L.	senna	X	-	-	-	O	O	O	-	C
<i>Cassia lechenaultiana</i> DC.	partridge pea, lauki	X	U	C	-	C	C	C	-	C
<i>Cassia occidentalis</i> L.	coffee senna, milipalaoa	X	-	-	-	C	C	C	-	C
<i>Crotalaria mucronata</i> Desv.	rattlepod	X	-	U	-	C	C	C	C	C
<i>Desmanthus virgatus</i> (L.) Willd.	slender mimosa	X	-	U	-	C	C	C	-	C
<i>Desmodium canum</i> (Gmel.) Schinz & Thell.	Spanish clover	X	-	-	U	O	O	O	-	O
<i>Desmodium triflorum</i> (L.) DC.	beggarweed	X	-	-	-	-	-	-	-	U
<i>Erythrina sandwicensis</i> Deg.	wiliwili	E	-	-	-	O	O	-	U	LC
<i>Indigofera spicata</i> Forsk.	prostrate indigo	X	-	U	-	-	-	-	-	-
<i>Indigofera suffruticosa</i> Mill.	indigo, 'iniko	X	-	C	C	C	A	C	-	C
<i>Leucaena leucocephala</i> (Lam.) deWit	koa-haole, popinac	X	-	C	C	C	C	C	C	C
<i>Lotus</i> sp.	lotus	X	-	-	-	R	-	-	-	-
<i>Medicago polymorpha</i> L.	burclover	X	LC	LC	-	-	-	-	-	-
<i>Melilotus officinalis</i> (L.) Lam.	yellow sweetclover	X	LC	LC	-	-	-	-	-	-
<i>Mimosa pudica</i> L.	sleepinggrass, pua-hilahila	X	-	C	-	LC	C	C	-	C
<i>Phaseolus atropurpureus</i> DC.	wild bushbean	X	-	C	C	-	-	-	-	-
<i>Phaseolus lathyroides</i> L.	wild bushbean	X	-	C	C	C	C	C	-	C
<i>Pithecellobium dulce</i> (Roxb.) Benth.	'opiuma	X	-	LC	LC	-	-	-	-	U
<i>Prosopis pallida</i> (Humb. & Bonpl. ex Willd.) HBK.	kiawe, mesquite	X	-	C	C	C	C	A	-	C
<i>Samanea saman</i> (Jacq.) Merr.	monkeypod, rain tree	X	-	O	O	O	O	O	-	-
<i>Vigna marina</i> (Burm.) Merr.	pohilihili	I	U	-	-	-	-	-	-	-

Scientific name	Common name	Status	Vegetation types							
			1	2	J	4	5	6	7	8
LOGANIACEAE (Strychnine Family)										
Buddleja asiatica Lour.	dogtail, huslo-'ilio	X	-	-	R	-	-	-	-	-
LYTHRACEAE (Loosestrife Family)										
Cuphea carthagenensis (Jacq.) Macbride	Columbian cuphea	X	-	-	-	-	-	-	C	U
MALVACEAE (Hibiscus Family)										
Abutilon grandifolium (Willd.) Sweet	hairy abutilon	X	-	-	R	U	U	U	-	-
Hibiscus tiliaceus L.	hau	I?	-	R	R	-	-	-	-	-
Malva parviflora L.	cheeseweed	X	U	C	C	C	C	C	-	C
Malvastrum coromandelianum (L.) Garcke	false mallow	X	C	C	C	C	C	C	C	C
Sida acuta Burm. f.	'ilima	X	U	R	-	C	C	C	-	C
Sida fallax Walp.	'ilima	I	C	C	-	-	-	-	-	-
Sida angustifolia Lam.	sida	X	U	C	-	C	C	C	-	C
Thespesia populnea (L.) Soland. ex Correa	milo	P	R	U	R	-	-	-	-	-
Unknown species		X	-	LC	U	C	C	C	-	-
MELIACEAE (Mahogany Family)										
Melia azedarach L.	Chinaberry	X	-	R	-	O	O	O	R	-
MORACEAE (Fig Family)										
Ficus microcarpa L. f.	Chinese banyan	X	-	O	O	-	O	O	O	R
Ficus rubiginosa Desf.	Port Jackson fig	X	-	-	R	-	-	-	-	-
Ficus sp.		X	-	-	-	R	-	-	-	-
MYRTACEAE (Myrtle Family)										
Psidium guajava L.	guava	X	-	-	-	Lc	-	-	-	C
Syzygium cumini (L.) Skeels.	Java plum	X	-	U	-	C	C	C	C	C
NYCTAGINACEAE (Four-o'Clock Family)										
Boerhavia coccinea Mill.	boerhavia	X	-	R	-	-	-	-	-	-
Boerhavia diffusa L.	alena	I	LC	C	U	-	-	-	-	-
Mirabilis jalapa L.	four o'clock	X	-	-	-	-	-	R	LC	-
ONAGRACEAE (Evening Primrose Family)										
Ludwigia octovalvis (Jacq.) Raven	primrose willow, kanole	I	-	-	LC	-	-	-	-	-

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Scientific name	Common name	Status	Vegetation types							
			1	2	3	4	5	6	7	8
OXALIDACEAE (Wood Sorrel Family)										
Oxalis corniculata L.	yellow wood sorrel	I	-	C	C	C	C	C	C	C
PASSIFLORACEAE (Passion Flower Family)										
Passiflora edulis Sims	passion fruit	X	-	O	-	-	O	O	O	-
Passiflora foetida L.	scarlet-fruited passion-flower, pohapoha	X	R	C	-	-	O	O	-	O
PIPERACEAE (Pepper Family)										
Peperomia leptostachya H. & A.	'ala'ala-wai-nui	I	-	-	-	-	-	-	-	R
PLANTAGINACEAE (Plantain Family)										
Plantago lanceolata L.	common plantain	X	-	C	U	U	U	U	-	-
Plantago major L.	narrow-leaved plantain	X	-	C	C	C	C	C	-	-
PLUMBAGINACEAE (Leadword Family)										
Plumbago zeylanica L.	'ilie'e	I	-	-	-	-	O	O	-	O
POLYGONACEAE (Buckwheat Family)										
Antigonon leptopus H. & A.	coral vine	X	-	-	-	R	-	-	-	-
Coccoloba uvifera L.	sea grape	X	R	R	-	-	-	-	-	-
PORTULACACEAE (Purslane Family)										
Portulaca oleracea L.	common purslane	X	U	C	C	C	C	C	-	C
PRIMULACEAE (Primrose Family)										
Anagallis arvensis L.	scarlet pimpernel	X	-	U	-	C	C	C	-	C
PROTEACEAE (Silky Oak Family)										
Grevillea robusta A. Cunn.	silk oak	X	-	-	-	C	C	C	-	C
Macadamia ternifolia F. Muell.	macadamia	X	-	-	-	U	-	-	-	-
RUBIACEAE (Coffee Family)										
Canthium odoratum (Forst. f.) Seem.	alaha'e	I	-	-	-	-	-	-	-	LC
RUTACEAE (Citrus Family)										
Citrus sp.	citrus	X	-	R	-	-	-	-	-	-
Murraya paniculata (L.) Jack	mock orange	X	-	-	-	R	-	-	-	-
SOLANACEAE (Nightshade Family)										
Lycopersicon pimpinellifolium Mill.	wild tomato	X	LC	C	LC	U	U	U	-	R

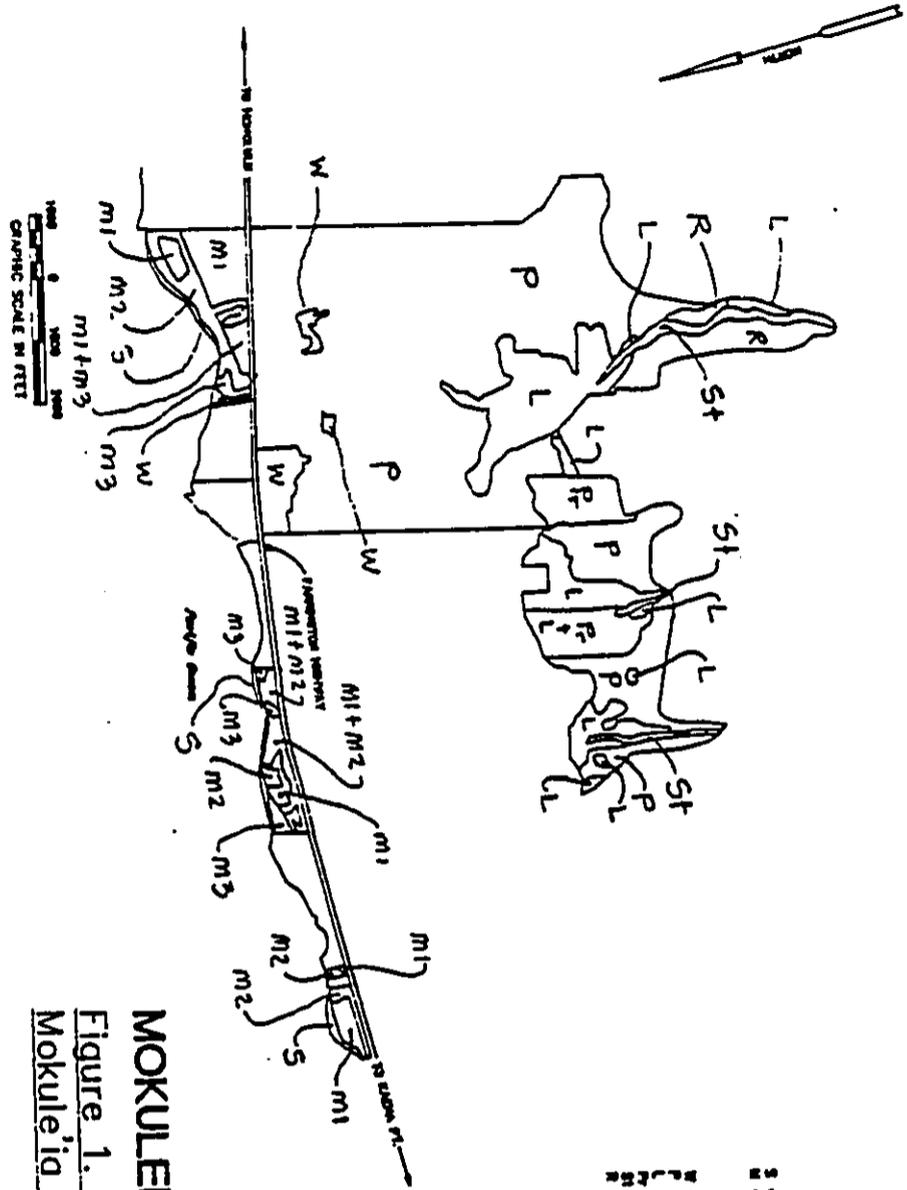
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Scientific name	Common name	Status	Vegetation types							
			1	2	3	4	5	6	7	8
<i>Nicandra physalodes</i> (L.) Gaertn.	apple-of-Peru	X	-	R	-	R	R	R	-	R
<i>Solanum nigrum</i> L.	popolo	I?	-	O	O	C	C	C	-	-
<i>Solanum sodomeum</i> L.	Sodom-apple, popolo-kikania	X	-	-	U	C	C	C	-	C
STERCULIACEAE (Cocoa Family)										
<i>Waltheria indica</i> L.	'uhaloa, hi'aloa	I	-	R	-	C	-	-	-	C
TILIACEAE (Linden Family)										
<i>Triumfetta semitriloba</i> (L.) Jacq.	burubush	X	-	-	-	-	LU	-	-	-
UMBELLIFERAE (Carrot Family)										
<i>Apium leptophyllum</i> (Pers.) F. Muell.	wild celery	X	-	C	C	C	C	C	-	C
VERBENACEAE (Verbena Family)										
<i>Lantana camara</i> L.	lantana, lakana	X	-	C	U	C	C	C	C	C
<i>Stachytarpheta jamaicensis</i> (L.) Vahl	Jamaica vervain, oi	X	-	C	U	C	C	C	C	C
<i>Verbena litoralis</i> HBK.	vervain, owi	X	R	C	C	C	C	C	-	C
<i>Vitex ovata</i> Thunb.	pohinahina	E	LC	-	-	-	-	-	-	-

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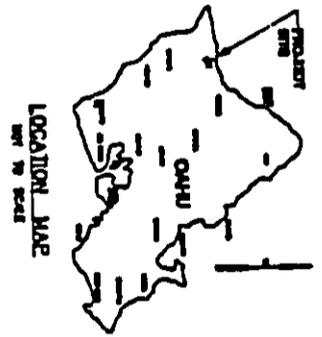
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1:000 0 1000 2000
 GRAPHIC SCALE IN FEET

- LEGEND**
- S = Strand vegetation
 - W = Wetland vegetation
 - M1 = Scrub and Shrub predominant
 - M2 = Tree predominant
 - M3 = Grass predominant
 - S = Sparse grassland grazing site areas
 - P = Pasture
 - L = Lowland forest
 - R = Riparian forest
 - St = Stream/estuary
 - W = Rocky/steep



MOKULEIA

Figure 1. Vegetation Map
 Mokuleia Project, Oahu

JUNE 11, 1986

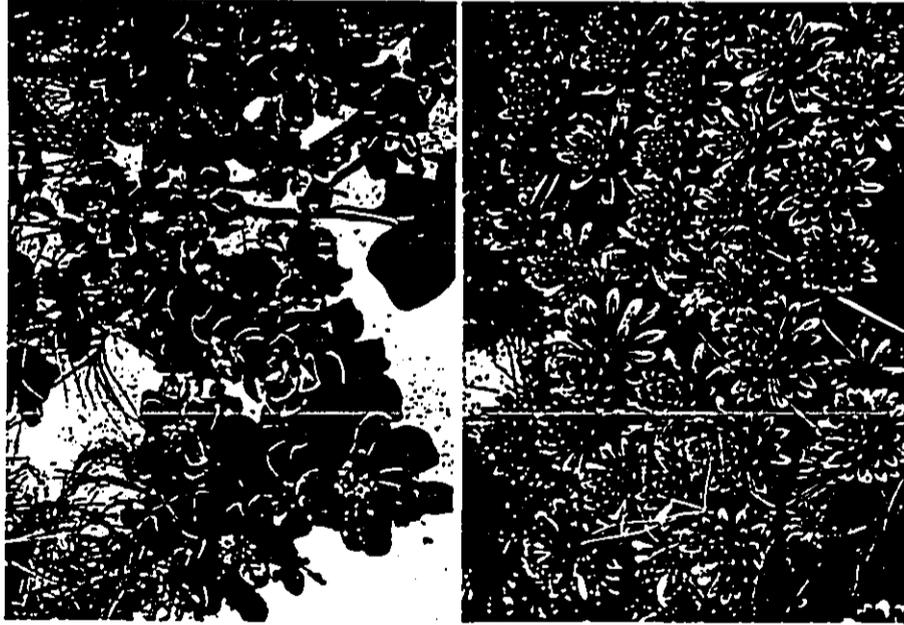


Figure 2. Some native lowland plants which may be used in landscape plantings.
 Upper photo, pohinahina, strand plant.
 Lower photo, hinahina, strand plant.

TERRESTRIAL FAUNAL SURVEY

The study area has been and still is used for grazing cattle and, to a lesser extent, horses. Pasture lands have replaced the original lowland forests in the upper sections of the project area.

Before the influence of Western man and his domesticated livestock on the Moku'e'ia area, the Hawaiians used the land largely for sweet potato cultivation (Handy and Handy 1972). Water from several streams and springs, especially near the foot of cliffs, was used to grow taro, banana, sugar cane, and 'ava.

Today the vegetation on the project area is dominated by introduced plant species. The faunal communities are likewise composed largely of alien species introduced by man.

Native and migratory bird species are found in two faunal habitats within the project area. Two endangered waterbird species are found in the pond areas, while the coastline and pond areas provide habitat for migratory shorebirds.

Survey Methods

The faunal survey was conducted on 24 and 25 May 1986; most of the field work was conducted between the hours of 0830 and 1700.

Transect counts were used to determine bird densities and distribution within the different habitat types. Birds were detected both by sight and by their vocalizations. In addition, the presence of bird species was determined by their tracks, nests, droppings, etc.

Mammalian, amphibian, and reptilian species were recorded when sighted or heard. Their presence was also indirectly determined by tracks, scat, remains, etc.

Results

Faunal habitats--Six general faunal habitats--pasture lands, koa-kaole scrub, kiawe forest, pond areas, beach area, and mixed maritime scrub/grassland--are recognized on the project area. A more detailed classification system of vegetation types is presented in the botanical report.

The predominant faunal habitat on the project area is pasture land, which consists of open to semi-open grassy areas. In the semi-open areas, scattered trees and shrubs of kiawe (Prosopis pallida), Java plum (Syzygium cumini), koa-kaole (Leucaena leucocephala), and kua (Acacia farnesiana) are frequently observed. The dominant grasses are two species of Panicum and California grass (Brachiaria mutica). The pasture area provides grazing for both beef and dairy cattle (Bos taurus) as well as horses (Equus caballus). Cattle egret (Ardeotis ibis) was often seen associated with horses and cattle in the lower pastures. Bird densities and variety are high in this habitat, with a number of granivorous (seed-eating) species present. Bird and several smaller mammal species, such as the mongoose (Hesperetes eropunctatus) and the house mouse (Mus musculus), are frequently encountered around the livestock watering troughs scattered throughout the paddocks.

The koa-kaole scrub and kiawe forest are the second and third faunal habitats. These habitats occupy the inland portions of the project area. Species density and diversity are not as great as in the pasture areas. The red-crested cardinal (Paroaria coronata) is common in this habitat. Mongoose, the metallic skink (Leiolopisma metallicum), and the mourning gecko (Lepidodactylus lugubris) prefer these wooded areas.

The pond areas around the Crowbar Ranch were surveyed intensively, as endangered waterbirds are known to frequent the area. Seventeen (17)

Hawaiian coot or 'aiue ke'oke'o were observed on the largest of the ponds, which has been modified for waterbirds; two (2) coot were observed in the reservoir pond behind the corrals; and one (1) coot was observed on the pond located on the Kai-a-lua side (easternmost) of the ranch facilities. This pond area consists of one irregularly-shaped pond which has been incompletely separated by an earth and corral rubble berm. Four (4) Hawaiian duck or kolea (Anas wyvilliana) were found on this pond. The birds are probably captive-bred birds released in this or a nearby area. We were not able to get close enough to see if the birds were banded.

The beach or coastline area is the fifth habitat and is used by a number of migratory species which winter over in the islands. The survey was conducted after most of these species had already left for their summer breeding grounds in North America or the Arctic. Migratory species which would probably be seen here during the late fall, winter, and early spring months include the Pacific golden-plover or kolea (Plyvialis fulva), wandering tattler or 'ulili (Heterostelus incanus), ruddy turnstone or 'akekeke (Arenaria interpres), and sanderling or luna-kai (Calidris alba). These species would also utilize the pond areas and some of the pasture areas, especially those low-lying spots periodically flooded during heavy rains.

The maritime mixed scrub/grassland habitat located behind the beach has a faunal community similar to those of the koa-kaole scrub and pasture areas. The house sparrow (Passer domesticus), however, is more numerous in these areas. The red-vented bulbul (Pycnonotus cafer) was common in this habitat and was often observed searching among the grassy areas for ripe wild tomato fruit (Lycopersicon pimpinellifolium). The tomato plants are

abundant here, and the birds are attracted to the area by the fruit; the birds would probably be less common in this area when the tomato plants are not fruiting.

Annotated species list--The following list includes all those "undomesticated" species observed on the project area. Cattle, horses, dogs, and the domesticated ducks found around the pond area are excluded. For each species, the scientific and common names are provided. Endemic species (evolved here and occurring only in the Hawaiian Islands) are indicated by "E"; indigenous species (native to the islands but have not evolved significantly from parent stock) are indicated by "I"; non-breeding regular migrants or visitors are indicated by "V"; and species introduced to the islands by man are indicated by the letter "F" (foreign).

A. Birds

1. Fulica americana alai

Hawaiian Coot, 'Alae-ke-oke'o

This subspecies of the American Coot is found on all the main islands except Lana'i (Audubon Society 1984). Twenty coot were observed in the pond areas around the Crowbar Ranch. They may also frequent the areas near the mouth of streams. The dark slate-gray birds with white bills and frontal shields fly only rarely, and then close to the water. No young were observed, although nests and young have been recorded in all months from April through September (Berger 1972). The coot is classified as Endangered and is protected by state and federal law.

E

2. Anas wyvilliana

Hawaiian Duck, Koloa, Koloa-mani

These small brownish ducks with plumage mottled in shades of brown and buff were once found on all the main islands except Lana'i (Berger 1972). Kua'i, which is mongoose-free, supports the largest number of birds. Captive-bred birds have been released on O'ahu and Kauai' (Hawaii Audubon Society 1984). Four koloa were observed sunning themselves on a fallen coconut tree by the easternmost (Wai-a-lua side) pond. The birds then took to the air in rapid flight, circled the pond below once, and flew off in the direction of the sugar cane reservoir located on the Ka'ena side of the project area. The koloa is classified as Endangered.

E

3. Nycticorax nycticorax hoactli

Black-crowned Night Heron

Found on all the main islands, the heron is not recognized as subspecifically distinct from the American continental birds (Audubon Society 1984). Two birds were observed feeding along the largest of the ponds near the Crowbar Ranch, while one bird was observed on the mud flats near the mouth of the stream located adjacent to the polo field.

I

4. Bubulcus ibis

Cattle Egret

Introduced in 1959 to help control cattle insect pests, the birds are now common in some areas of O'ahu and Kauai'. These small, white herons with yellowish legs and bills are common in the lower pasture areas. The birds can often be seen following the cattle and horses, searching for

F

all habitats on the project area except the beach area, where it is rare.

8. Passer domesticus F

House Sparrow, English Sparrow

Released on O'ahu in 1871, the house sparrow now occurs on all of the main islands (Hawaii Audubon Society 1984). The house sparrow is common in the maritime scrub/grassland habitat and around the ranch buildings and homes. It is occasional around the pond areas, but in the remaining habitats it is uncommon. It seems to prefer those areas in the lower portion of the study site.

9. Carpodacus mexicanus frontalis F

House Finch, Papayabird, Linnet

The house finch was observed in small flocks of about 3 to 6 birds. It prefers the open grassy areas, feeding on grass and weed seeds. The birds are also fond of soft fruits, especially papaya (Carica papaya).

10. Mimus polyglottos F

Northern Mockingbird

The mockingbird is uncommon on the project area and was only observed in the kiawe forest, flying from perch to perch. It was introduced to O'ahu and Kauai in 1911 to 1933 and has spread to the other islands (Hawaii Audubon Society 1984). It prefers drier lowland areas.

Insects which the larger animals have disturbed. The birds frequently gather in the trees around the pond areas. Birds are sometimes seen in the upper pasture areas, although their presence there is rather uncommon.

5. Acridotheres tristis F

Common Myna

Mynas are found on all the main islands, generally at lower elevations (Hawaii Audubon Society 1984). Although mynas are normally abundant in residential areas, very few birds were observed around dwellings on the study site. The birds, however, were common in the middle pasture areas which had scattered trees. They were uncommon to occasional throughout most of the other habitat types.

6. Geopelia striata F

Zebra Dove, Barred Dove

Zebra doves are found on all the main islands, from sea level to about 4,000 feet and are abundant in residential areas (Hawaii Audubon Society 1984). These birds were found frequently in the open pasture areas feeding on small weed and grass seeds lying on the ground. They were occasional in all of the other habitats except the beach and maritime scrub/grassland. In this habitat they were uncommon to rare.

7. Streptopelia chinensis F

Spotted Dove, Face-Necked Dove

Occurring on all the main islands from sea-level to 8,000 feet (Hawaii Audubon Society 1984), the spotted dove is occasional throughout

12. Lonchura malacca

F

Chestnut Munfinch, Black-headed Munfinch

The chestnut munfinch is uncommon to rare on the project area.

A few birds were observed in the open, grassy, upper pasture area only.

13. Amandava amandava

F

Strawberry Finch, Red Munia, Red Avadavat

Three groups of about a dozen birds each were observed in the scrubby area between the ponds and the lower pasture area. The birds were among several large pluchea shrubs (Pluchea odorata) which had abundant seed.

14. Pycnonotus cafer

F

Red-Vented Bulbul

The red-vented bulbul is an unauthorized cage release, 1965 or before (Hawaii Audubon Society 1986), and it has spread rapidly since then on O'ahu. It is common throughout all habitats except the beach, where it is uncommon to rare. Birds have also been observed feeding on strawberry guava (Psidium cattleianum) fruit in the Hokuile'ia Forest Reserve above the project area (pers. obser.). It is noisy and gregarious; several birds were observed harassing a red-crested cardinal. It is largely a fruit eater and is considered a pest, as it relishes mangoes, guavas, and other fruits grown by homeowners.

15. Cardinalis cardinalis

F

Northern Cardinal, Kentucky Cardinal

Pairs of cardinals (male and female) can be observed in all habitats

except the beach on the project area. They are occasional on the project area and can frequently be heard vocalizing.

16. Petroica coronata

F

Red-Crested Cardinal, Brazilian Cardinal

After the red-vented bulbul, the red-crested cardinal is the most common bird on the project area. It occurs in all habitat types except the beach. Small flocks of birds are frequently seen in the koa-hoole scrub, kulae forest, and semi-open pasture areas.

17. Zosterops japonicus

F

Japanese White-Eye, Mejiro

The white-eye is occasional in areas with shrub and tree cover on the project area. Old nests were observed in these areas. It was originally introduced to O'ahu from Japan in 1929 and is common in both dry and wet habitats, from sea level to tree line on Maui and Hawaii (Hawaii Audubon Society 1986).

18. Alectoris chukar

F

Chukar

Only one bird was observed on the lawn of the Dillingham Ranch; it is probably rare on the project area.

19. Fraucolinus erckelii

F

Erckel Francolin

Francolins are quite common in the upper pasture areas and in the Hokuile'ia Forest Reserve. The loud cackle of male birds is conspicuous

In the Kapuna Gulch area during the spring and summer breeding season (pers. obser.).

20. Phasianus colchicus
Ring-necked Pheasant

F

The birds are occasionally found in the open to semi-open pasture areas. Three males were observed separately in the grassy upper pasture areas; one female was observed near the largest pond area.

21. Pavo cristata
Common Peacock

F

Peacocks were heard in the pasture areas above the project site. About half a dozen birds, peacocks and peahens, can be seen occasionally near the watering trough located near the Mokule'ia Forestry Reserve gate (pers. obser.). The relatively level area with forestry plantings of Norfolk Island pine, which can be seen from below, is known as "Peacock Flat" because of the presence of the birds. Although the birds were not observed on the project area during this survey, they may utilize the upper pasture areas within the site occasionally.

B. Mammals

1. Felis catus

Feral Cat

F

One feral cat was heard in the dense scrub of the maritime habitat. Feral cats are probably attracted to this area as the beach and maritime habitats are used by campers and beach goers. Trash piles are common in the overgrown areas behind the beach.

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2. Herpestes auropunctatus

F

Small Indian Mongoose

The mongoose is occasional throughout the project area. They can often be seen darting across the paved and unpaved roads. Mongooses are often seen around the water troughs in the pasture areas.

3. Mus musculus

F

House Mouse

The house mouse was observed in the maritime scrub/grassland. The mouse was found feeding on the fruit of New Zealand spinach (Tetragonia tetragonoides). Mice are also found near the trash dumped in this area. Mice were occasionally observed in the open, grassy pasture areas. Mice probably occur throughout the project area, as they are known to colonize a number of diverse habitats (van Ripper and van Ripper 1982).

C. Reptiles and Amphibians

An intensive search was not conducted for these two classes, as none of the terrestrial and pond species are native to the islands nor are any considered endangered.

1. Rana catesbeiana

F

Bullfrog

Three bullfrogs were heard near the largest pond area. The amphibians, which were resting near water's edge, were startled and made a squeaking noise before splashing loudly into the pond to escape. The Wrinkled Frog (Rana rugosa) has been observed in the streams found in the forest reserve above the project area (pers. obser.). They may also be present

89

in some of the pond areas; however, the bullfrog is an aggressive feeder and will eat anything smaller than itself, including the wrinkled frog (McKeown 1978).

2. Leptodactylus lugubris

Mourning Gecko

The gecko was found in "wooded" habitats such as the kiawe forest and tall koa-koale scrub. Geckos were found in the cracks and crevices of bark on the trees and larger shrubs. They may also be found under rocks. Other gecko species no doubt are also present in the project area.

3. Leiolopisma metallicum

Metallic Skink

This skink is active during the day and is occasionally seen among the leaf litter and debris in wooded areas such as the kiawe forest and the clumps of ironwood (Casuarina equisetifolia) trees on the project area. It is the most common species of skink in the islands (McKeown 1978).

Discussion and Recommendations

The vegetation on the project area has been greatly modified, especially by cattle ranching practices. Introduced plant species predominate. Likewise, the vertebrate fauna present on the project area is also composed largely of introduced species.

Development of the pasture areas, kiawe forest, koa-koale scrub, and maritime scrub/grassland will probably reduce the habitat size of a

number of introduced bird species, especially finch and game bird species. Opportunities for range expansion of species commensal with man, such as the house sparrow (Passer domesticus) and the common myna (Acridotheres tristis) will increase. The vertebrate fauna affected by the development in the preceding four areas is of minor environmental concern, as they are introduced species, and none is considered endangered by federal or state governments. Some, such as the mongoose and cat, prey on the native waterbirds found in the pond area.

The pond area and the coastline, to a lesser extent, support a number of native bird species. The pond areas provide habitat for and are utilized by two endangered waterbird species. The koloa (Anas wyvilliana) seems to prefer the irregularly-shaped pond which is shallow in one section with emergent California grass. The Hawaiian coot (Fulica americana alai) utilizes the largest pond more frequently than the small ponds.

The Final Draft Revision of the Endangered Hawaiian Waterbirds Recovery Plan has identified the ponds around the Crowbar Ranch as important habitat for the recovery of endangered Hawaiian waterbirds (E. Kosaka, USFWS, in letter to W. Wanket). The pond areas should be incorporated into the design of the development, and managed to preserve the habitat. Trees and shrubs around the ponds should remain. Additional plantings should be made in those areas of the pond which are without a shrubby buffer zone.

Alterations to or modifications of the pond areas should only be done in close consultation with the U.S. Fish and Wildlife Service.

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APPENDIX J

AIR QUALITY STUDY
FOR THE
PROPOSED DEVELOPMENT AT MOKULEIA
OAHU, HAWAII

Prepared for
Mokuleia Development Corp.

Prepared by
Barry D. Root

June 23, 1986

AIR QUALITY STUDY
FOR THE
PROPOSED DEVELOPMENT AT MOKULEIA
OAHU, HAWAII

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Kaneohe, Hawaii

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1. The proposed Mokuieia Development involves site preparation and construction of a recreational residential/resort complex on about 1,019 acres of land in Mokuieia on the northwestern portion of Oahu.
2. Present air quality in the project area is estimated to be very good since there are no major contributing sources of air pollutant emissions other than vehicles traveling on nearby roadways and isolated sugar cane fires.
3. Except for dust emissions during the construction phase of the development, no significant short term direct air quality impacts are expected. Adequate control measures exist to limit the impact of windblown dust, but special care will have to be exerted to insure that previously developed residential areas are not subjected to excessive levels of particulate pollution from construction activities.
4. Indirect air quality impacts are expected to result from new demands for electrical energy. This impact is most likely to occur in the vicinity of existing power plants such as the Mahe Plant on the Waianae coast where increased levels of particulates and sulfur dioxide can be expected. Maximum use of solar energy designs in project development can at least partially mitigate the magnitude of this impact. New methods of generating electrical power such as wind or ocean thermal energy conversion may eventually also play a mitigative role in this regard.
5. Increased traffic generated by the Mokuieia Development will increase emissions of carbon monoxide along Farrington Highway in the project area. Modeling of current and projected weekend peak hour worst case concentrations of carbon monoxide at the intersection of the main project access road and at Thomson Corner indicates that projected levels will be well within allowable State and National ambient air quality standards with or without project development. For that reason no specific air pollution mitigation measures other than those proposed in the traffic impact study for the project are deemed to be necessary.
6. The modeling study does indicate, however, that installation of a traffic light at the intersection of the main project access road and Farrington Highway sometime before project completion should result in lower concentrations of carbon monoxide than would be the case without such a signal.

2. AIR QUALITY STANDARDS

State of Hawaii and National Ambient Air Quality Standards (AQS) have been established for six classes of pollutants as shown in Table 1. An AQS is a pollutant concentration level not to be exceeded over a specified sampling period which varies for each pollutant depending upon the type of exposure necessary to cause adverse effects. Each of the regulated pollutants has the potential to cause some form of adverse health effect or to produce environmental degradation when present in sufficiently high concentration.

National AQS for particulates and sulfur dioxide have been divided into primary and secondary levels. Primary AQS are designed to prevent adverse health impacts while secondary AQS refer to welfare impacts such as decreased visibility, diminished comfort levels, damage to vegetation, animals or property, or a reduction in the overall aesthetic quality of the atmosphere. State of Hawaii AQS for all six pollutants have been set at a single level which is in some cases significantly more stringent than the lowest comparable national limit. In particular, the State of Hawaii one hour standard for carbon monoxide is four times more stringent than the national standard.

National AQS are based on 40 CFR Part 50, while State of Hawaii AQS are set in Chapter 11-59, Hawaii Administrative Rules. This chapter was recently amended (March 25, 1986) to make Hawaii AQS for particulates and sulfur dioxide essentially the same as the most stringent national limits.

1. PROJECT DESCRIPTION

The proposed Mokuleia Development involves site preparation and construction of a recreational residential/resort complex on about 1,019 acres of a 2,900 acre parcel of land in Mokuleia on the northwestern portion of Oahu as shown in Figure 1.

Of the acreage to be developed, 313 acres are slated for resort use consisting of approximately 2,100 hotel units and 1,200 condominium units; 331 acres are to be used for about 700 single-family residential units; 342 acres are planned for golf course use; and 33 acres are designated as commercial space.

Project development is expected to take several years with completion of sales and full occupancy not anticipated until 2005.

Roadway access from the development to other urbanized parts of Oahu will be via Farrington Highway to Thomson Corner (the junction of Farrington Highway with Keukonahua Road) and thence to Mahiwa via Keukonahua Road or to Halewa via Weed Circle.

The purpose of this study is to describe existing ambient air quality in the project area and along the major access route leading to and from the project and to estimate the magnitude of any increase in air pollutant concentrations resulting from actions related to the proposed project.

3. PRESENT AIR QUALITY

There are no ambient air quality monitoring stations within the immediate vicinity of Mokuiea. Under prevailing trade wind conditions there is no industrial activity for thousands of miles upwind and it is reasonable to assume that present air quality is quite good.

The only significant sources of man-made air pollution in the area are motor vehicles traveling on Farrington Highway and sugar cane growing and harvesting activities. Fugitive dust from cane cultivation and smoke from field burning at harvest time could create periodic high levels of particulates in the project area, but these activities are infrequent enough to present only a minor annoyance to area residents.

Natural air pollutant producers which could affect Mokuiea air quality include the ocean (sea spray), plants (aero-allergens), dust, and perhaps a distant volcanic eruption on the island of Hawaii. Concentrations of pollutants from these kinds of sources should be fairly uniform for most Oahu locations.

The nearest long term air pollution monitoring station to the project is located in Pearl City, 16 miles to the southeast. Only particulates are measured at Pearl City and for the past several years readings there have been running on the order of half the allowable State and National AQ5.

Oahu wide air pollution monitoring data indicates that State of Hawaii ambient air quality standards for particulates, sulfur dioxide, nitrogen dioxide, and lead are currently being met at most locations.

On the other hand, carbon monoxide and ozone readings from urban Honolulu indicate that allowable State of Hawaii standards for these vehicle related air pollutants are being violated at a rate of more than once per year. Ozone is an indicator of the formation of photochemical pollutants in the air, a condition which tends to develop if the air mass over the islands has been fairly stable with little wind flow for a period stretching over several days.

Concentrations of carbon monoxide are more directly related to vehicular emissions and tend to be highest during periods of rush hour traffic. Carbon monoxide would thus be the pollutant most likely to cause difficulty in meeting allowable State of Hawaii AQ5 as a result of new residential development on Oahu.

4. DIRECT AIR QUALITY IMPACT OF PROJECT CONSTRUCTION

During the site preparation and construction phases of this project it is inevitable that a certain amount of fugitive dust will be generated. Field measurements of such emissions from apartment and shopping center construction projects has yielded an estimated emission rate of 1.2 tons of dust per acre of construction per month of activity. This figure assumes medium level activity in a semi-arid climate with a moderate soil silt content. Actual emissions of fugitive dust from this project can be expected to vary daily depending upon the amount of activity and the moisture content of exposed soil in work areas.

One major generator of fugitive dust during project development is construction equipment moving over unpaved roadways. This problem can be substantially mitigated by completing and paving roadways and parking areas as early in the development process as possible. Because of the relatively long time frame envisioned for project development, some construction will eventually be taking place in close proximity to existing residential areas. In these instances, dust control will have to be an item of special concern.

Heavy equipment at construction sites will also emit some air pollutants in the form of engine exhausts. The largest equipment is usually diesel powered. Carbon monoxide emissions for large diesel engines are generally about equal to those from a single automobile, but nitrogen dioxide emissions from this type of engine can be quite high. Fortunately, nitrogen dioxide emissions from other sources in the area should be relatively low and the overall impact of pollutant emissions from construction equipment should be minor compared to levels generated on roadways nearby.

5. AIR QUALITY IMPACT OF INCREASED ENERGY UTILIZATION

As proposed, the Mokuia Development would contain the following: 700 single-family residences; 1,200 condominium units; 2,100 hotel units; and approximately 100,000 square feet of commercial space.

Estimating about 1,800 square feet average size for the single family residences; 1,000 square feet average size for the condominium units; and 600 square feet average for the hotel units yields a combined residential/resort floor space of about 3.7 million square feet. Energy consumption rates at the power plant for single family residential units with all-electric kitchens and water heaters are about 55,000 BTU per square foot; for similarly equipped apartments the rate is 45,000 BTU per square foot; for hotels the rate is 270,000 BTU per square foot; and for commercial space the average rate is 490,000 BTU per square foot. Thus this project could require about 513 billion BTU of energy per year at the power plant, or about 80,000 barrels of oil if the demand were to be met totally by burning fuel oil, to meet the needs of the proposed development by the year 2005.

The major impact of burning fuel oil to meet this increased energy demand will be increased levels of sulfur dioxide and particulates in the vicinity of existing power plants, primarily the Kaha Power Plant on the Waianae coast.

This energy requirement could be reduced substantially by the installation of solar water heating on all new residential units. It is also possible that the new demand could be met by means other than burning fuel oil. Generation of electrical energy by wind power or by using ocean thermal energy conversion are two such possibilities.

6. INDIRECT AIR QUALITY IMPACT OF INCREASED TRAFFIC

Once construction is completed the proposed project is not in itself likely to constitute a major direct source of air pollutants. By serving as an attraction for increased motor vehicle traffic in the area, however, the project must be considered to be a significant indirect air pollution source.

Motor vehicles, especially those with gasoline-powered engines, are prodigious emitters of carbon monoxide. Motor vehicles also emit some nitrogen dioxide and those burning fuel which contains lead as an additive contribute some lead particles to the atmosphere as well. The major control measure designed to limit lead emissions is a Federal law requiring the use of unleaded fuel in most new automobiles. As older cars are removed from the vehicle fleet lead emissions should continue to fall. In fact, effective January 1, 1986, the Federal Environmental Protection Agency has revised the allowable lead amount in gasoline to 0.1 grams per gallon. At the beginning of 1985 the standard was 1.1 grams per gallon. The EPA is also advocating a total ban on lead in gasoline to take effect as early as 1988.

Federal control regulations also call for increased efficiency in removing carbon monoxide and nitrogen dioxide from vehicle exhausts. By 1995 carbon monoxide emissions from the vehicle fleet then operating are mandated to be about one third lower than the amounts now emitted.

7. CARBON MONOXIDE DIFFUSION MODELING

In order to evaluate the future air quality impact of projected increases in traffic associated with the proposed Mokuia Development in view of the previously described government-mandated decreasing emission rates per vehicle, it was necessary to carry out a detailed carbon monoxide modeling study. The study was designed to yield carbon monoxide concentration values which could be compared directly to allowable State and National Ambient Air Quality Standards.

Two critical receptor sites were selected for analysis: site 1 on the mauka side of Farrington Highway near the proposed intersection with the main project access road; and site 2 on the mauka side of Farrington Highway at Thomson Corner. These two sites were selected for analysis because increased traffic related to project development would be likely to show maximum air quality impacts at these two intersections. The particular position of both sites with respect to the intersection was selected because that spot would be most likely to have the highest levels of automobile-generated air pollutants, specifically carbon monoxide, under worst case weekend peak hour traffic and meteorological diffusion conditions. The locations of sites 1 and 2 are shown in Figures 2 and 1 respectively.

Expected worst case weekend peak hour carbon monoxide concentrations at sites 1 and 2 were computed for study years 1985 and 2005. Computations were made for traffic conditions with and without the proposed Mokuia Development.

Traffic volumes for study years were determined using the traffic impact study for the project. Weekend peak hour (Sunday afternoon) traffic volumes were used for air pollution computations because the traffic impact study found these volumes to be higher than weekday peak hour values. Traffic mitigation measures proposed in the traffic impact study include constructing left and right turn lanes on Farrington Highway at the intersection with the main project access road (but no traffic signal), and installation of a signal light at Thomson Corner. The air quality study assumes that these modest mitigative measures will be adopted and additionally investigates the potential air quality impact of installing a signal light at the main project access road intersection with Farrington Highway (site 1).

Using a one hour traffic survey conducted by the consultant at Weed Circle on Sunday, May 18, 1986, after the Polo match, the existing weekend peak hour vehicle mix in the project area was evaluated to be 78% gasoline-powered automobiles, 19% light duty gasoline-powered trucks and vans, 3% diesel-powered automobiles, 1% diesel-powered light duty trucks, 1% diesel-powered trucks and buses, and 1% motorcycles. The same vehicle mix was assumed for both study years.

Where signal lights would control traffic flow, average vehicle speeds were assumed to be 5 mph upstream from red signal lights and 15 mph downstream from signals or turns. Traffic was assumed to move at 25 mph in unimpeded flow.

For all computations a temperature of 68 degrees F was assumed with 20 percent of vehicles operating in the 'cold start' mode.

The EPA computer model MOBILE 2 was run using the above parameters to produce vehicular carbon monoxide emission estimates for each of the years studied.

The EPA computer model HWAY 2 was used to calculate carbon monoxide concentrations at both of the selected critical receptor sites for each scenario studied. Stability category 4 was used for determining diffusion coefficients. This stability category represents the most stable (least favorable) atmospheric condition that is likely to exist in a suburban area such as this.

To simulate worst case wind conditions a uniform wind speed of one meter per second was assumed with the worst case wind direction for site 1 from the southwest and for site 2 from the northeast. For each receptor site concentrations were computed at a height of 1.5 meters to simulate levels that would exist within the normal human breathing zone. Background contributions of carbon monoxide from sources or distant roadways not directly considered in the analysis were assumed to be zero.

Results of the carbon monoxide modeling study are presented in Table 2. For both critical receptor sites, existing and projected peak hour carbon monoxide concentrations are computed to be within allowable State of Hawaii ambient air quality standards with or without the proposed Mokuia Development, even under the worst case meteorological dispersion conditions considered in the study.

While projected peak hour levels of carbon monoxide with project development are within allowable limits, Table 2 does illustrate that traffic generated by the project will have a significant impact on air quality at the sites studied. At site 1, in particular, carbon monoxide levels are projected to go from barely measurable to almost half the allowable standard by the time the project is completed. In this case the modeling study indicates that a significant portion of the increase could be mitigated by installing a traffic signal at the intersection of Farrington Highway and the main project access road sometime before the project is completed.

B. MITIGATIVE MEASURES

A. SHORT TERM

As previously indicated the only direct short term adverse air quality impact that the proposed project is likely to create is the emission of fugitive dust during construction. State of Hawaii regulations stipulate the control measures that are to be employed to reduce this type of emissions. Primary control consists of wetting down loose soil areas. An effective watering program can reduce particulate emission levels from construction sites by as much as 50 percent. Other control measures include good housekeeping on the job site and pavement or landscaping of bare soil areas as quickly as possible.

B. LONG TERM

Once completed, the proposed Mokuiea Development is expected to have little direct impact on the air quality of the surrounding region.

Indirect long term impacts in the form of increased air pollutant emissions from power plants serving new residences in the project area can be mitigated somewhat by planning and implementing solar energy design features to the maximum extent possible.

Other indirect long term air quality impacts are expected in those areas where traffic congestion can potentially be worsened by the addition of vehicles traveling to and from the proposed project. Project planners can do very little to reduce the emission levels of individual vehicles, but the installation of traffic signals at the main intersection of project traffic with Farrington Highway and at Thomson Corner could decrease traffic queuing times at these intersections, thereby decreasing projected air pollution impacts at these critical locations.

Carbon monoxide modeling conducted as a part of this report indicates that no special traffic control measures will be necessary to ensure compliance with State and National air quality standards even under worst case traffic and meteorological dispersion conditions.

Because the stringent national vehicular emissions reduction program now being pursued is entirely the product of perpetually changing government regulations, it is always possible that economic conditions or other factors could lead to an early abandonment of the program. If that were to occur, then the projected pollutant levels presented in this study could be too optimistic. On the other hand, it is possible that technological innovation may lead to new vehicular power systems that produce few or none of the currently regulated atmospheric pollutants.

The projected increase in carbon monoxide levels with project development at site 2 is less significant because it is assumed that a traffic signal will be installed at this intersection by the time the project is completed. Present traffic levels at this site are also substantially higher than those in the vicinity of site 1, thereby decreasing the relative air pollution impact of project-related traffic.

Average one hour traffic volumes during the peak eight hour period are about 80 percent of the peak hour level. Eight hour carbon monoxide levels are estimated by multiplying the peak hourly values by this traffic volume ratio and a 'meteorological persistence factor' of 0.6 which is recommended in EPA modeling guidelines to account for the fact that meteorological dispersion conditions are more variable (and hence more favorable) over an eight hour period than they are for a one hour period. Multiplying projected peak hour carbon monoxide levels by this combined factor of about 0.5 will yield values that are exactly one half those shown in Table 2. The State of Hawaii eight hour AQS for carbon monoxide is also one half the one hour standard. Thus the conclusions reached above regarding the State of Hawaii one hour standard will hold with respect to the eight hour standard as well.

All carbon monoxide concentrations calculated in the foregoing analysis are well within the less stringent National one and eight hour AQS whether the proposed project is undertaken or not.

In any case, this study indicates that currently proposed mitigative measures for traffic congestion along roadways leading to and from the project area should be sufficient to meet existing air quality requirements and no further air pollution mitigation measures are proposed. It is noted, however, that tall, dense vegetation can provide some screening of residential areas from larger airborne particulates generated along roadways and near construction areas. It is thus recommended that wherever possible such vegetative cover be included in landscaping plans with plantings occurring as early in the development process as practicable.

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1. U.S. ENVIRONMENTAL PROTECTION AGENCY, User's Guide to MOBILE 2: Mobile Source Emissions Model, February, 1981.
2. U.S. ENVIRONMENTAL PROTECTION AGENCY, User's Guide to HWAY 2, A Highway Air Pollution Model, May, 1980.
3. U.S. ENVIRONMENTAL PROTECTION AGENCY, Guidelines for Air Quality Maintenance Planning and Analysis, Volume 9: Evaluating Indirect Sources, January, 1975.
4. CALIFORNIA DEPARTMENT OF TRANSPORTATION, Energy and Transportation Systems, December, 1978.
5. PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC., Traffic Impact Report for Mokuleia, May, 1986. (PRE-FINAL)

TABLE 2

RESULTS OF PEAK HOUR CARBON MONOXIDE ANALYSIS
(Milligrams Per Cubic Meter)

SITE 1	1986	2005
Without Mokuieia Development	0.4	0.3
With Mokuieia Development (no traffic signal)		4.5
With Mokuieia Development (traffic signal)		3.7
SITE 2		
Without Mokuieia Development	1.4	1.0
With Mokuieia Development		3.3

TABLE 1

SUMMARY OF HAWAII AND NATIONAL AMBIENT AIR QUALITY STANDARDS
(Micrograms per Cubic Meter)

POLLUTANT	SAMPLING PERIOD	AMBIENT AIR QUALITY STANDARDS	
		NATIONAL	HAWAII
Particulates	Annual Geometric Mean	75	60
	Maximum 24-Hour Average	260	150
Sulfur Dioxide	Annual Arithmetic Mean	80	80
	Maximum 24-Hour Average	365	365
	Maximum 3-Hour Average	1300	1300
Nitrogen Dioxide	Annual Arithmetic Mean	100	70
	Maximum 1-Hour Average	240	100
Carbon Monoxide (milligrams per cubic meter)	Maximum 8-Hour Average	10	5
	Maximum 1-Hour Average	40	10
Lead	Calendar Quarter	1.5	1.5

STATE OF HAWAII AQS: 10
NATIONAL AQS: 40

Note: See Figures 1 and 2 for location of receptor sites.

APPENDIX K

NOISE STUDY

Prepared for
Mokuleia Development Corp.

Prepared by
Darby and Associates

L. NOISE

Existing Conditions - The primary land uses that will potentially be affected by the project are public and private beach parks and residences located between the shore and Farrington Highway. Noise sources affecting these areas now are categorized as:

- Surf
- Motor vehicle traffic on Farrington Highway
- Aircraft
- Wind in the trees
- Birds and people activities

In reference 1, measurements of existing noise levels in the area were made continuously over a 2-month period, utilizing a sensor located at two different locations on the Episcopal Church camp property. Once location was midway between the highway and the shoreline, while the other was 54 feet seaward of the highway. Though these measurements were made in 1977, they are considered representative of the existing conditions.

The typical diurnal noise level variation in the populated area had an hourly equivalent sound level (Leq) of 47 dBA at night and a maximum Leq of 65 dBA during the day. At night the noise sources were primarily the surf and wind in the trees. During the day, motor vehicles, aircraft, birds and people activities also contributed to the total noise level.

In reference 1, it was found that occupants of beachfront residences experienced relatively high, continuous noise exposures attributed to the surf. The surf is a high-level, linear noise source that generally attenuates 3 dB each time a person doubles his distance from it. It masks practically all motor vehicle noises in beachfront homes. It was found that, on the average, surf noise exceeded existing aircraft noise by 10 dB at a beachfront location directly under the departing flight path.

Occupants of typical residences directly on Farrington Highway experience a lower level of surf noise and a greater contribution of motor vehicular noise. In reference 1, it was found that the average total day-night sound level (Ldn) was 61 dBA over a 21-day period. Motor vehicle noise contributed an average of 51 dBA to the total, while aircraft noise contributed an average of 53 dBA. The surf, wind in the trees, birds and people activities were the dominate noise sources, contributing about 60 dBA, Ldn, and controlled the average total noise exposures in housing along the highway at that time.

Proposed Action - Development of the project site will involve land clearing, site preparation, construction of infrastructure and buildings, and the installation of landscaping.

Anticipated Impacts and Mitigative Measures - The various construction phases of a development project may generate significant amounts of noise; the actual amounts are dependent upon the methods employed during each stage of the process. Typical construction equipment noise ranges in dB(A) are shown on Figure 1. Piledrivers; earthmoving equipment such as bulldozers; and diesel powered trucks will probably be the loudest equipment used during construction.

The State Department of Health (DOH) Title 11, Administrative Rules, Chapter 43, Community Noise Control for Oahu specifies maximum allowable levels of noise for each use zone contained in the City and County of Honolulu's Comprehensive Zoning Ordinance. Allowable noise levels from the project site are:

- Preservation (P-1) and Residential (R-1) through current A-7)
- Daytime (7 a.m.-10 p.m.): 55 dBA
- Nighttime (10 p.m.-7 a.m.): 45 dBA.

Apartment (A-1) through current A-5)

Daytime (7 a.m.-10 p.m.): 60 dBA

Nighttime (10 p.m.-7 a.m.): 55 dBA.

These standards apply to non-impulsive sounds. The allowable level for "impulse" noise is 10 dB(A) above those listed. The Comprehensive Zoning Code (CZC) also regulates noise levels emanating from private property and is usually confined to stationary noise sources (reference 2).

Since it is anticipated that noise generated during construction will exceed allowable limits, a permit will be obtained from DOH. DOH may grant permits to operate vehicles, construction equipment, power tools, etc. which emit noise levels in excess of the allowable limits. Required permit conditions for construction activities are:

"No permit shall allow construction activities creating excessive noise...before 7:00 a.m. and after 6:00 p.m. of the same day."

"No permit shall allow construction activities which emit noise in excess of ninety-five dB(A)...except between 9:00 a.m. and 5:30 p.m. of the same day."

"No permit shall allow construction activities which exceed the allowable noise levels on Sundays and on...[certain] holidays. Activities exceeding ninety-five dB(A) shall [also] be prohibited on Saturdays."

In addition, construction equipment and on-site vehicles or devices requiring an exhaust of gas or air must be equipped with mufflers.

Traffic noise from heavy vehicles traveling to and from the construction site will be minimized to daylight hours in residential areas and will comply with the provisions of Title 11, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu enforced by DOH.

Because sound attenuates with distance, the farther away people are from a noise source, the less the sound will affect them. Thus, during construction in the proposed mauka resort and residential areas, the potential noise impact to persons in the housing and parks along Farrington Highway will be minimal. However, construction operations in the shore resort parcels (numbers 1, 6, 7 and 8) will have greater noise impact on persons in the abutting land use.

After the proposed resorts are completed and are in operation, persons in the abutting land uses will potentially be impacted by noise from the stationary equipment servicing the complex, such as air conditioning and pool pumps. Noise levels from such equipment must not exceed the allowable noise limits in the aforementioned DOH and CZC noise regulations.

As the project develops, there will be an increase in traffic on Farrington Highway causing higher traffic noise levels primarily to housing directly on the highway. Tables I and II show the assumptions used to predict traffic noise levels along Farrington Highway. From the tables it can be seen that presently the maximum hourly averaged noise level [Leq(1hr)] at 50 feet from the center of the road is about 56 dBA during the weekdays and about 60dBA during the weekends. Because Farrington Highway has only two lanes and is directly accessed by driveways, the average vehicle speed will be reduced as the traffic

volume increases. Traffic noise increases more rapidly with increasing vehicle speed as compared to increasing traffic volume. Thus, there tends to be a limiting effect on traffic noise levels that can be seen in Tables 3 and 11. For example, the maximum predicted traffic noise level, for the years 2000 and 2005 tends to limit-out at 62 to 63 dBA despite significantly greater traffic volumes. These predicted noise levels are 2 to 3 dBA greater than that presently experienced on weekends, but may be 5 to 6 dBA greater than that presently experienced on weekdays. It is to be noted that the maximum predicted noise levels do not exceed the noise criteria of 67 dBA as recommended by the Federal Highway Administration (FHWA) for "picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, hotels, schools, churches, libraries, and hospitals." (reference 3) Table 111 addresses the predicted traffic noise levels for proposed housing on the mauka road. Acceptable noise levels will exist if posted speeds of 35 mph are used and if building setbacks are at least 50 feet.

Occupants in the proposed project will be exposed to noise from aircraft operations from Dillingham Airfield. Dillingham Airfield is operated by the State Department of Transportation and has a single runway 5,000 feet long. Only daylight visual flight rule operations requiring good weather and visibility are conducted by civil aircraft. Aircraft operations at Dillingham Air Field are now dominated by single-engine airplanes towing gliders. Military use of the airfield involves helicopters and light fixed wing aircraft. As can be seen in Figure 2, the number of operations at the field has declined lately: e.g. in 1980 there were 82,406 civilian power operations (ops) and 21,930 military ops while in 1985 there were 60,494 civil ops and 5,060 military ops.

Aircraft noise contours were provided in reference 1 for various aircraft operation levels that were predicted to occur. This analysis assumes a civilian power operations level in 1995 which is approximately double the number of operations experienced in 1983-1985, see Figure 2. Figures 3 and 4 show the noise contours taken from reference 1 for about 120,000 civilian power aircraft operations that was then predicted to occur in 1980 if improvements were made at the airfield.

The noise contour in Figures 3 and 4 use the day-night noise level (L_{dn}) which is a time averaged dBA noise level over 24 hours that includes a 10 dBA penalty for any noise events occurring at night (10 p.m. to 7 a.m.). Most federal agencies including the Department of Housing and Urban Development (HUD) and the Department of Defense (DOD) recommend that housing not be located in areas where L_{dn} 65 is exceeded. For future planning, the Federal Environmental Protection Agency (EPA) in reference 4 has established long range goals of:

"Through vigorous regulatory and planning actions, reduce environmental noise exposure levels to L_{dn} 65 dB or lower, and ... in planning future programs concerned with or affecting environmental noise exposure, to the extent possible, aim for environmental noise levels that do not exceed an L_{dn} of 55 dB. This will ensure protection of the public health and welfare from all adverse effects of noise based on present knowledge."

Because of the open life style in Hawaii, it is often recommended that L_{dn} 60 not be exceeded for residential and resort areas.

In Figures 3 and 4, it can be seen that all of the proposed residential and resort parcels mauka of the highway and Resort Parcel 1 should never experience aircraft noise levels exceeding L_{dn} 55. Also the figures indicate that L_{dn} 60 should not be exceeded on Resort Parcels 6, 7 and 8. It is also possible to design the

structures on Resort Parcels 7 and 8 such that they will tend to shield persons on the shore side of the buildings from aircraft noise during tradewind takings when the aircraft are on the runway or at very low altitudes. It is estimated that about 90% of the aircraft operations per year are in a tradewind pattern and that there are no operations about 26 days per year due to excessive crosswinds (reference 1).

As noted in Figure 2, the recent use of Dillingham Airfield by the military is lessening. However, it is possible that in the future there could be sporadic training exercises involving helicopters. Reference 1 addressed this possibility by generating noise contours using techniques mandated in reference 5. The resulting contours, shown in Figure 5, are considered conservative; that is, they are in excess of actual existing noise exposures and are not necessarily directly comparable with civilian noise contours. The following considerations are involved:

- a. Helicopter noise is different in nature from that of fixed-wing aircraft, and "a correction factor of +7 dBA is added to all results to account for helicopter noisiness and turns."
- b. The operations at Dillingham Airfield approximate the following parameters used in the methodology of Reference 5: The aircraft mix is 80 percent UH-1, 15 percent AH-1, and 5 percent CH-47 and 10 percent of the operations are at night (from 10 p.m. to 7 a.m.).
- c. At Dillingham Airfield, it is estimated that 66 helicopter operations per day represent a typical "busy day." However, the contours must express 100 operations per day in order to allow for possible future growth.

In Figure 5, three zones are defined by the contour set. Zone 3, the smallest in area, has the largest noise impact on people and is the area in which the frequency of exposure and intensity are almost certain to produce difficulties in relation to some other possible uses of the area, particularly where the use, or proposed use, is residential. Zone 2 is a larger area in which similar problems with regard to other uses may occur. Zone 1, all land outside Zone 2, is an area in which essentially no such difficulties may be expected. Note that for civilian aircraft noise contours, all land outside the airport boundary is equivalent to Zone 1, i.e., not expected to create adverse impacts.

Residents in the proposed resort and residential areas abutting (or near) the sugar cane fields will experience noise exposures from cane operations. See Figure 6. Typically, sugar cane fields are harvested every two years involving bulldozers (pushrakes) and clam-shell cranes loading trucks operating over 24 hours per day. At harvesting rates of 30 to 40 acres per 24 hours, the heavy equipment can cause appreciable noise exposures above the background noise for several days.

Land preparation for planting occurs typically every six years if ratoon crops are used and involves a sequence of operations such as harrowing, plowing, leveling, stone removal, etc. averaging a rate of about 13 acres per day based on two shifts per day. Thus, noise exposures during land preparation from heavy diesel-powered equipment operating in nearby fields for a total of several days every few years will be experienced by project occupants. The grandfather clause on the aforementioned State DPH noise regulations will allow the sugar operations to make 70dBA for 10% of the time in any 20-minute period at the property line. Furthermore, the regulations allow conditional use of permits for agricultural field preparation and harvesting as long as 95 dBA is not exceeded at the property line. Thus, some

occupants in the project may be annoyed and complain about the legal periodic 24-hour loud noise events which may interfere with sleep, conversations, and radio/TV listening. It is to be noted that the field operations of land preparation every two to six years and harvesting every two years should not cause the annual average L_{dn} to exceed 65 L_{dn} at the property line. It is recommended that the sales documentation for new housing in the project located near cane fields contain information on the nature of the sugar operations and of the noise exposures to be expected.

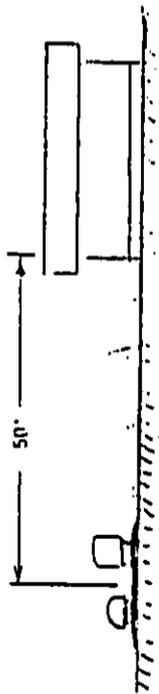
Housing and resort facilities located on, or near, the cane haul road shown in Figure 7 will experience 24-hour noise events from passing cane haul trucks when the fields serviced by the cane haul road are being harvested. Tables IV and V provide calculations for predicting noise exposures along the cane haul road caused by cane haul trucks and other vehicles which service the fields near the project. It is estimated that there are 9 fields totalling to about 376 acres. From Table V it is estimated that, on the average, there will be five days (24 hours) per year when cane haul trucks will use the road. Day-night noise levels (L_{dn}) on those days are predicted to be 55 dBA or less assuming a setback of at least 50 feet from the cane haul road. Though the total noise exposure does not exceed the aforementioned criteria, persons may complain of noise from the large cane haul vehicles which will be much greater than the ambient noise level (typically 84 dBA at 50 feet).

Another noise event that will be experienced by persons in the proposed project, will be aircraft flyovers when the sugar cane fields are sprayed with insecticides, herbicides, etc.

References

1. "Environmental Impact Assessment for Dillingham Airfield General Aviation Facilities Project." Kentron International, Inc. for the State Department of Transportation, May 1978.
2. "Noise Regulation" - Section 21-2.21, Comprehensive Zoning Code, City & County of Honolulu, 1978.
3. "Procedures for Abatement of Highway Traffic Noise and Construction Noise," Federal Highway Administration, 23 CFR Part 772, July 1982.
4. "Towards a National Strategy for Noise Control," U.S. Environmental Protection Agency, April 1977.
5. "Interim Criteria for Planning Rotary-Wing Aircraft Traffic Patterns and Siting Noise-Sensitive Land Uses," P. Schomer et al; U.S. Army Construction Engineering Research Laboratory Interim Report M-9, September 1976.
6. "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," Bolt Beranek & Newman; U.S. E.P.A. PB 206 717, December 1971.

TABLE I - PREDICTED TRAFFIC NOISE LEVELS
ALONG FARRINGTON HIGHWAY
EAST OF PROJECT HAUKA ROAD



YEAR	PEAK HOUR TIME	VEHICLES PER HOUR	SPEED (MPH)	L_{eq} (1 hr) (dB)	Δ dB re 1985
1985*	a.m.	101	35	55.5	
	p.m.	541	35	56.1	
	Weekend	729	30	60	
2000**	a.m.	541	30	61.8	6.3
	p.m.	818	25	61.9	5.8
	Weekend	1312	20	62.0	2
2005**	a.m.	729	25	61.5	6.0
	p.m.	1165	20	61.4	5.3
	Weekend	1783	20	63.4	2.4

* Vehicle mix assumed 95% autos, 4% medium trucks, 1% heavy trucks

** Vehicle mix assumed 94.5% autos, 4% medium trucks, 1.5% heavy trucks

TABLE II - PREDICTED TRAFFIC NOISE LEVELS
ALONG FARRINGTON HIGHWAY
WEST OF PROJECT HAUKA ROAD



YEAR	PEAK HOUR TIME	VEHICLES PER HOUR	SPEED (MPH)	L_{eq} (1 hr) (dB)	Δ dB re 1985
1985	a.m.	101	35	55.5	
	p.m.	116	35	56.1	
	Weekend	402	30	60.0	
2000**	a.m.	269	35	60.3	4.8
	p.m.	416	30	61.1	5.0
	Weekend	858	25	61.9	1.9
2005**	a.m.	409	30	60.6	5.1
	p.m.	710	25	61.4	5.3
	Weekend	1170	20	61.7	1.7

* Vehicle mix assumed 95% autos, 4% medium trucks, 1% heavy trucks

** Vehicle mix assumed 94.5% autos, 4% medium trucks, 1.5% heavy trucks

TABLE 101 PREDICTED TRAFFIC NOISE LEVELS
ALONG PROJECT MAUKA ROAD



YEAR	PEAK HOUR TIME	VEHICLES PER HOUR	SPEED (MPH)	$\Delta L_{p0}(1 \text{ hr})$ (dB)
2000	a.m.	140	35	57.5
	p.m.	290	35	60.2
	Weekend	370	30	59.5
2005	a.m.	220	35	59.3
	p.m.	430	30	60.2
	Weekend	550	30	61.3

TABLE IV
VEHICLE COUNT ESTIMATES FOR THE CANE HAUL ROAD

A = 376 ACRES
H = 9 FIELDS

VEHICLE TYPE	OPERATION	OCCURRENCE FACTOR	PASSES PER ACRE PER 24 MONTHS		PASSES/24 NO. PER 24/HR.*		PASSES/HR.*		
			DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
TYPE 10 AUTOS AND PICKUP TRUCKS	H	1	1.10	.38					
	LP	1/3	.57						
	P	1/3	.77						
	R	2/3	.29						
	TOTALS		2.73	.38	1,026	143	2.8	0.4	
TYPE 20G GASOLINE POWERED TRUCKS	H	1							
	LP	1/3							
	P	1/3							
	R	2/3							
	TOTALS		.19	0	71.4	-----	.20	-----	
TYPE 20D DIESEL TRUCKS (NOT CANE HAUL)	H	1	.10	0					
	LP	1/3	.10	0					
	P	1/3	.36	0					
	R	2/3	.05	0					
	TOTALS		.61	0	229	0			
	EQUIPMENT TRANSPORT	1 (0.5H)			94.5	0			
	TOTALS		-----		324	0	.9	0	
			1	3.75	2.25	1,410	846	3.9	2.3
	TYPE 30D (CANE HAUL)	H	1						

1 = HARVESTING
LP = LAND PREPARATION
P = PLANTING
R = RATOONING
1 = TOTAL ACRES
4 = NUMBER OF FIELDS

* BASED ON 183 OPERATING DAYS PER YEAR

DAYS: 7 a.m. to 10 p.m.

NIGHT: 10 p.m. to 7 a.m.

TABLE V
 L_{dn} AND L_{eq} CALCULATIONS FOR CANE HAUL ROAD TRAFFIC

Vehicle type	(dB) SEL at 50'	Number of Passes		Day-Night Noise Level (L_{dn})
		Day N_d	Night N_n	
10	70	2.8	.4	29
206	80	.2	0	24
200	86	.9	0	36
300	90.2*	3.9	2.3	55
TOTAL				55

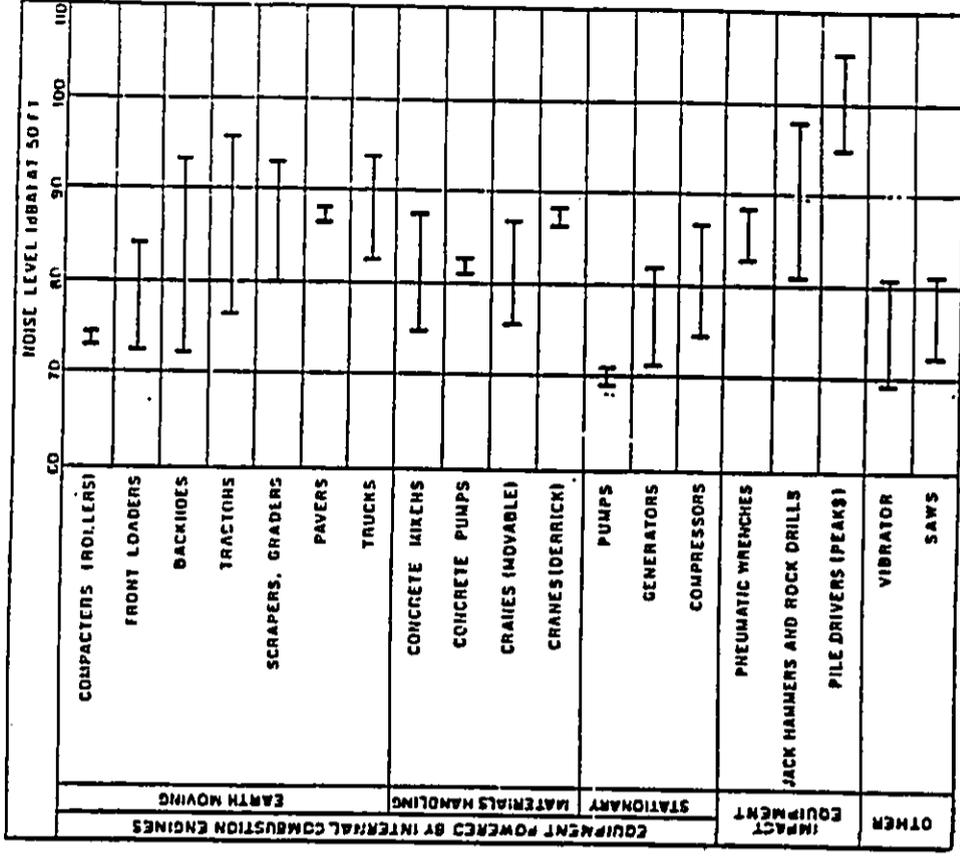
$$L_{dn_j} = SEL_j + 10 \log (N_{d_j} + 10N_{n_j}) - 49.4$$

$$L_{dn_{TOTAL}} = 10 \log \sqrt[10]{10^{L_{dn_j}}}$$

* Average of 37 Cane Haul Trucks (21 Trucks loaded, 16 Trucks empty)
 $SEL = 90.2 + 2 \text{ dB}$
 $dBA_{max} = 83.8 + 2B$

* Sound propagation based on spherical spreading only.

NOTE: At a harvest rate of 40 acres/day (24 hours), it requires 376 acres = 40 AC/DAY = 9.4 DAYS/2 YEARS or about 5 DAYS/YR. for harvesting.



Note: Based on Limited Available Data Samples

FIG. 1. CONSTRUCTION EQUIPMENT NOISE RANGES.
 (from reference 6)

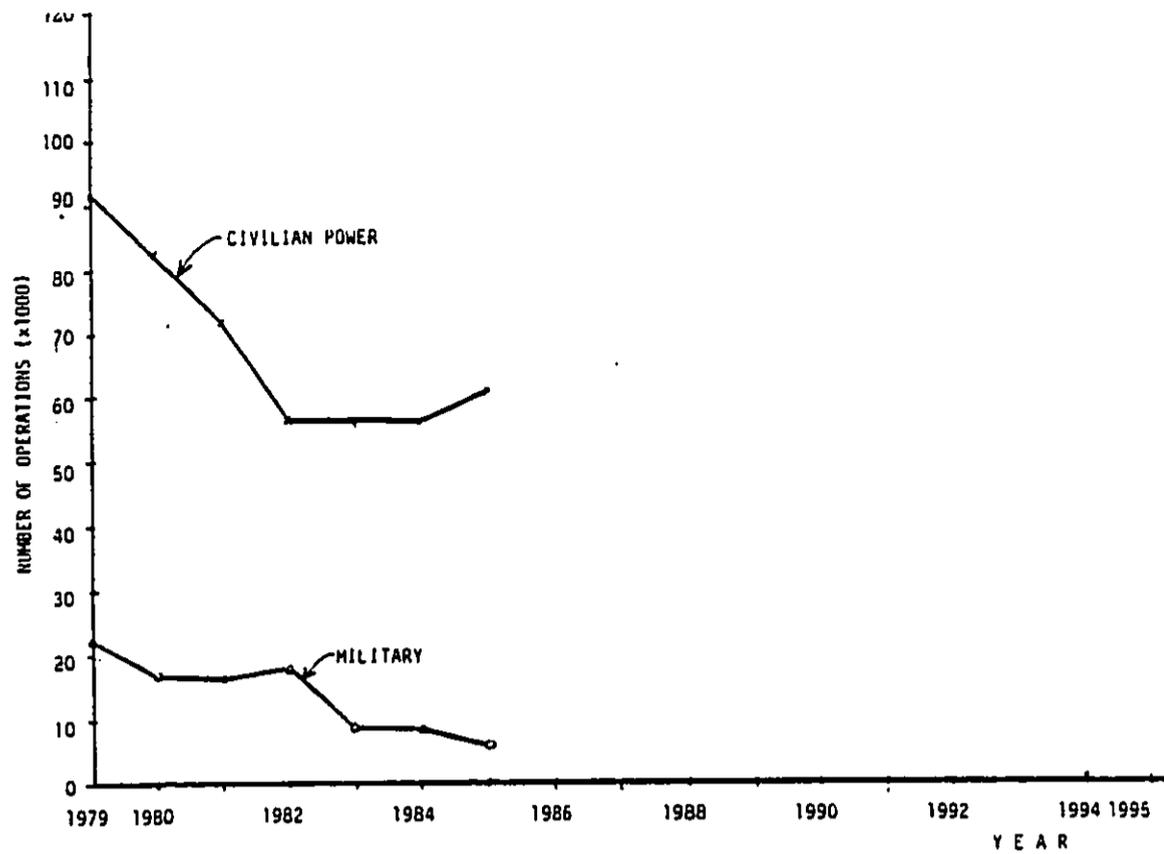


FIGURE 2 - CIVILIAN POWER AIRCRAFT AND MILITARY AIRCRAFT OPERATIONS AT DILLINGHAM AIRFIELD

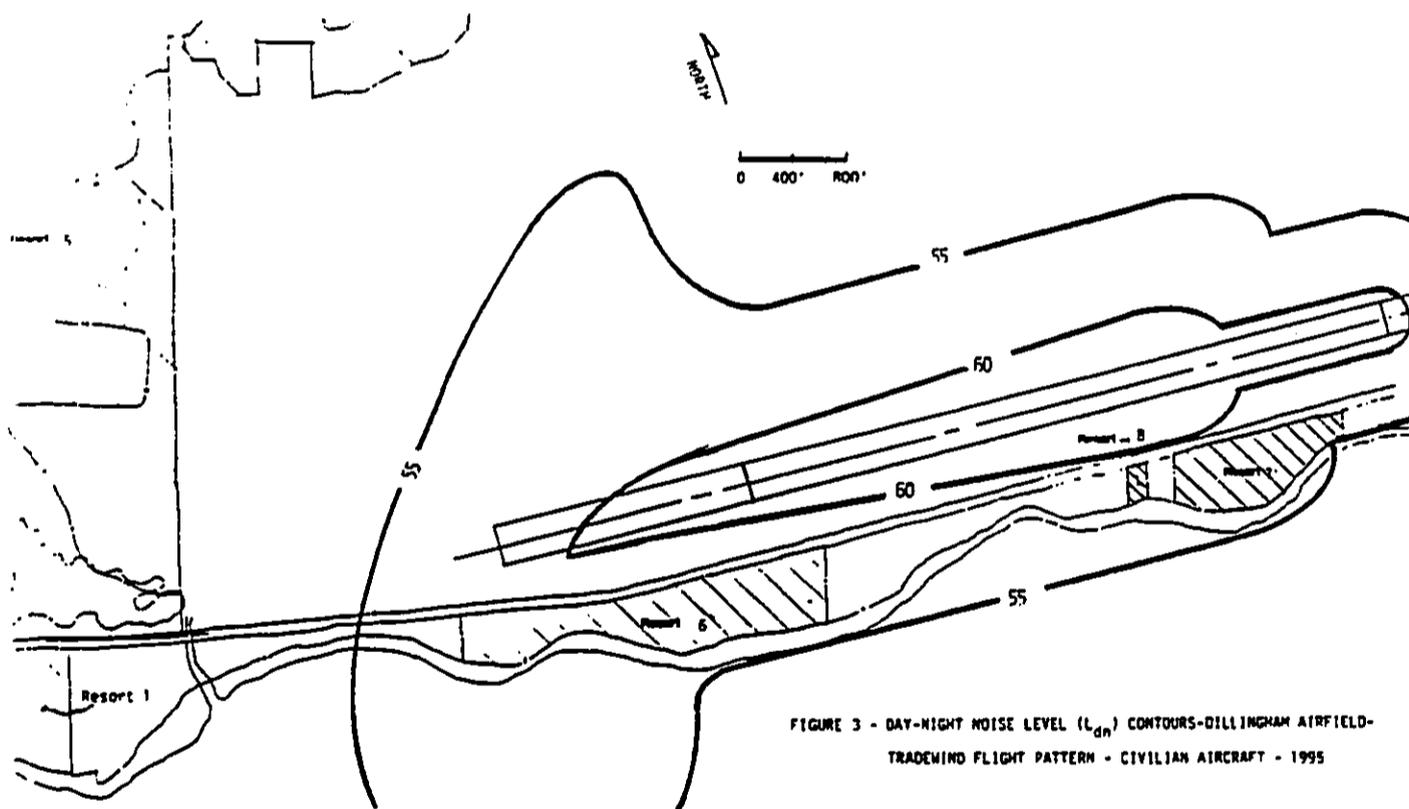


FIGURE 3 - DAY-NIGHT NOISE LEVEL (L_{dn}) CONTOURS-DILLINGHAM AIRFIELD-TRADING WIND FLIGHT PATTERN - CIVILIAN AIRCRAFT - 1995

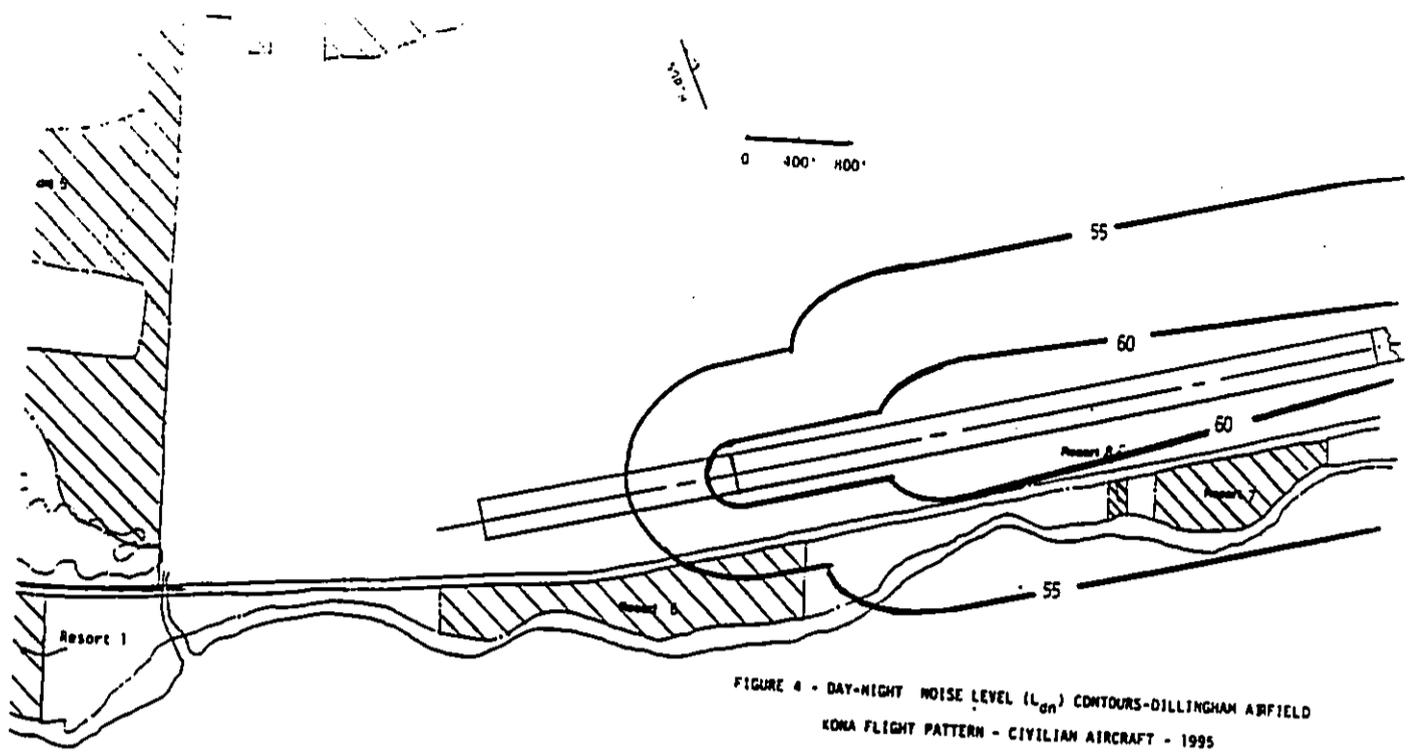


FIGURE 4 - DAY-NIGHT NOISE LEVEL (L_{dn}) CONTOURS-DILLINGHAM AIRFIELD
KONA FLIGHT PATTERN - CIVILIAN AIRCRAFT - 1995

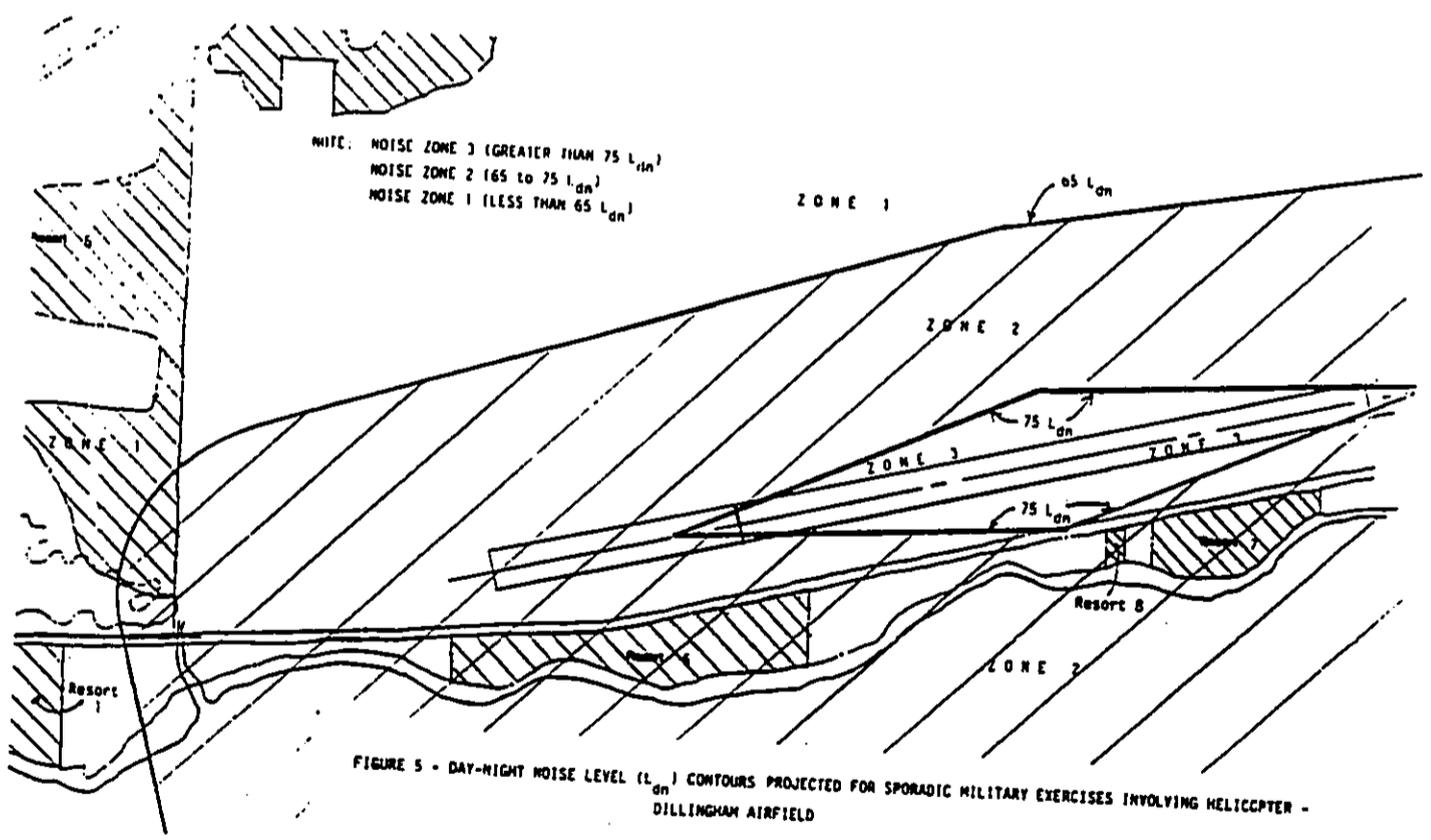


FIGURE 5 - DAY-NIGHT NOISE LEVEL (L_{dn}) CONTOURS PROJECTED FOR SPORADIC MILITARY EXERCISES INVOLVING HELICOPTER -
DILLINGHAM AIRFIELD

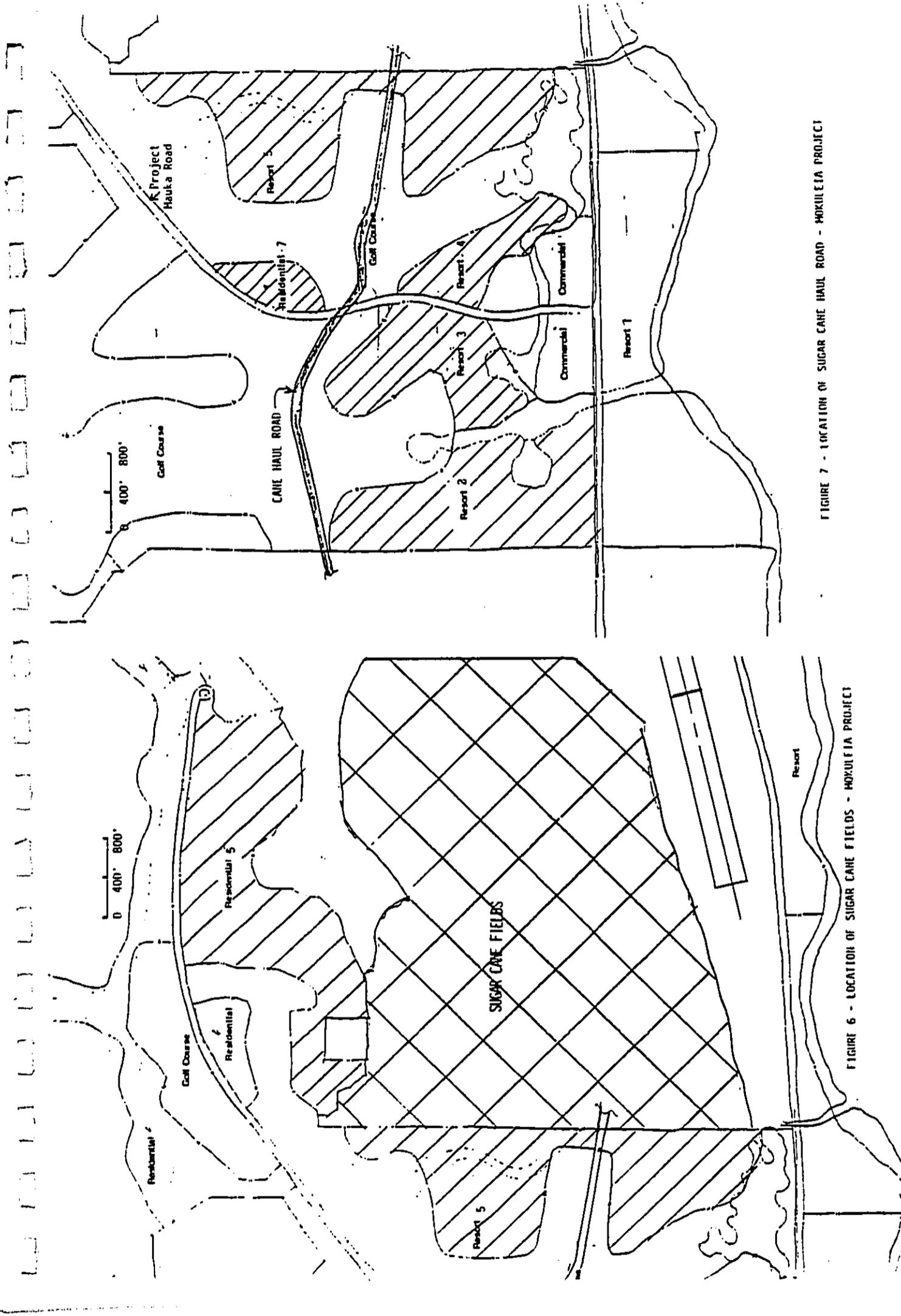


FIGURE 7 - LOCATION OF SUGAR CANE HAUL ROAD - MOKULEIA PROJECT

FIGURE 6 - LOCATION OF SUGAR CANE FIELDS - MOKULEIA PROJECT

APPENDIX L

TRAFFIC IMPACT REPORT
MOKULEIA

Prepared for
Mokuleia Development Corp.

Prepared by
Parsons Brinckerhoff Quade & Douglas, Inc.

May 1986

T R A F F I C
I M P A C T
R E P O R T

Mokulele

May 1986

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Prepared For: Mokulele Development Corporation

Prepared By: Parsons Brinckerhoff Quade & Douglas, Inc.

TRAFFIC IMPACT STUDY
MOKULEIA

SUMMARY

Mokuleia Development Corporation has proposed to develop a recreational project in Mokuleia near Waialua, on the north shore of Oahu. The proposed development includes golf courses, campsites, hiking and equestrian trails, recreational homes, resort hotels and condominiums, and related commercial areas.

The proposed project will increase traffic volumes on Farrington Highway and other roadways in the area. A study of the potential traffic impacts at full and partial development was done to identify needed traffic improvements.

The existing two-lane Farrington Highway has sufficient capacity to serve the traffic expected to be generated by the proposed project. Improvements will be needed fronting the project to handle turning movements into and out of driveways. Increased traffic volumes are also expected to affect conditions at Thomson Corner (the junction of Farrington Highway and Kaukonahua Road), where signalization would be needed. The remainder of the highway network is not expected to be significantly affected by the proposed project.

INTRODUCTION

Mokuleia Development Corporation has proposed a project to develop a recreational destination at Mokuleia on the North Shore of Oahu, between Kaena Point and the town of Waialua. This report summarizes an assessment of the expected traffic impacts of the proposed project.

The assessment included the identification of the existing traffic conditions in the area and an evaluation of probable future traffic conditions with the proposed project.

The traffic impacts of the proposed 4,000-unit recreational development were evaluated for two cases: full development in year 2005 and partial development of 2,500 units in year 2000. The major traffic impacts are expected along Farrington Highway between the project site and Waialua. Impacts to the highway within the project's limits have also been identified.

EXISTING CONDITIONS

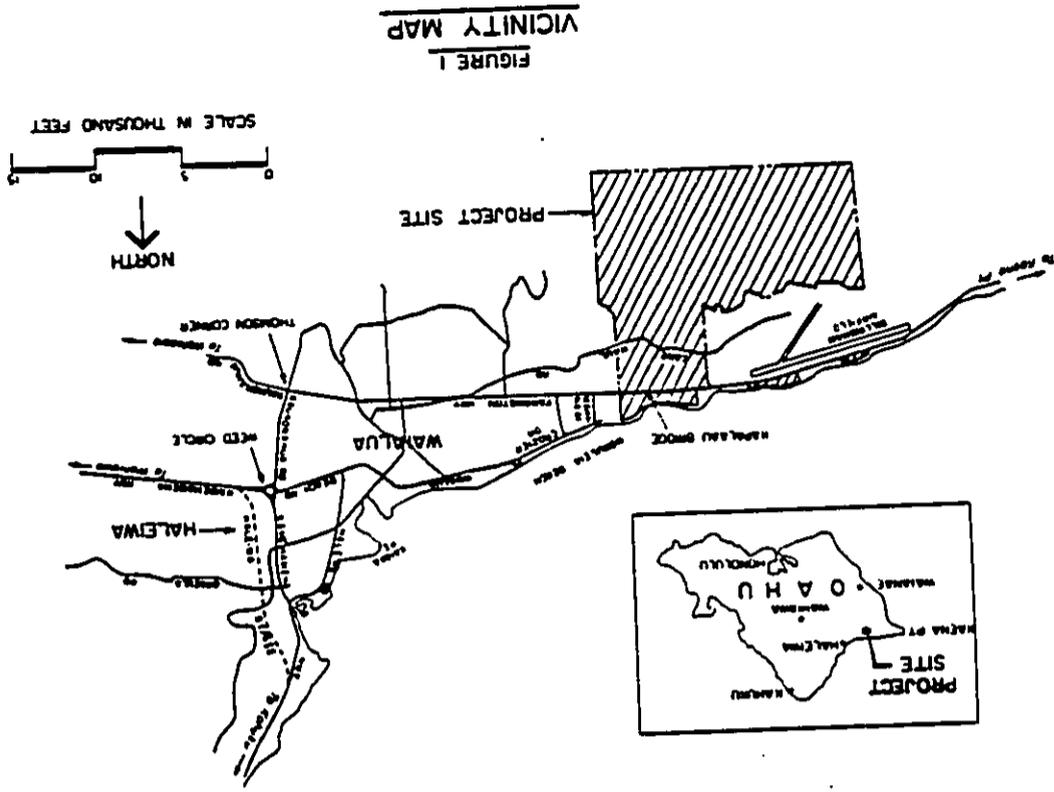
The project site is located approximately three miles west (or toward Kaena Point) of Waialua on the north shore of the island of Oahu (See Figure 1). Farrington Highway connects the project site with Waialua. The paved portion of the highway ends approximately four miles west of the project site; Farrington Highway continues around Kaena Point to the Maianae coast, but becomes essentially an unpaved roadbed. The paved portion begins again near Makua Valley, located approximately 4 miles southeast of Kaena Point.

The portion of Farrington Highway between Kaena Point and Waialua is a State highway, presently on their Federal-aid Secondary System. Current plans show little development in the area and no improvements have been proposed for the highway. No other public roadways provide access to the project site.

Near the project, the two-lane Farrington Highway varies in width from 20 to 22 feet. The highway is on level terrain, but shoulders are unpaved or non-existent. Several beach parks, the Camp Erdman recreational area, and Dillingham Airfield (glider port) are located between the project site and Kaena Point. A portion of the project site is presently used for polo matches, which are held on Sunday afternoons during the spring and summer.

In Waialua, the highway pavement is wider, and parking is permitted alongside the travel lanes. In the one-mile segment from Waialua to the end of Farrington Highway at Thomson Corner (junction with Kautonahua Road), various cross streets and driveways enter the highway.

Kautonahua Road is a two-lane highway which continues in two directions from Thomson Corner. In the southeasterly direction, the road



provides access to Mahiawa, and connects to Kunia Road, Kamehameha Highway, and the H-2 Freeway via Wiliikina Drive. To the north, Kaulonahua Road feeds Weed Circle, a traffic rotary which also serves Kamehameha Highway and Nahaia Beach Road. From the rotary traffic can continue toward Mahiawa, Maialua, or into Haleiwa and other points north of Haleiwa.

Traffic Conditions

Existing traffic volumes were determined from manual field counts and data from previous counts taken by the State Highways Division. 1 Weekday traffic volume (two-way) on Farrington Highway at Kapalaau Bridge near the project site was approximately 1,330 vehicles per day (vpd) in 1984. Earlier counts were higher, averaging 1,800 vpd in the mid-1970s and 1,450 vpd in the early-1980s (See Table 1).

Peak hour volumes in the 1984 weekday sample at Kapalaau Bridge occurred between 3:45 and 4:45 PM, during which 116 vehicles per hour (vph) were counted. Analysis of conditions on the two-lane highway during the weekday peak hour using the Highway Capacity Manual² shows Level of Service A (levels of service are described in Appendix A).

Weekend traffic conditions were sampled on April 5-6, 1986, which coincided with the opening of the polo season (data in Appendix B). Daily two-way traffic volumes at Kapalaau Bridge were estimated to be 2,400 vpd on Saturday and 3,500 vpd on Sunday. Peak hours identified by the field counts are 2:00-3:00 PM on Saturday and 1:15-2:15 PM on Sunday. Two-way peak hour volumes counted on Farrington Highway west of Mahiawa Street were 237 vph on Saturday and 402 vph on Sunday.

Analyses show Level of Service B in Saturday's peak hour and Level of Service C during Sunday's peak hour. Field observations indicated better levels of service, probably attributable to the relatively short

Table 1
HISTORICAL TRAFFIC VOLUMES
Vehicles/Day

Farrington Highway at:	Kapalaau Bridge			Kaulonahua Road		
	WB	EB	Total	WB	EB	Total
July 1973	908	958	1,866	-	-	-
July 1974	1,019	969	1,988	-	-	-
June 1975	828	1,061	1,889	-	-	-
June 1976	738	775	1,513	2,816	2,944	5,760
April 1977	887	842	1,729	2,744	2,999	5,743
March 1978	944	902	1,846	2,650	3,127	5,777
August 1979	-	-	-	2,698	2,756	5,444
August 1981	633	614	1,247	2,445	2,513	4,958
August 1982	801	823	1,624	2,967	3,217	6,184
August 1983	779	693	1,472	3,020	3,434	6,454
September 1984	685	643	1,328	2,970	3,241	6,211

Source: State of Hawaii, Department of Transportation, Highways Division, Planning Branch. Count Stations C-23-D and 22.

stretch of highway (approximately 3 miles) and the lack of slow moving vehicles in the traffic stream.

Traffic volumes on the other side of Matalua, near Thomson Corner (Kaukonahua Road intersection) were also recorded by the State Highways Division. Weekday volume was approximately 6,210 vpd in 1984. A review of the counted volumes indicates an average growth of 1.2 per cent per year (See Table 1).

The weekday peak hour volume in 1984 near Thomson Corner was 619 vph between 6:45 and 7:45 AM; the afternoon peak hour occurred between 4:30 and 5:30 AM, in which traffic volume was 500 vph. The maximum volume at this location was estimated to be 770 vph during the peak hour on Sunday.

Existing highway levels of service near Thomson Corner were computed to be "C" during weekday peak hours and "D" in the Sunday peak hour. However, because of the limited length of this segment of Farrington Highway and the numerous driveways and other crossings, intersection levels of service at Thomson Corner would be a better indicator of conditions in this area. Using estimated turn volumes for the Sunday peak hour, the longest delays are for vehicles wishing to turn left from Kaukonahua Road (from Weed Circle) toward Matalua; Level of Service D would be experienced.

PROPOSED PROJECT

The proposed project (Figure 2) is a recreational development including golf courses, campsites, hiking and equestrian trails, and other facilities. In support of these activities, recreational homes, resort hotels and condominiums, and related commercial areas will be provided.

The project is expected to be developed over a period of 15 years, starting about 1990 after the receipt of the necessary governmental approvals. Two 18-hole golf courses and commercial facilities are expected to be developed in the early years, with the recreational homes, hotels, and condominiums being constructed over the entire term of the project. The project is expected to be fully developed in year 2005. Traffic conditions in two future years were evaluated for the following levels of development:

	Year:	Year 2000	Year 2005
Golf Course (acres)		330	330
Commercial (gross square feet)		77,000	100,000
Recreational Homes (dwelling units)		500	700
Hotel & Condominium (units)		2,000	3,300

FUTURE AND PROJECT TRAFFIC

In order to identify the potential traffic impact of a proposed project, future traffic volumes are projected from existing and planned projects. Estimates of traffic generated by the proposed project are also calculated. Numerical analyses generally rely on available data, averages from surveys of similar uses, and other information.

Future Conditions Without Project

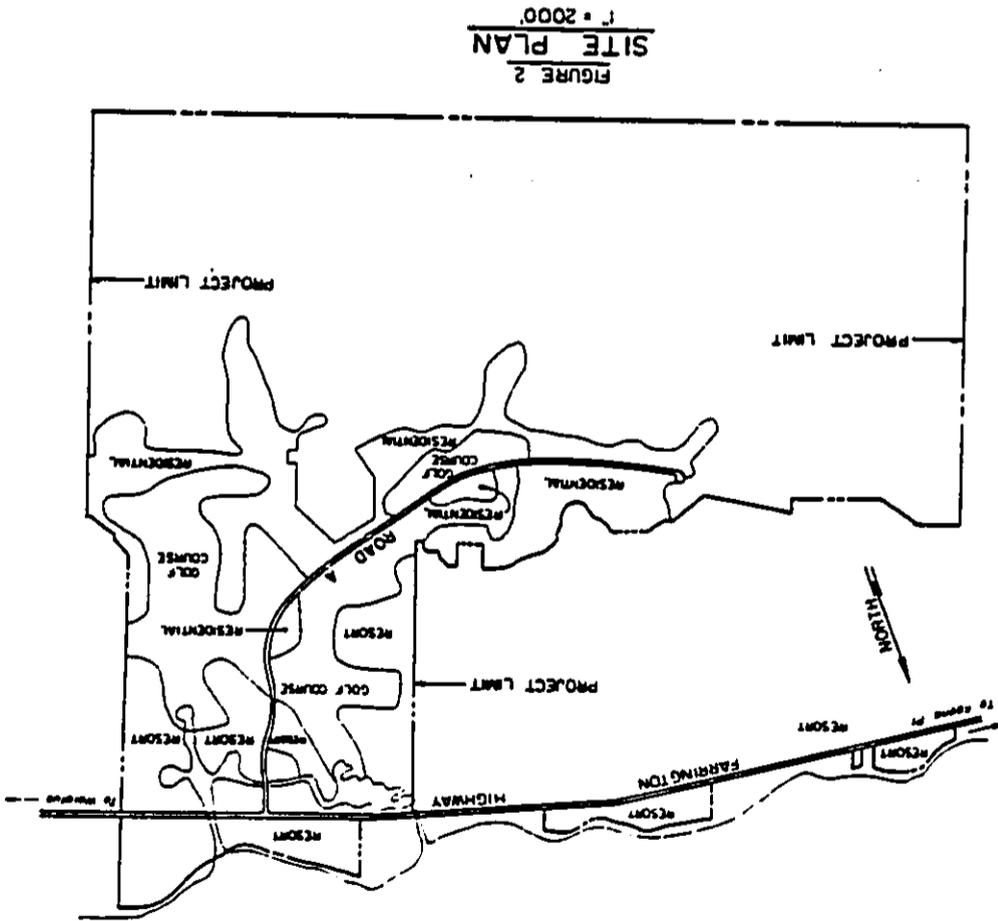
For this evaluation, future traffic without the proposed project is estimated using trends from historical traffic count data. As indicated earlier, traffic volumes on Farrington Highway in the vicinity of the project (Kapalaau Bridge) have decreased in the past decade. Future volumes without the project have been assumed to equal the latest available count; i.e. the State Highways Division's 1984 data and the April 1986 weekend count by Parsons Brinckerhoff.

Future conditions along Farrington Highway without the proposed project, therefore, would be the same as existing. Levels of Service would be "A" for weekday peak hours and "C" for the weekend peak hour.

At Thomson Corner, counted volumes show a growth rate of 1.2 per cent per year; this rate was applied to the 1984 State count to predict future volumes at this location without the proposed project. The existing unsignalized intersection will continue to adequately serve the increasing volumes; the Kaulanahua Road approach from Weed Circle, however, will experience greater delays and shoulder stabilization or widening would be needed to minimize delays to right turn traffic.

Traffic Generation

The traffic generation analyses estimate the increase in traffic caused by the project. These analyses include trip generation, trip distribution, and traffic assignment.



The traffic generated by the proposed development was estimated by applying traffic generation rates to the parameters of the project. Separate rates were used for weekdays and for weekends. Rates for traffic entering and leaving the golf courses and commercial area were derived from data contained in the Institute of Transportation Engineers' Trip Generation³ report. Traffic volumes generated by the recreational homes were also calculated using this report.

Traffic volumes generated by the hotel and condominium units were based on data collected by the City's Department of Transportation Services⁴ in 1977 at the entrance to the 487-unit Kullima Hotel (presently Turtle Bay Hilton). The hotel, like the proposed project, is situated in a low-density area. Traffic volumes entering and exiting the hotel were recorded over a one-week period in August. Peak hours and traffic generation rates were derived from this data. The highest hourly traffic volumes were recorded on Sunday, between 12:30 and 1:30 PM. A comparison of counts taken at the Kullima resort entrance in July 1984 on a Tuesday and on a Saturday with the 1977 counts indicate that traffic generation rates for the 1984 counts were lower; the rates used in this study, however, are from the higher and more extensive 1977 counts. Table 2 summarizes the rates used.

The traffic volumes estimated for the proposed project's golf courses, commercial development and the hotel and condominium units represent total traffic expected at their respective driveways. Many of the trips in the proposed development are expected to be internal trips, i.e. both trip ends of a trip, the origin and destination, would be within the development. The following factors were used to account for the internal trips:

- 80% of the traffic generated by golf courses
- 75% of the traffic generated by commercial activity
- 15% of the traffic attracted to hotel or condominium units (5% in year 2000)

Table 2
TRIP GENERATION RATES

Daily Traffic (veh./day, in plus out)	Hourly Traffic (veh./hour)		PM Peak Hour		
	In	Out	In	Out	
<u>Driveway Volumes</u>					
<u>Hotel & Condo.</u> ¹					
Weekday	5.59	0.18	0.10	0.25	0.29
Weekend	6.76	-	-	0.37	0.39
<u>Golf Course</u> ²					
Weekday	6.9	0.22	0.05	0.08	0.31
Weekend	5.9	-	-	0.21	0.43
<u>Commercial</u> ³					
Weekday	76.9	1.1	1.1	3.4	3.7
Weekend	109	-	-	5.2	5.2
<u>Net Volumes - at entrance to resort</u>					
<u>Recreational Homes</u> ⁴					
Weekday	3.16	0.11	0.05	0.10	0.16
Weekend	3.07	-	-	0.13	0.15
<u>Other Resort</u> ⁵ - (Year 2000)					
Weekday	3.55	0.15	0.05	0.14	0.22
Weekend	4.25	-	-	0.23	0.28
<u>Other Resort</u> ⁵ - (Year 2005)					
Weekday	2.88	0.13	0.04	0.11	0.18
Weekend	3.42	-	-	0.18	0.22

Notes:

- 1- vehicles/unit, derived from 1977 Kullima counts
- 2- vehicles/acre, from ITE, Trip Generation, 3rd Edition
- 3- vehicles/thousand gross square feet leasable area, from ITE, Trip Generation, 3rd Edition
- 4- vehicles/unit, from ITE, Trip Generation, 3rd Edition
- 5- vehicles/unit, calculated

The estimate of project-generated traffic on the external roadway system was developed by deducting the internal trips. Additionally, 15% of the traffic attracted to the commercial area was estimated to be diverted from traffic already on the highway.

The trip distribution estimated that 30% of the project's external traffic will have origins or destinations in the Mokuilela to Maialua area. Haleiwa would account for an additional 30%, with the remainder of the North Shore attracting 10%. Only 30% of the project generated traffic is expected to travel to or beyond Mahiwa.

Traffic Impacts

The traffic impacts of the proposed project were evaluated for the weekday (PH) peak hour and the weekend peak hour, which based on existing traffic would occur on Sundays in the early afternoon. The significant impacts are expected on Farrington Highway between the project and Waiawa, at Thomson Corner, and within the project site.

Table 3 shows the daily traffic generated by the project. Since the proposed project includes various uses on a number of sites, total and net traffic volumes were calculated. The total traffic for each use is the daily vehicle trips at the driveways of the various sites. The net traffic volumes represent the increase in traffic volumes on Farrington Highway at the east limit of the project and were derived after accounting for internal movements within the project.

Table 4 shows the net peak hour traffic volumes. Peak hours on the highway and of the proposed project were assumed to coincide because the peak times were fairly close. The project's most significant traffic impact would occur during the weekend peak hour.

Table 3
TRAFFIC GENERATION

	Vehicles per day (In + Out)		Weekday		Weekend	
	Total	Net*	Total	Net*	Total	Net*
Year 2000						
Hotel & Condominiums	11,180	5,160	13,520	6,020		
Golf Courses	2,280	460	1,950	390		
Commercial	5,920	590	8,390	840		
Recreational Homes	2,940	1,580	3,240	1,530		
TOTAL	22,320	7,790	27,100	8,780		
Year 2005						
Hotel & Condominiums	18,450	7,130	22,310	8,170		
Golf Courses	2,280	460	1,950	390		
Commercial	7,690	770	10,900	1,090		
Recreational Homes	4,020	2,210	4,440	2,150		
TOTAL	32,440	10,570	39,600	11,800		

* Increase in traffic on Farrington Highway at project limit (east of Maialua side)

TRAFFIC EVALUATION AND RECOMMENDATIONS

Farrington Highway will provide access to the project; traffic volumes are expected to increase because of the project. The analyses of year 2000 conditions with the proposed project show Level of Service E in the weekend peak hour. Traffic demands on weekdays would be served at Level of Service D or better. For the ultimate development in year 2005, predicted weekday and weekend peak hour traffic demands would result in Level of Service E conditions on the existing highway. Table 5 summarizes the highway conditions.

At Thomson Corner, the increased traffic demands caused by the project will create very long delays for vehicles turning left from Weed Circle toward Wahiawa before year 2000. The analysis also indicates that all of the stop-controlled movements at the intersection will have demands greater than available capacities in year 2005. Signalization of the intersection would alternately assign to the various conflicting movements the right to use the intersection; the analysis shows, in all cases, below capacity conditions. Traffic volumes and operating conditions at this intersection should be monitored and signalization provided when warranted.

Traffic impacts beyond the Mokuleia-Waiālaia area are expected to be significantly less. Two existing highways, Kaukonahua Road and Kamehameha Highway, provide service south toward Wahiawa. Kamehameha Highway, Haleiwa Road, and the proposed Haleiwa Bypass Road provide service northward through Haleiwa. Within Haleiwa, existing commercial activities and recreational areas could become destinations for traffic generated by the proposed project.

An earlier study of the daily travel patterns exhibited by persons staying at the Turtle Bay Hilton (formerly Kullima) showed that only 30% of the traffic traveled beyond Haleiwa or Laie to other parts of the

Table 4
NET TRAFFIC - PEAK HOURS

Vehicles per hour	Weekday(AH)		Weekday(PM)		Weekend	
	In	Out	In	Out	In	Out
<u>Year 2000</u>						
Hotel & Condominium	273	79	215	358	341	427
Golf Courses	15	3	5	20	14	28
Commercial	8	8	27	28	40	40
Recreational Homes	55	25	50	80	65	75
TOTAL	351	115	297	486	460	570
<u>Year 2005</u>						
Hotel & Condominium	385	91	287	484	463	576
Golf Courses	35	3	5	20	14	28
Commercial	11	11	34	37	52	52
Recreational Homes	77	35	70	112	91	105
TOTAL	488	140	396	653	620	761

island. A similar distribution of the proposed Mokualeia project's traffic is expected; this distribution would result in minor impacts to the other highway facilities.

Table 5
TRAFFIC CONDITIONS
Farrington Highway

	Traffic Volume (vph)		Level of Service*	V/C Ratio
	WB	EB		
<u>Existing</u>				
Weekday AM Peak Hour	58	43	101	A 0.05
Weekday PM Peak Hour	53	63	116	A 0.06
Saturday Peak Hour	123	114	237	B 0.12
Sunday Peak Hour	276	126	402	C 0.22
<u>2000 With Project</u>				
Weekday AM Peak Hour	409	158	567	C 0.32
Weekday PM Peak Hour	350	549	899	D 0.47
Weekend Peak Hour	736	696	1,432	E 0.71
<u>2005 With Project</u>				
Weekday AM Peak Hour	546	183	729	D 0.47
Weekday PM Peak Hour	449	716	1,165	E 0.62
Weekend Peak Hour	896	887	1,783	E 0.88

* for existing 2-lane highway: 10-foot lanes, no shoulders

Within the project, Farrington Highway should be widened to provide a median lane for left turn traffic. The highway's traffic volumes in this area will include the project's internal trips between the ocean-front resort parcels and the commercial and recreational activities mauka of the highway. The median lane will improve traffic operations by allowing traffic desiring to make left turns from the highway to vacate the through lane; in addition, traffic desiring to enter the highway from a driveway or side street will have a refuge area available so that only one lane of traffic needs to be crossed at a time.

Turn volumes at the intersection of Farrington Highway and the proposed access road were estimated for the weekend peak hour in years 2000 and 2005 to determine localized improvements that will be needed (Figure 3). The following actions are recommended at the intersection:

- Signalize the intersection when traffic volumes or conditions warrant this improvement; the predicted volumes indicate that the unsignalized intersection will reach capacity in the middle of year 2001.
- The access road (Road A) should be at least four lanes wide; two lanes should be provided on the access road approach to the intersection so that left and right turns onto Farrington Highway can be separated.
- A separate, dedicated left turn lane should be provided for westbound Farrington Highway-to-access road traffic.
- A deceleration lane should be constructed for eastbound Farrington Highway traffic turning right into the access road.

- Driveways from the commercial areas, hotels, or other uses should be located as far as possible from the intersection; desirable minimum distances are 400 feet along Farrington Highway and 300 feet along Road A.

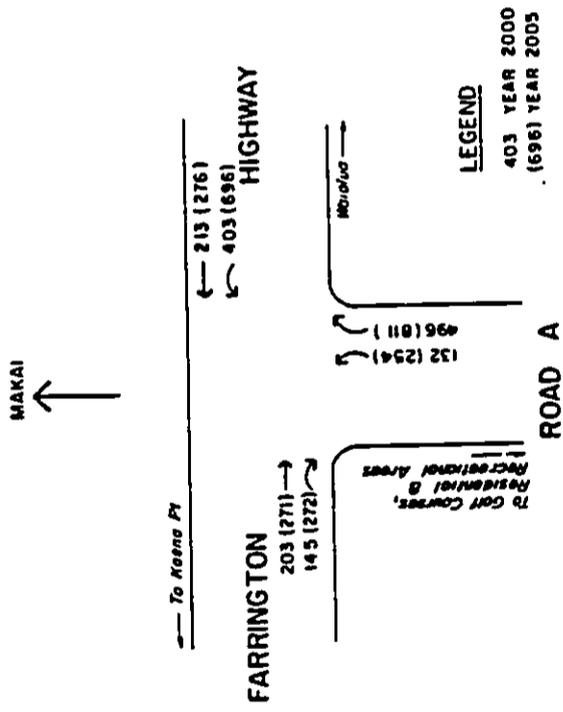


FIGURE 3
TRAFFIC ASSIGNMENT
 WEEKEND PEAK HOUR

CONCLUSIONS

The proposed project will increase traffic volumes on Farrington Highway in the Mokuia-Hatalua area. Levels of service on the existing two-lane highway will reflect the increased traffic, with the existing Sunday peak hour Level of Service C changing to Level of Service E with completion of the proposed project. The existing highway, however, has sufficient capacity to serve the predicted peak hour volumes.

At Thomson Corner, signalization will be needed. Without signalization, the increased traffic volumes will cause very long delays to traffic movements which would be controlled by existing stop signs or which must yield to oncoming vehicles.

The traffic increases on other roadways farther from the project will be smaller due to the distribution of demands; the increases will be a small portion of existing traffic and will not have any significant impact on traffic conditions. Within the project limits, improvements are recommended to minimize the adverse effects of the increased traffic volumes.

REFERENCES

- 1 - State of Hawaii, Department of Transportation, Highways Division.
- 2 - Transportation Research Board, National Research Council, Highway Capacity Manual, Washington, D. C., 1985.
- 3 - Institute of Transportation Engineers, Trip Generation (Third Edition), Washington, D. C., 1982.
- 4 - City and County of Honolulu, Department of Transportation Services.

APPENDIX A

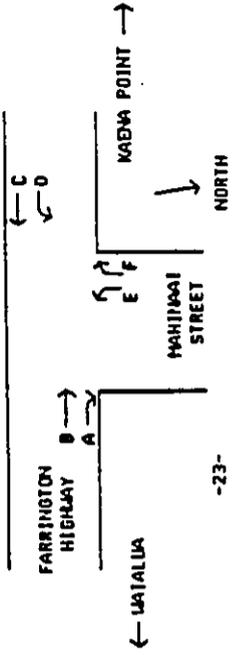
The Highway Capacity Manual defines "Levels of Service" as qualitative measures which describe traffic operational conditions considering speed and travel time, freedom to maneuver, traffic interruptions and delays, comfort and convenience, and safety. Six levels of service, from "A"(best) to "F"(worst), are defined.

- Level of Service A represents free flow. Individual users are virtually unaffected by the presence of others. For a two-lane highway, passing demand is well below passing capacity; platooning of three or more vehicles is rare. For unsignalized intersections, little or no delay is experienced.
- Level of Service B represents stable flow where the presence of other users in traffic becomes noticeable. On a two-lane highway, platooning is common as passing demand approaches passing capacity. Short traffic delays occur at unsignalized intersections.
- Level of Service C describes stable flow with greater constraints on maneuvering. Long platoons and lower speeds are experienced on two-lane highways. Delays at unsignalized intersections are described as "average."
- Level of Service D represents high density, stable flow. Significant restrictions in speed and maneuverability begin to occur. The opposing traffic streams of a two-lane highway operate separately as passing capacity approaches zero. Delays at unsignalized intersections are long as acceptable gaps in the main traffic stream become infrequent.
- Level of Service E represents capacity or near-capacity conditions. Speeds are low and flow is considered unstable. Passing on two-lane highways is virtually impossible and platooning becomes intense where there are slow moving vehicles or other interruptions. Very long delays occur at unsignalized intersections.
- Level of Service F describes a condition in which traffic demands exceed capacity. Forced flow, with extreme delays and long queues, occur.

APPENDIX B
FIELD TRAFFIC DATA

MOKULEIA TRAFFIC COUNTS
INTERSECTION: FARRINGTON HWY. AT MAHINAAI ST.
COUNT TAKEN ON SATURDAY, 04/05/86 BY LM AND KO
PAGE 1 OF 2

COUNT VOLUMES	A	B	C	D	E	F	TOTAL
10:10-10:15 AM	0	5	0	0	0	0	5
-10:30	0	28	6	0	2	1	29
-10:45	1	18	13	1	0	0	33
-11:00	0	17	21	0	0	1	39
-11:15	2	21	10	1	1	3	46
-11:30	1	19	21	1	1	1	44
-11:45	3	27	15	1	1	2	49
-12:00 PM	2	32	16	1	3	1	55
-12:15	4	23	29	2	0	1	59
-12:30	2	17	21	0	0	2	42
-12:45	0	23	22	0	2	0	47
-1:00	5	24	22	0	2	0	53
-1:15	4	26	21	0	0	3	54
-1:30	2	35	19	2	0	0	58
-1:45	1	26	18	1	0	2	48
-2:00	0	24	22	2	1	1	50
-2:15	0	22	31	2	1	1	57
-2:30	2	32	34	0	1	3	72
-2:45	2	30	20	1	1	0	62
-3:00	1	31	16	2	0	4	54
-3:15	1	11	32	0	6	0	50
-3:30	0	12	28	0	0	0	40
-3:45	0	13	28	1	1	1	36
-4:00	1	15	27	0	1	2	46
-4:15	3	16	42	4	2	2	69
-4:30	2	14	38	0	0	0	46
-4:45	0	23	38	1	2	0	56
-5:00 PM	0	11	22	0	1	1	35
10:10-5:00 TOTAL	39	587	624	23	29	32	1334
10:15-5:00 TOTAL	39	582	624	23	29	32	1329



APPENDIX M

Visual Impact Analysis

for

Mokuleia Development Proposal

by

Michael S. Chu, Land Architect

April 1987

VISUAL IMPACT ASSESSMENT
FOR THE PROPOSED DEVELOPMENT AT MOKULEIA
OAHU, HAWAII

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LIST OF EXHIBITS

- Exhibit 1: Location Map
- Exhibit 2: Mokuleia Conceptual Development
- Exhibit 3: North Shore Viewshed Map
- Exhibit 4: Visual Impact Zone Map
- Exhibit 5: Description of Photos

prepared by

MICHAEL S. CHU, LAND ARCHITECT
Planning, Landscape Architecture, Urban Design
1121 Nuuanu Avenue Suite 205
Honolulu, Hawaii 96817

A. INTRODUCTION

The purpose of the following assessment is to identify existing views and the visual quality of the Mokualea area, and to determine the extent of possible visual impacts resulting from the proposed Mokualea development. This assessment is based on the Mokualea Conceptual Plan as presented in the Draft EIS, Mokualea Development Proposal, February 20, 1987. This plan contains no specific detail regarding building locations or design features other than a general statement that buildings will be six to seven stories in height. It is therefore assumed that building heights will be in the 60 to 70 foot range and located in the general vicinity as indicated by the plan. Issues such as setbacks (beyond zoning standards), building color, facade treatments, landscaping, etc. are not provided at this point and are therefore not taken into account within this assessment. General bulk, approximate building locations and the existing visual quality of the area are the primary factors under consideration.

B. OBJECTIVES

The primary objectives of this assessment is to determine the probable visual impact zone generated by the project relative and other general concerns (visual) to the overall visual qualities of the North Shore Viewshed, and to provide documentation that will support such determinations.

C. METHODOLOGY

The methodology will focus on the following procedure:

1. Identification of current policies regarding public views and significant land forms
2. Identification of significant view objects, and public viewing points (stationary and road views) relative to the project area
3. Establishment of vertical benchmarks corresponding to stated building heights
4. Photographic documentation illustrating views of the site(s) relative to items 2 and 3 above
5. Determination of visual impact zone

D. PROJECT DESCRIPTION

The proposed Mokualea development consist of site preparation and construction of a recreational and residential/resort nature on about 1019 acres of land consisting of 5 noncontinuous parcels. Gross land holdings total more than 2900 acres.

Of the areas to be developed, 313 acres are proposed for resort use consisting of 2100 hotel rooms and 1200 condominium units; 331 acres are proposed for 700 single family residential units; 342 acres are proposed for golf course use; and 33 acres are proposed for commercial use.

PANEL	SIZE	PROPOSED USES
A mauka	2762 ac.	resort, condominium, commercial, golf course, single family residential
B makai	83 ac.	resort, condominium, commercial
C makai	26 ac.	resort/condominium
D makai	.85 ac.	residential
E makai	13 ac.	resort/condominium
	2884.85 ac.	

E. HEIGHT POLICIES

According to current Development Plan policies, maximum building height controls for the North Shore district are as follows:

Residential	25 feet
Commercial	40 feet
Low Density Apt.	30 feet
Medium Density Apt.	40 feet

These are maximum heights which are ultimately set by zoning and SMA conditions, however they serve as the maximum ceiling heights for this assessment.

F. PUBLIC VIEW POLICIES

Development Plans:

The Development Plans state the following in regards to Public Views (General Provisions):

- Public views include views along street and highways, mauka-makai view corridors, panoramic, and significant landmark views from public places, views of natural features, heritage resources, and other landmarks, and view corridors between significant landmarks.
- Such public views shall be protected by appropriate building heights, setbacks, design and siting controls established by the CZC (LHO). These controls shall be determined by the particular needs of each view and applied to public streets and to both public and private structures.
- The design and siting of all structures shall reflect the need to maintain and enhance available views of significant landmarks. No development will be permitted that will block important views.
- Whenever possible, overhead utility wires and poles that significantly obstruct public views shall be relocated or placed underground.

Further policy statements regarding public views are found in the North Shore Development Plan, Special Provisions.

CZM and SMA

In order to protect and enhance the rural attractiveness of the North Shore, broad open space views from public places of the agricultural fields, and panoramic and continuous views from public places of the coast and the sea shall be protected whenever possible. Important views to be protected include, but are not limited to the following:

- Panoramic views of Waimea Bay to Sunset Beach from Pupukea Highlands.
- Views of Waimea Bay from Kamehameha Highway bridge over Waimea River.
- Panoramic views of Maialua Town and Haleiwa Town from the Maialua approach of Kamehameha Highway and Kaukonohua Road.
- Panoramic view of Haleiwa to Kawaihoa from the area near the hairpin turn of Kawaihoa Drive.
- Views of the Waianae Mountains from Kaukonohua Road and Kamehameha Highway in Haleiwa near Heed Circle.
- Ocean views from Kamehameha Highway between Kawaihoa and Sunset Beach.
- Views of the Pali mauka of Kamehameha Highway in Sunset Beach.

Another important set of policies pertaining to views are embodied in Chapter 205A Coastal Zone Management, and the Special Management Area Ordinance (SMA).

Chapter 205A contains seven broad policies focusing on a variety of land use and management practices within coastal areas. One of these policies is entitled Scenic and Open Space Resources in which the following statements are made:

- Identify valued scenic resources within the coastal zone management area;
- Insure that new developments are compatible with their visual environment by designing and locating such development to minimize the alteration of natural land forms and public views to and along the shoreline;
- Preserve, maintain, and where desirable, improve and restore shoreline open space and scenic resources;
- Encourage those developments which are not coastal dependent to locate in inland areas.

The SMA Ordinance states, "It is the City and County of Honolulu's policy to preserve, protect and where possible, restore the natural resources of the coastal zone of Hawaii." This Ordinance establishes an SMA boundary around Oahu which encompasses parcels B, C, D, and E of the

proposed Mokuieia development. The Ordinance states:

"The Council shall seek to minimize, where reasonable, ... any development which would substantially interfere with or detract from the line of sight toward the sea from the State highway nearest the coast."

Conclusion

Efforts to protect scenic coastal resources and views are clearly a thematic message through all of the above policies and objectives. The context for these statements however are inclusive with other policy statements and are not singled out as having priority over other considerations such as housing, employment, public utilities, etc. Also noteworthy are the Special Provisions of the North Shore Development Plan Ordinance which contains no specific statement regarding public views that pertain to the Mokuieia area.

G. EXISTING VIEWS AND VISUAL QUALITY OF THE MOKUIEIA AREA

Due to its bowed configuration, the entire North Shore is considered to be one viewshed ranging from Kanna Point to Kawela Bay with a maximum viewing distance of 18 miles across.

viewshed- all the surface area visible from an observer's view point. (Visual Resource Management,

Jones and Jones, 1977).

In order to determine the visual quality of the Mokuieia area, the entire North Shore Viewshed was studied, beginning at the farthest reaches of this viewshed and moving inward towards the Mokuieia site. This procedure is meant to establish the visual context of the project site and the degree of its visibility from off-site viewing points.

Off Site Public Stationary Viewing Points-East

Primary public viewing points to the east and the degree of visibility of the project site are as follows:

Sunset Beach- Viewing distance of approximately 11 miles. At this distance, the general form of the Maianae Mountains are the only distinguishable features (see photo #1).

Pupukea Beach Park- Viewing distance of approximately 8.5 miles. At this distance, the general form of the Maianae Mountains are the only distinguishable features (see photo #2).

Maimea Bay- Viewing distance of approximately 7.5 miles. At this distance, the general form of the Maianae Mountains are the only distinguishable features (see photo #2).

Haleiwa Beach Park- Viewing distance of approximately 5 miles. At this distance, no details are visible of the project site however the tree line of Ironwoods at the MDA apartments off of Crozier Drive (viewing distance of approximately 2.5 miles) become noticeable

Haleiwa Alli Beach Park- Viewing distance of approximately 4 miles. At this distance, still no details are visible of the project site (see photo #4). The tree line of Ironwoods and the 5 to 6 story buildings off of Crozier Drive (viewing distance of 2.2 miles) become distinctly visible. This observation is significant in that the 5 to 6 story apartment buildings off of Crozier Drive are comparable in height to the proposed structures to the proposed Mokuleia development. The stand of adjacent Ironwoods are also comparable site features.

Kalaka State Park- Viewing distance to project site of approximately 3.1 miles. From this distance, details of the Ironwood tree line (such as variation in tree heights) begins to be visible. Highly visible are the 5 to 6 story apartments off of Crozier Drive (viewing distance of 1.1 miles). Views of the Waianae mountains are visible however the Ironwood tree line screen the base of the mountains from view (see photo #6).

Puuiki Park- No views of the site from Puuiki Park.

Park at MDA apts.- Viewing distance to project site of approximately 2 miles. Visibility of the Mokuleia site is quite visible and details such as fences and existing structures can be seen (see photo #7).

Off Site Public Stationary Viewing Points- West

Primary viewing public viewing points to the west, and the degree of visibility of the project site are as follows:

Camp Erdman and beyond- Viewing distance of approximately 2 miles to parcel D and E. Due to the angle of the coastline, primary views are from the shoreline where the Army Beach can be seen jutting out with the Ironwoods on parcel D and E in the background (see photo #14).

Army Beach- Parcel D and E are adjacent to and in full view from the Army Beach. Also visible are lateral views along the shoreline of these two parcels. Mauka views are screened by roadside vegetation.

Roadway Views and Views From Mokuleia Beach Park

Generally, mauka views focus on the Waianae Mountains however the Ironwoods and Hale Koa limit the view to the

Upper ridges. Mauka roadway views into the lower portions of parcel A are only visible from a relatively short section of the highway fronting parcel A at the Crowbar Ranch (see photo #15). This is a fairly significant mauka view as it is one of the few opportunities to view the foothills of the Waianai Mountains.

Parcel B contains significant roadway frontage and currently provides views into the open space of the polo field.

Parcel C lies between the residential lots and Mokuleia Beach Park. The site is heavily vegetated with tall Ironwoods and other coastal plant material. Views from the roadway across the site are not significant due to this thick vegetation (see photo 11).

Parcel D and E are located between Mokuleia Beach Park and Army Beach. They are moderately vegetated with Ironwoods and other plant material inhibiting views across the site. (see photos #12 and 17).

Views from Mokuleia Beach Park and the Army Beach are strongly oriented in a makai direction. Parcels C, D and E flank these parks with tall Ironwood trees and emphasize this mauka-makai viewing direction.

Conclusion

Parcels A, B, C, D, and E, together with the residential lots and Mokuleia Beach Park, occupy approximately 2.5 miles of highway and coastline frontage. Development of 6 to 7 stories on the coastal parcels will likely be visible from as far away as Kaiaka Recreational Park, particularly if minimum shoreline setback standards are used. This viewing direction (from the east) is most critical as the angle of the view provides a broader view of the coastline.

Off-site views from the west (Camp Erdman and beyond) are not as critical because of the shoreline configuration. Parcel E may be visible in the background from western off-site viewing points. Views beyond parcel E and mauka views of parcel A appear hidden by vegetation.

The importance of the roadway views are not focused on any particular view corridor or view object. Important is the overall visual experience over the 2.5 miles of highway frontage from parcel A to parcel E (see discussion on Visual Quality).

H. VISUAL QUALITY

Visual quality refers to the visual and physical attributes of a scene. In describing these attributes, the criteria

developed by the Washington State firm of Jones and Jones, 1977, is applied.

Intactness- Intactness refers to both the integrity of a visual pattern and the extent to which the landscape is free from visually encroaching features. In a predominantly natural environment, manmade development can be an additive element that does not necessarily encroach on its natural setting. However the presence of visual encroachment or eyesore contributes to low visual intactness.

It is the quality of intactness (free from visual encroachment) that is the primary ingredient contributing to the visual quality of the Mokuleia area. At a macro scale, there are no encroaching features into the viewshed. At a micro scale, existing manmade features are generally low in height, dispersed and integrated with the natural landscape.

Vividness- Vividness or memorability of a landscape is derived from contrasting landscape components as they combine in striking and distinctive visual patterns.

At a macro scale, the quality of vividness is not a prime attribute of the Mokuleia area. Within the project area the vivid qualities are more apparent at a micro when viewing

laterally along the shoreline. Contributing to this are the stands of Ironwoods in contrast to the sand beaches and open spaces along the roadway, such the polo field and Mokuleia Beach Park. There are no specific scenic points or visual resources to identify on any of the parcels.

Unity- Unity is the degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. One aspect of this criterion is the unity between manmade and natural pattern elements.

There are very few manmade elements to assess the quality of unity within the Mokuleia area. At both the micro and macro scale, unity and intactness are similar.

Conclusion

The Mokuleia area is unique in its intact and unified characteristics. The absence of urbanization, dispersion of manmade elements, and abundance of natural vegetation (particularly Ironwood trees) over a substantial stretch of the highway attributes to this character. Qualities of vividness are secondary.

I. VISUAL IMPACT ZONE

The visual impact zone represents the outer limits in which proposed building heights may significantly encroach into and alter the visual quality of a given area.

Benchmarks

Important to this determination is the establishment of vertical benchmarks that can be used to represent the approximate building heights proposed by the development.

The first benchmark in determining vertical height involves the usage of telephone poles along Farrington Highway. These poles were determined to be 30 feet tall. However because these poles were often not visible from off-site viewing points, a more visible benchmark was needed. By photographic and mechanical comparison, it was generally determined that many of the on-site stands of Ironwood trees were twice the height of the poles. Since most the parcels are well vegetated with these Ironwood stands, this inferred benchmark was used as a secondary reference point and generally corresponds to the height of a typical 6 to 7 story building.

Further down the Mokuleia coastline (off of Crozier Drive) are several coastal apartment buildings in the five to six

story range, with similar stands of Ironwood trees clustered around and behind the buildings. These buildings and their setting were used to establish an indirect benchmark simply to verify the Ironwood stands as a general height indicator. This benchmark is particularly noteworthy in that it illustrates the relationship in scale between 5 to 6 story buildings and the Ironwoods. One cannot infer however, that the visual impact from this scene is representative of the visual impact on the subject parcels and caution is advised in drawing this conclusion.

Conclusion

Based on an inventory and assessment of off-site views and the establishment of several vertical benchmarks, the probable visual impact zone generated by the proposed Mokuleia development lies between the Army Beach to the west and Kaiaka Recreational Park to the east. Views from the east are the more critical of the two.

Within this zone, visual impacts upon the existing visual quality of the area will probably be concentrated along 2.5 miles of Farrington Highway (mauka and makai) from the eastern side of the Army Beach to the eastern end of Parcel A. The impacts from within this inner zone will relate

primarily to views experienced from the road (moving vehicles) and will likely be generated from the proposed 6 to 7 story buildings, parking lots and other buildings/site development within eye sight of Farrington Highway.

J. SUMMARY AND DISCUSSION

Policies regarding views within the Development Plans, Chapter 205A and the SMA Ordinance are clearly designed to minimize the loss or degradation of scenic resources, particularly at coastal area. It is also quite evident from site visits that the Mokuleia area is unique in its visual qualities and sense of remoteness. Based on the Mokuleia Conceptual Plan, specific visual impacts that may be expected are as follows:

1. The visual quality (particularly the intactness) of each individual parcel and the general Mokuleia area will be noticeably altered.
2. The proposed 6 to 7 story buildings along the coastal parcels will likely be visible and prominent from several off-site public viewing points. Army Beach, Mokuleia Beach Park, park at MDA apartments, and Kaiaka Recreational Park are within the determined visual impact zone.

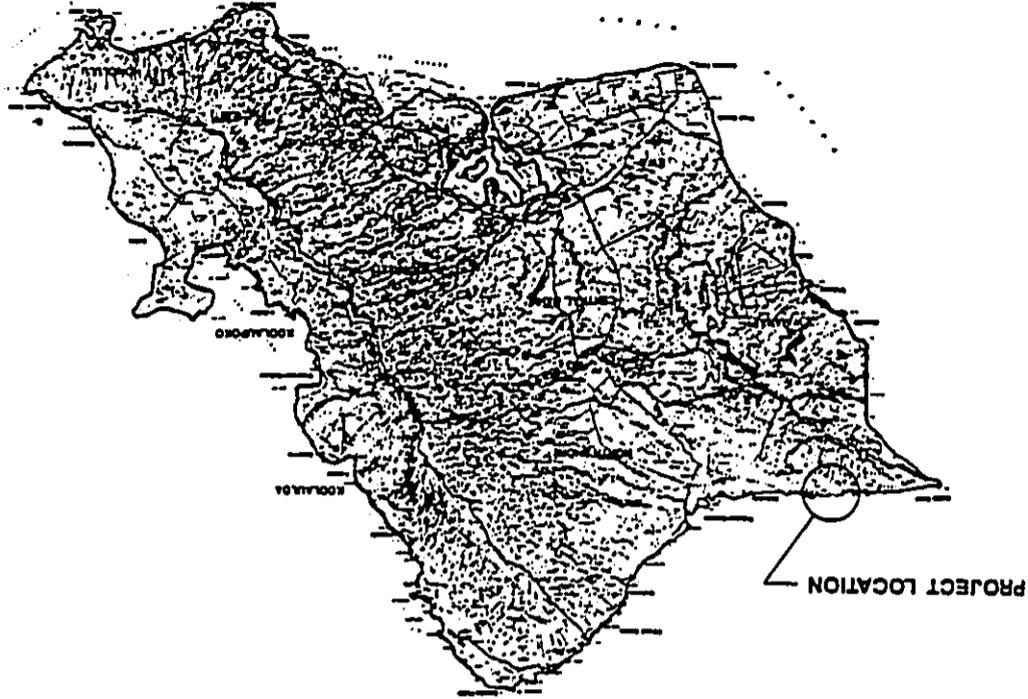
3. Existing roadway views from Farrington Highway (between Army Beach and Mahinaal Rd.) will be altered to and will likely include substantial views of the proposed development in both the mauka and makai directions.

Visual impact however is an occurrence that accompanies any development regardless of size or magnitude. The capacity of the Mokuleia area to assimilate urbanization of the nature proposed, while retaining its visual integrity, may rely upon a development concept that de-emphasizes building prominence in favor of visual compatibility. The MDA apartment buildings off of Crozier Drive may be considered a "worst case" example of visual encroachment along the Mokuleia shoreline. Yet other examples such as the Makaha Sheraton and the Kikioala Plantation on Kauai demonstrate remarkable visual compatibility.

Mitigative measures which may help to reduce visual impact include the following:

1. Reduction in building heights.
2. Increased shoreline setbacks to include angled building envelopes.

EXHIBIT 1
LOCATION MAP



3. Retention of existing trees and siting of buildings among/behind the trees for maximum screening.
4. Development of specific public view corridors.
5. Provide extensive landscaping using plant material that are consistent with the visual quality of the area and will assist in the screening of structures.
6. Use of muted building colors to blend in with the background.

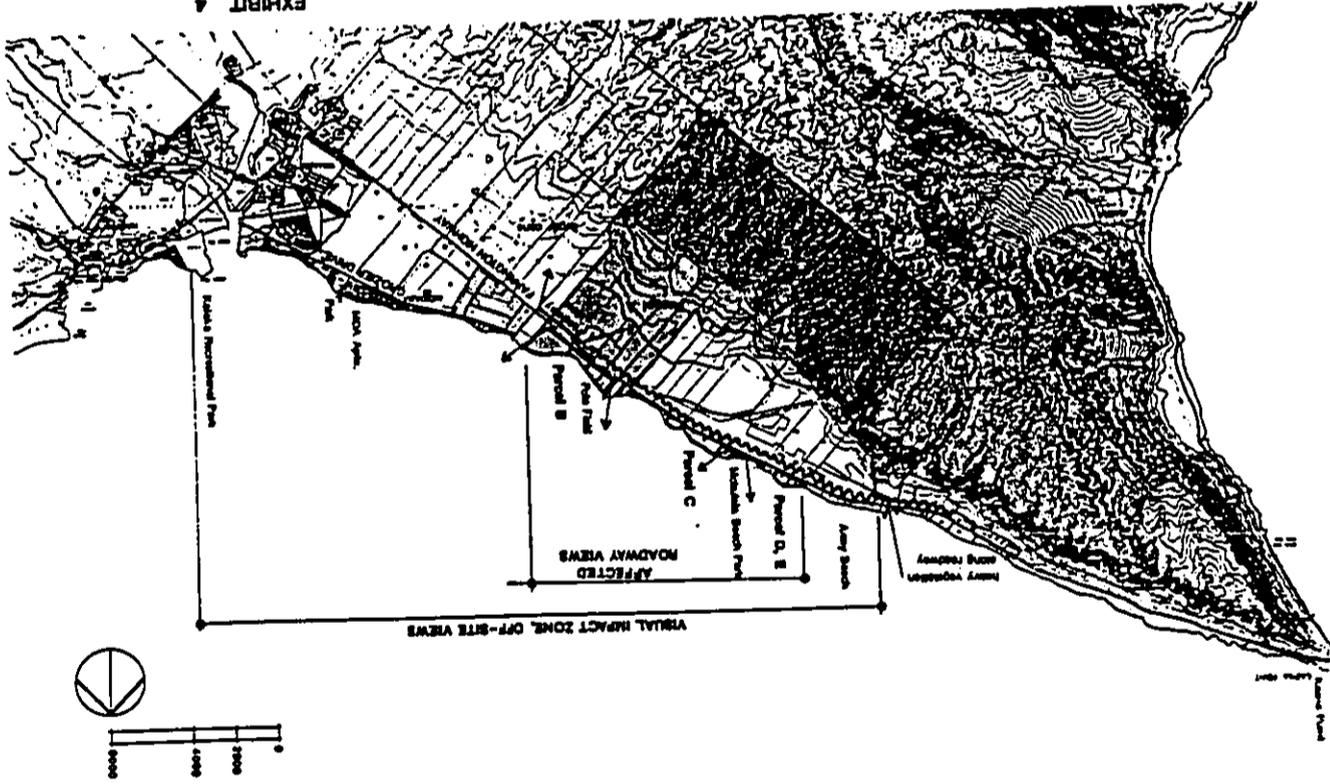


EXHIBIT 4
VISUAL IMPACT ZONE

EXHIBIT 5
DESCRIPTION OF PHOTOS

Note: All photos are taken at 58mm (unless otherwise noted) which approximates the view seen from the normal human eye.

1. View of Mokuleia from Sunset Beach.
2. View of Mokuleia from Waimea Bay.
3. View of Mokuleia from Pupukea Beach Park.
4. View of Mokuleia from Haleiwa Beach Park.
5. View of Mokuleia from Haleiwa Alli Beach Park.
6. View of Mokuleia from Kaiaka Recreational Park.
7. View of Mokuleia from park site at MDA apartments.
8. Telephoto view of shoreline apartments off of Crozier Drive.
9. Telephoto view of Mokuleia coastline.
10. View of parcel C from Mokuleia Beach Park.
11. Roadway view along Farrington Highway in front of parcel C (note telephoto poles at 30 ft. ht.).
12. Roadway view at parcel D (note telephone pole at 30 ft. ht.).
13. Makai view from Farrington Highway across parcel B (large tree in foreground is determined to be 65 feet in ht.).
14. Lateral coastal view at Army Beach (stand of trees to the right are located on parcel E).
15. Mauka view from Farrington Highway into parcel A.
16. Lateral coastal view at parcel B (polo field in background).
17. Roadway view from Farrington Highway at parcel E.
18. Telephoto of apartment buildings off of Crozier Drive (note: building are 5 to stories).

NOTE: FULL SIZED COLOR PHOTOS ARE ON FILE
AT THE DEPARTMENT OF GENERAL PLANNING

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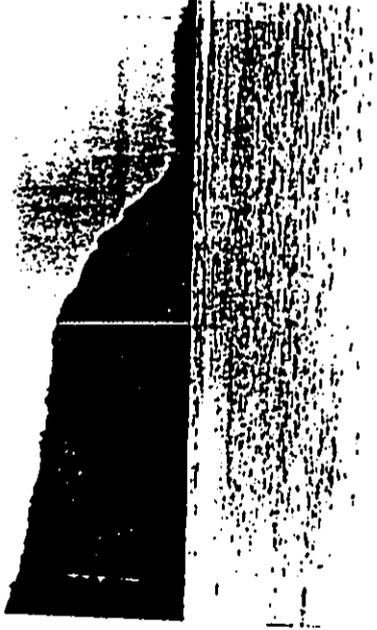
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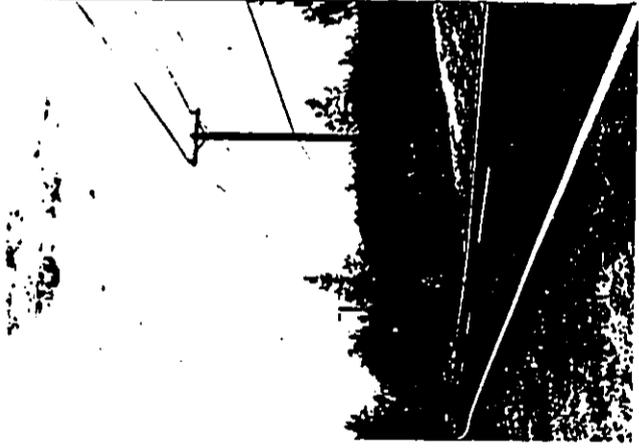
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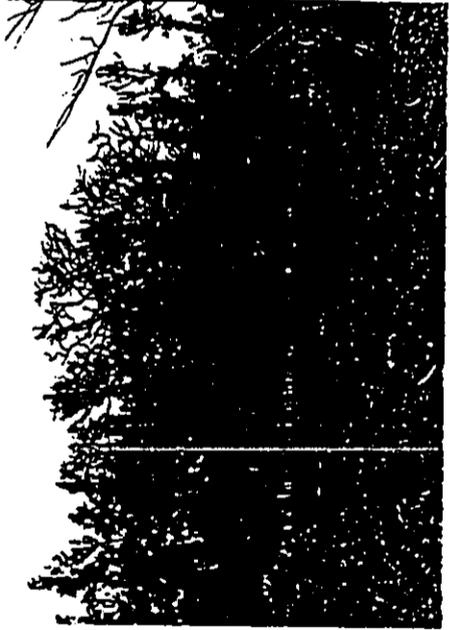
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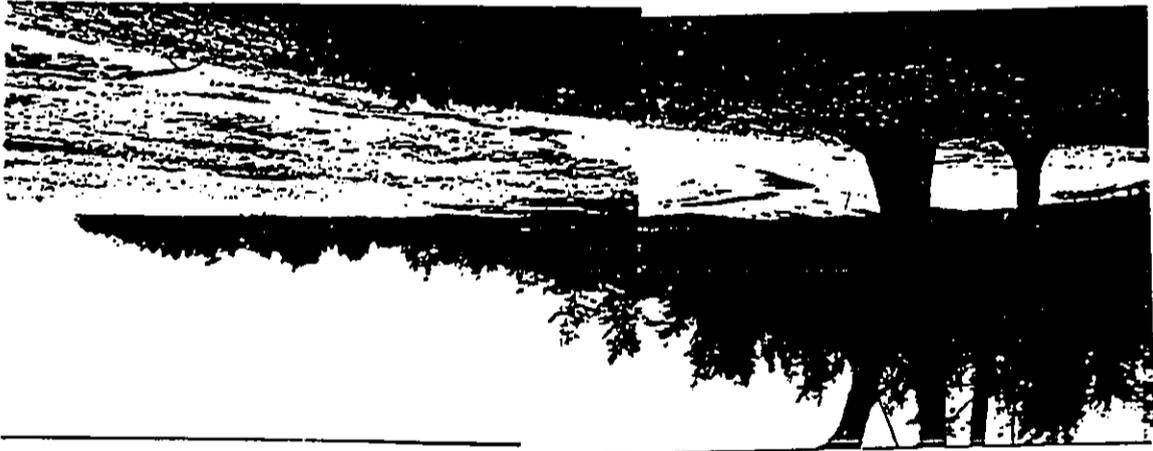
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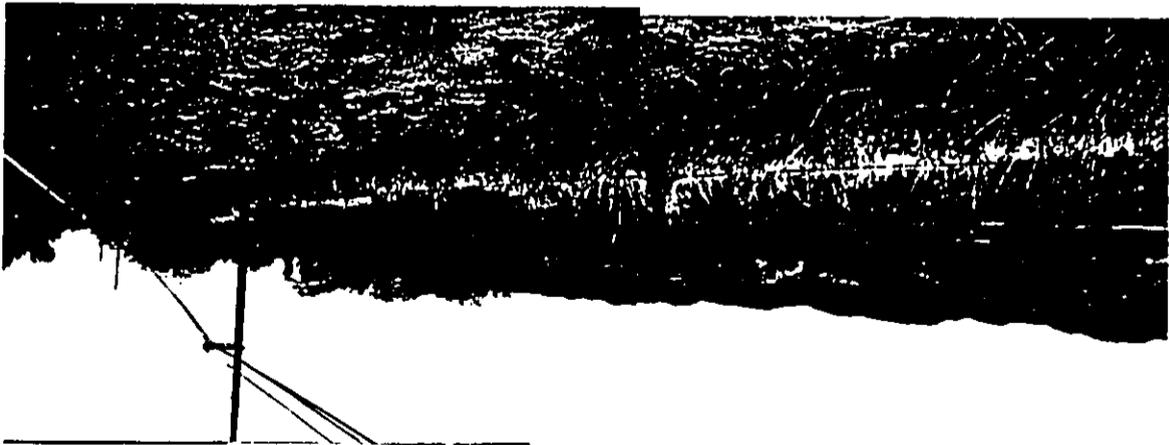
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