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Environmental Impact Statement

Draft

June 1988

KAPOLEI TOWN CENTER

THE ESTATE OF JAMES CAMPBELL

Ewa, Oahu, Hawaii

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P1990.0092

Office of Environmental Quality Control
235 S. Beretania #702
Honolulu HI 96813
586-4185

DATE DUE

Feb. 27, 2003
Feb 1, 2006

Environmental Impact Statement

Draft

June 1988

Prepared for:
The Estate of James Campbell

For Submittal to:
City & County of Honolulu
Department of General Planning

Prepared by:
Helber, Hastert & Kimura, Planners

KAPOLEI TOWN CENTER

THE ESTATE OF JAMES CAMPBELL

Ewa, Oahu, Hawaii

TABLE OF CONTENTS

1.0 INTRODUCTION AND SUMMARY

Page

1.1 Introduction 1-1
1.2 Summary 1-4

2.0 DESCRIPTION OF PROPOSED KAPOLEI TOWN CENTER MASTER PLAN

2.1 Description of the Property 2-1
2.2 Development Objectives 2-4
2.3 Project Rationale 2-4
2.4 Design Concept 2-7
2.5 Land Uses 2-8
2.6 Infrastructure 2-17
2.7 Project Phasing 2-19
2.8 Project Costs 2-21

3.0 ASSESSMENT OF EXISTING CONDITIONS, PROBABLE IMPACTS AND MITIGATING MEASURES -- PHYSICAL ENVIRONMENT

3.1 Geology, Physiography and Topography 3-1
3.2 Climate 3-2
3.3 Regional Land Use Pattern 3-2
3.4 Soils and Agriculture Potential 3-10
3.5 Hydrology 3-18
3.6 Physical Hazards 3-22
3.7 Noise 3-23
3.8 Flora and Fauna 3-34
3.9 Historic and Archaeological Resources 3-37
3.10 Air Quality 3-38
3.11 Scenic and Visual Resources 3-40

4.0 ASSESSMENT OF EXISTING CONDITIONS, PROBABLE IMPACTS AND MITIGATING MEASURES -- SOCIO-ECONOMIC

4.1 Population 4-1
4.2 Economy/Employment 4-5
4.3 Housing 4-8
4.4 Community Participation 4-9

TABLE OF CONTENTS
(Continued)

5.0 ASSESSMENT OF EXISTING CONDITIONS, PROBABLE IMPACTS AND MITIGATING MEASURES -- PUBLIC FACILITIES AND SERVICES

5.1 Schools 5-1
5.2 Recreation Facilities 5-2
5.3 Police Protection 5-4
5.4 Fire Protection 5-4
5.5 Emergency Medical Services and Health Care Facilities 5-5
5.6 Water 5-5
5.7 Solid Waste Disposal 5-7
5.8 Wastewater Disposal 5-7
5.9 Power and Communications 5-9
5.10 Traffic 5-10
5.11 Public Transportation 5-14

6.0 RELATIONSHIP TO STATE AND COUNTY LAND USE PLANS AND POLICIES

6.1 Hawaii State Plan 6-1
6.2 State Functional Plans 6-14
6.3 State Land Use Law 6-16
6.4 General Plan of the City & County of Honolulu 6-18
6.5 Ewa Development Plan 6-20
6.6 County Zoning 6-26
6.7 Coastal Zone Management/Special Management Area Rules and Regulations 6-26
6.8 Environmental Impact Statement Law 6-28

7.0 ALTERNATIVES TO THE PROPOSED ACTION

7.1 Introducation 7-1
7.2 Alternative Locations 7-1
7.3 Continued Agricultural Use of the Site 7-2
7.4 "No Action" Alternative 7-3
7.5 Analyses and Conclusions 7-5

8.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES AND RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

8.1 Irreversible and Irretrievable Commitments of Resources 8-1
8.2 Relationship Between Local Short-term Uses of the Environment and Maintenance and Enhancement of Long-term Productivity 8-1

TABLE OF CONTENTS
(Continued)

9.0 ORGANIZATIONS AND INDIVIDUALS WHO ASSISTED IN THE PREPARATION OF THIS EIS

10.0 REFERENCES

11.0 CONSULTED PARTIES AND COMMENTS RECEIVED DURING THE PREPARATION OF THE DRAFT EIS

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B. An Evaluation of the Profitability Impact on Oahu Sugar Company Resulting from Secondary Urban Center Land Withdrawals. Jack Larsen, Agro-Industrial Consultant. March 1986.
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I. Letter from U.S. Navy Regarding Status of 1984 AICUZ Noise Footprint. (September 24, 1988)

TABLE OF CONTENTS
(Continued)

LIST OF FIGURES

1. Location Map 2-2
2. Tax Map 2-3
3. Master Plan Land Uses 2-9
4. Project Phasing 2-20
5. Ewa Long Range Master Plan 3-3
6. Soil Conservation Service Soil Types 3-14
7. Existing Drainage Conditions 3-20
8. Proposed Drainage Improvements 3-21
9. FAA Height Restrictions 3-24
10. U. S. Navy 1984 Air Installation Compatible Use Zone (AICUZ) Noise Contours 3-29
11. Campbell Estate Noise Contours 3-32
12. State Land Use Districts 6-17
13. Existing Ewa DP Land Use Map 6-21
14. Proposed Changes to Ewa DP Land Use Map 6-22
15. Revised Ewa DP Land Use Map 6-23
16. Existing Ewa DP Public Facilities Map 6-25
17. Proposed Zoning Amendment 6-27

LIST OF TABLES

1. Proposed Changes to Present Ewa DP Land Use Map 1-1
2. Necessary Permits and Approvals 1-7
3. Projected Office Uses 2-10
4. Projected Commercial Space Uses 2-11
5. Projected Government/Civic Uses 2-12
6. Projected Light Industrial Uses 2-13
7. Projected Demand for Other Public Uses 2-14
8. Projected Demand for Housing 2-15
9. Land Use Summary 2-16
10. Estimated Water Demand 2-18
11. Estimated Wastewater Flows 2-19
12. Order of Magnitude Infrastructure Costs 2-21
13. Population Projections by Development Plan Area: 1985-2005 4-2
14. Ewa Area Population Projections: 1985-2005 4-3
15. Selected Demographic Characteristics: 1980 4-4
16. Labor Force Size and Characteristics: 1980 4-5
17. Summary of Projected Employment 4-6
18. Estimated Enrollment Increase in Area Schools 5-2
19 Proposed Changes to Present Ewa DP Land Use Map 6-24

Introduction and Summary

CHAPTER 1

KAPOLEI TOWN CENTER

THE ESTATE OF JAMES CAMPBELL

Ewa, Oahu, Hawaii

1.1 INTRODUCTION

1.1.1 Purpose

The purpose of this environmental impact statement (EIS) is to: 1) describe the proposed Kapolei Town Center development; 2) discuss the proposed action to amend the City and County of Honolulu's Ewa Development Land Use Map; 3) disclose the probable environmental effects of the proposed action; 4) describe measures proposed to minimize adverse effects; and, 5) discuss and analyze alternatives to the proposed action and their environmental effects.

1.1.2 Proposed Action

The EIS has been prepared to support an application by the Estate of James Campbell ("applicant") to amend the City and County of Honolulu's Ewa Development Plan Land Use Map ("proposed action") to accommodate recent master plan revisions to the proposed Kapolei Town Center area. Table 1 below summarizes the proposed changes (full discussion in Section 6.5).

Table 1: PROPOSED CHANGES TO PRESENT EWA DP LAND USE MAP
(acres)

DP Land Use Category	Existing	Proposed	Net Change
Residential	53	20	-33
Low-Density Apt.	103	219	+116
Medium-Density Apt.	30	0	-30
Commercial	493	452	-41
Park	159	163	+4
Public Facility	41	25	-16
TOTAL	879	879	0

As can be seen from the table, net losses in residential, medium-density apartment, commercial and public facility uses are offset by gains in low-density apartment and park uses. The major net change is from residential (loss of 33 acres) and commercial (loss of 41 acres) to low-density apartment uses (net gain of 116 acres).

1.1.3 EIS Process

The Application for Development Plan (DP) Amendment and Environmental Assessment [1] was submitted to the City and County of Honolulu's Department of General Planning (DGP) on February 23, 1988. Because the proposed DP amendments involved a non-county initiated amendment to the City and County of Honolulu Development Plans and would result in designations other than agriculture, conservation or preservation, the proposed action is also subject to the provisions of the Environmental Impact Statement Law, Chapter 343, HRS (Section 343-5 (a)(6)).

Based on the scale of the proposed development and related impacts on population and the economy, and because the applicant was not required to prepare an EIS pursuant to its previous (1985) DP amendments,[2] the applicant determined that the proposed action may have a significant effect on the environment. The Department of General Planning ("accepting agency") concurred with this assessment and, accordingly, on February 29, 1988, filed an environmental impact statement preparation notice (EISPN) with the Office of Environmental Quality Control (OEQC) [3] and notified the applicant of this determination (p. 11-3). The EISPN was subsequently published in the March 8, 1988 OEQC Bulletin (p. 11-20A & B).[4] Additional background information was transmitted to a total of 44 agencies, organizations and individuals on March 9, 1988 to solicit input into the EIS preparation process (pp 11-4 to 11-20).

1.1.4 Scope of EIS

The EIS discusses the probable impacts of the proposed action (essentially a reconfiguration of existing Town Center DP land use boundaries) as well as the larger local and regional implications associated with the development of a major urban center within the Ewa Plain.

1.1.5 Sources of Information

Information for this EIS has been excerpted from an environmental assessment of the proposed Kapolei Town Center submitted to the State Land Use Commission in support of a petition to reclassify the Town Center from the Agriculture district to the Urban district,[5] from subconsultant reports prepared for the proposed Kapolei Town Center, technical reports prepared for the applicant as part of its long-range planning efforts, [6] written comments submitted by public agencies, utilities and community organizations,[7] reports published by public agencies, and other technical

1. Helber, Hastert & Kimura Planners, February 1988.
2. Prior to a State Attorney General Opinion issued in late 1985 (No. 85-30), EIS requirements were generally imposed at the zoning level.
3. Pursuant to Section 200-11 (a)(1), Administrative Rules of the Department of Health.
4. The EISPN incorrectly reported (applicant error) that the project area encompassed a total of 886 acres (including a 217-acre parcel containing Puu Palailai). By letter dated March 10, 1988, the applicant notified both DGP and OEQC that the actual project area was 879-acres in size and that the Puu Palailai parcel was only 210-acres. OEQC published notice of the correction in the March 23, 1988 OEQC Bulletin.
5. Helber, Hastert & Kimura, Planners. June 1987. (Included as Exhibit "A" of Verified Petition for Amendment for District Boundaries and Reclassification from Agricultural to Urban, Docket No. A87-613.)
6. Supporting technical studies are reproduced in the Appendices to this EIS.
7. Agency comments to EISPN reproduced in Chapter 11.

reports and studies related to the proposed action. A full reference of all information sources is provided in Chapter 10.

1.1.6 Explanation Of Terms

Secondary Urban Center (SUC). The development of the Ewa Secondary Urban Center is a long-range growth policy of the General Plan of the City and County of Honolulu. The SUC area includes the Kapolei Town Center, the Ko Olina Resort, the James Campbell Industrial Park and Deep Draft Harbor, and the adjacent residential communities of Makakilo and the proposed Kapolei Village.

Kapolei Town Center. The 569-acre Kapolei Town Center (or "Town Center") is the name of the development proposed by the Estate of James Campbell to represent the urban core of the General Plan SUC growth policy. Roughly triangular in shape, the proposed Town Center is bounded by the H-1 Freeway/Farrington Highway Corridor to the north, the Barbers Point Naval Air Station to the south, the Barbers Point Access Road to the east, and Kalaeloa Boulevard to the west. Proposed land uses for the Town Center include areas for office and commercial uses, governmental offices and municipal services, parks, an` elementary school, and single and multi-family housing.

Project Area. The 879-acre project area is the subject of this EIS and encompasses the Kapolei Town Center and lands to the east of the Town Center (between Farrington Highway and the H-1 Freeway mauka of the proposed Kapolei Village residential development), lands mauka of the H-1 Freeway (between the Makakilo and Palailai Interchanges, below the existing Makakilo residential community), and a parcel of land west of and adjacent to Kalaeloa Boulevard (Section 3.1). Included within the project area is the first increment (first major development phase) consisting of a 135-acre area south of and adjacent to the H-1 Freeway/Farrington Highway corridor, a portion of which is adjacent to the proposed Kapolei Shopping Center. The terms "Kapolei Town Center," "Town Center" and "Project Area" are used synonomously unless specified otherwise specifically or by context.

1.1.7 Relevant Planning History

In 1977, the City and County of Honolulu designated the Ewa area as the "Secondary Urban Center" (SUC) in the Honolulu General Plan to "...relieve developmental pressures in the urban fringe and rural areas" (Objective C, Policy 2). In 1985 the applicant submitted two separate applications to amend the Ewa Development Plan Land Use Map,[8] based on the "Central Business District" master plan prepared by Helber, Hastert & Kimura, Planners in 1984 (Section 7.4). Collectively, the two DP applications established the urban nucleus of the SUC. The amendments were formally adopted by the Honolulu City Council in March 1986 as reflected in the present Ewa DP Land Use Map.

The major planning effort for the Kapolei Town Center began in 1986 with the commissioning of the market research firm of Kenneth Leventhal & Company and the planning and architectural firm of Pereira and Associates to update the 1984 "Central Business District" master plan discussed above. What emerged from this

8. Helber, Hastert & Kimura, Planners, February and June 1985.

effort is the basis of the environmental analyses presented in this report -- a detailed implementation plan for the orderly development of the Kapolei Town Center.

1.2 SUMMARY

1.2.1 Development Summary

Applicant/Landowner:	The Estate of James Campbell 828 Fort Street Mall, Suite 500 Honolulu, Hawaii 96813
Consultant for EIS:	Helber, Hastert & Kimura, Planners 733 Bishop Street, Suite 2590 Honolulu, Hawaii 96816
Project Location:	Ewa, Oahu, Hawaii
Proposed Action:	Applicant Action: Applicant requests the Department of General Planning to approve proposed changes to the Ewa Development Plan Land Use Map.
Accepting Agency:	Department of General Planning
Project Area:	879 acres
Tax Map Keys:	9-1-15: por. 4, por. 5 9-1-16: 1, por. 4, 5, 6, 9, 12, 13 16, 18, 24, and 30 9-2-03: por. 2, 12 9-2-19: 1
Existing Use:	Agricultural and vacant uses
Proposed Uses:	Commercial/retail facilities, light industrial, public facilities, parks, residential and mixed use developments.
State Land Use District:	Agriculture and Urban
Development Plan Designations:	Commercial, Public Facility, Medium and Low Density Apartment, Residential and Park.
Zoning:	AG-1 and AG-2

1.2.2 Alternatives Considered

The applicant considered three alternatives to the proposed action: 1) alternative locations; 2) continued agricultural use of the site; and 3) no action. The "alternative locations" alternative examines the public policy debate leading up to the selection of Ewa as the preferred location for the secondary urban center. The "continued

agricultural use of the site" alternative assumes that present farming of the site continues until it is no longer viable. The "no action" alternative considers development of the project area using the existing Development Plan Land Use designations (Chapter 7).

The findings of the alternatives analysis supports the proposed action and indicates that: 1) Ewa is the appropriate location for the secondary urban center; 2) The long-term retention of the site in agricultural use is not desirable because of the high opportunity costs and the fact that OSCO viability will not be adversely impacted by the gradual, phased development of the site; and, 3) The proposed Town Center master plan represents the best match between obtaining general planning objectives of new town development and market realities.

1.2.3 Probable Impacts

- *Ewa Development Plan.* The proposed amendments to the Ewa Development Plan do not significantly alter the residential capacity of the Ewa DP area (Section 6.5.2).

- *Regional Land Use Pattern.* The proposed Kapolei Town Center forms an essential link in the development of the Ewa Secondary Urban Center. Existing, planned and proposed developments in Ewa will support, and be supported by, the development of the Town Center (Section 3.3).

- *Impact on Oahu Sugar Company.* The project area is presently under sugarcane cultivation by the Oahu Sugar Company (OSCo). Studies prepared for this report and discussions with OSCo management indicate that the phased withdrawal of cane lands will not adversely affect OSCO's operations (Section 3.4).

- *Aircraft Noise.* The applicant has studied the probable impacts of aircraft noise on proposed land uses within the project area. Findings from these and other independent investigations indicate that the land uses proposed in this project request are compatible with the existing noise environment. The studies have also found that the 1984 U.S. Navy AICUZ noise study, prepared for the Naval Air Station Barbers Point, systematically overstated aircraft noise impacts due to certain methodological errors (Section 3.7).

- *Flora and Fauna.* No protected or endangered biota were found to inhabit the project area (Section 3.8).

- *Historic and Archaeological Resources.* No significant historic or archaeological remains were found within the project area (Section 3.9).

- *Socio-Economic.* The Ewa area is planned to undergo a relatively rapid growth cycle over the next twenty year period as it becomes Oahu's Secondary Urban Center. The Kapolei Town Center will become the major regional employment center (Chapter 4). A major potential problem facing area residents will be displacement due to changing employment opportunities.

- *Public Facilities and Services.* The goal of developing a true Secondary Urban Center in Ewa is a twenty to fifty year program, and one which will require a

public/private partnership of unprecedented proportions. The development described herein will create additional demands on public infrastructure, facilities and services (Chapter 5). Demand for urban uses of potable water within the Pearl Harbor Ground Water Control Area will increase, although this will be offset by a corresponding decrease in agricultural uses (Section 5.6). Increased wastewater flows and demands on the Honouliuli Wastewater Treatment Plant and related transmission systems will also occur (Section 5.8). Increased vehicular traffic will be generated and attracted by Town Center land uses (Section 5.10).

- *Air Quality.* The growth in vehicular traffic resulting from the development of the Secondary Urban Center will not result in the impairment of existing ambient air quality levels, provided programmed roadway improvements are developed as recommended in the traffic impact studies prepared for the Town Center (Appendix J) (Section 3.10).

- *Public Policy.* The first increment of the project request will reduce the amount of "important agricultural land" (as identified by the LESA maps) by approximately 135-acres (Chapter 6 and Section 3.4).

1.2.4 Mitigating Measures

- *Traffic.* The employment emphasis of the Town Center will have a mitigative effect on the overall growth in vehicular trips projected for the Ewa area over the next twenty year period. The project request can be expected to ease the increasing travel demands on the Primary Urban Center during the peak periods. The projected widening of Farrington Highway and construction of the Kapolei Parkway will mitigate adverse traffic impacts along major existing east-west corridors within the region (Section 5.10.4).

- *Employment.* The applicant is concerned about the potential of displacing Ewa area residents and is working closely with community groups, service providers and public agencies mitigate adverse impacts. The applicant is also represented on the board of the West Oahu Employment Corporation (WOEC), an agency formed to facilitate the entry of Leeward Oahu residents into jobs newly created by development on the Ewa Plain (Section 4.2.4).

- *Agriculture.* A phased withdrawal of sugar lands will minimize adverse impacts on the profitability of Oahu Sugar Company (Section 3.4).

1.2.5 Unresolved Issues

- *Traffic.* Additional investigation into probable impacts of the proposed action on the Palailai and Makakilo Interchange has been requested by State DOT. This work is currently being conducted and a full report of probable impacts and mitigating measures will be included in the Final EIS (Section 5.10.5).

1.2.6 Relationship to Land Use Plans and Policies

A thorough discussion of the relationship of the proposed action to land use plans and policies is presented in Chapter 6. The proposed action is consistent with all

relevant public goals, objectives, policies, plans and controls, with the exception of pending State Land Use Commission approvals, the adoption of the proposed action and subsequent change of zone requests as identified below.

1.2.7 Necessary Permits and Approvals

A number of permits and approvals must be secured by the applicant before development of the site can begin. Major permits and approvals still outstanding are listed in Table 2.

Table 2: NECESSARY PERMITS AND APPROVALS

Authority	Approval/Permit Required
State of Hawaii	
Department of Health	New Water Source System Approval
Department of Land and Natural Resources	Ground Water Control Area Permit
Land Use Commission	Boundary Amendments
City and County of Honolulu	
Department of General Planning	Ewa Development Plan Amendments
Department of Land Utilisation	Change of Zone Approvals Subdivision Approvals
Department of Public Works	Building Permits Grading Permits Drainage Master Plan Approval Sewer Master Plan Approval
Board of Water Supply	Water Master Plan Approval

Description of Proposed Kapolei Town Center Master Plan

CHAPTER 2

KAPOLEI TOWN CENTER

THE ESTATE OF JAMES CAMPBELL

Ewa, Oahu, Hawaii

This Chapter presents descriptive information regarding the proposed Kapolei Town Center, including project location, brief description of the project area, development objectives, overall project rationale, proposed land uses, related infrastructure improvements, project phasing and order of magnitude costs.

2.1 DESCRIPTION OF THE PROPERTY

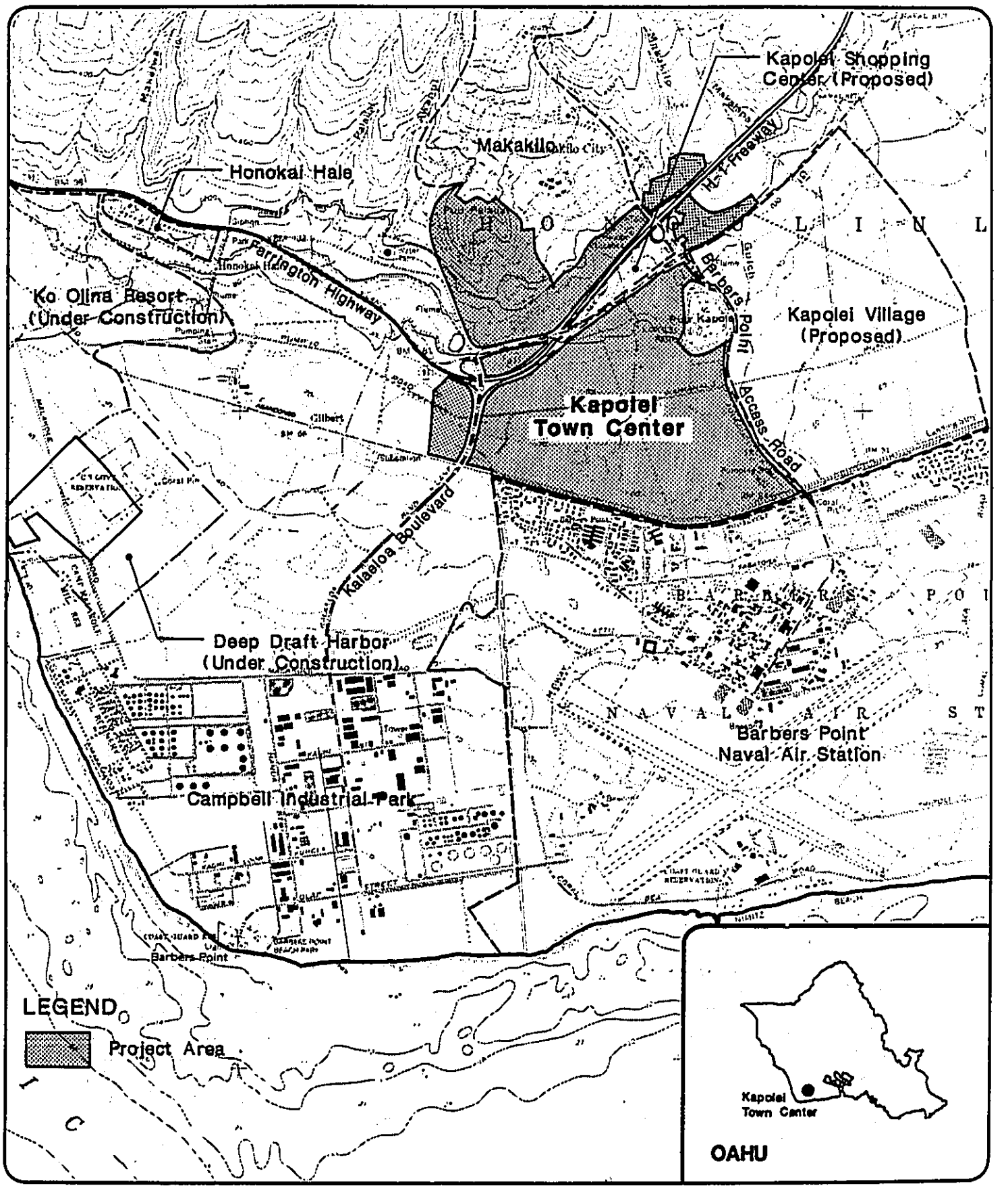
2.1.1 Location

The project area is located within the Ewa District of Oahu, 22 miles west of Honolulu, the island's primary urban center (Figure 1). Major urban land uses surrounding the project area are: the James Campbell Industrial Park (JCIP); the Naval Air Station, Barbers Point (NASBP) (to the south); the residential communities of Makakilo (to the north) and Honokai Hale (to the west); and the proposed Deep Draft Harbor and the Ko Olina Resort area (due west). The project area is bisected by the H-1 Freeway and is serviced by both the Palailai and Makakilo Interchanges and by Farrington Highway, Kalaeloa Boulevard and the Barbers Point Access Road.

2.1.2 Project Area

The project area encompasses an area of approximately 879 acres. The project area generally corresponds with the 890-acre area now being considered for boundary amendment by the State Land Use Commission (referred to as the "petition area") with the following exceptions: 1) approximately 80-acres of TMK 9-1-16: 4 were omitted from the project area as the developers of this parcel are now in the process of filing separate Development Plan and Zoning amendments with DGP and DLU; and, 2) where possible, tax parcel and master plan boundaries and/or existing Development Plan Land Use boundaries were used to identify project boundaries, adding approximately 69 acres (See Figure 12 for visual description of relationship of project area to petition area).

The project area consists of six separate parcels (Figure 2). The largest parcel comprises an area of approximately 569 acres and is generally referred to as the Kapolei Town Center. This parcel is bounded by Kalaeloa Boulevard to the west, NASBP to the south, Barbers Point Access Road and Puu Kapolei to the east and the Farrington Highway/H-1 Freeway corridor to the north. The second largest parcel located north of the H-1 Freeway is approximately 210 acres in size and includes the cinder cone known as Puu Palailai. A third parcel within the project area is approximately 35 acres in size and is located west of and adjacent to Kalaeloa Boulevard. The western boundary of this parcel is coterminous with the eastern boundary of the Ko Olina option area. The fourth parcel is 13 acres in size and is located adjacent to and east of the Palailai Interchange, between Farrington Highway and the H-1 Freeway. The fifth parcel is 25 acres in size and is located in the northeastern quadrant of the Makakilo Drive/H-1 Freeway interchange. The sixth parcel of 26 acres, is located in the southeastern quadrant of the same interchange with the southern boundary lying along Farrington Highway and the eastern boundary coterminous with the proposed Kapolei Knolls residential community being proposed by the Lusk Company.



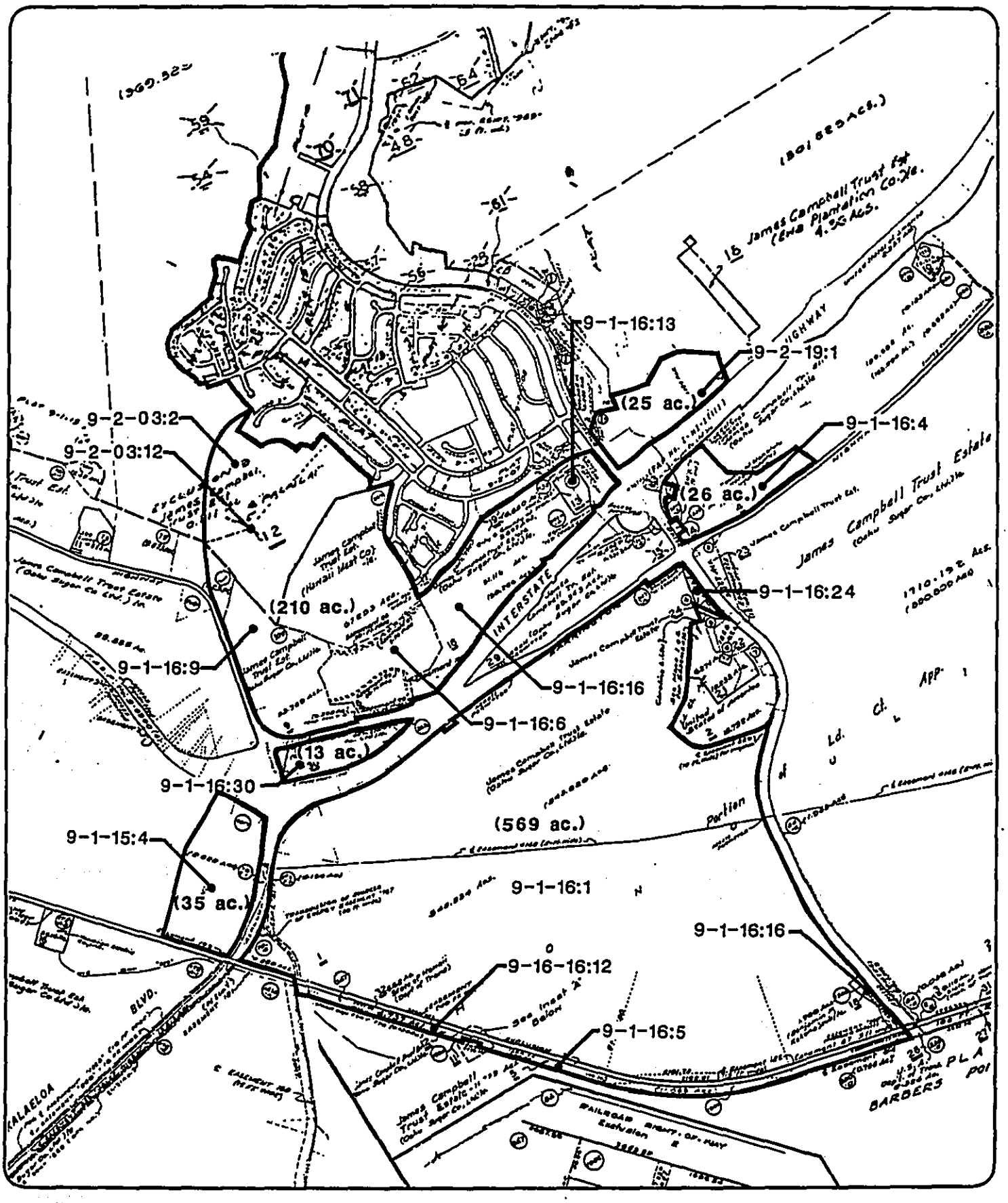
Location Map

0 3000' Feet

Figure: 1

Kapolei Town Center E.I.S.

HELBER, HASTERT & KIMURA PLANNERS
GROSVENOR CENTER • PRI TOWER • 733 BISHOP STREET • SUITE 2590
HONOLULU, HAWAII 96813 • TELEPHONE: (808) 545-2055



Tax Map

0 1450' Feet

Figure: **2**

Kapolei Town Center E.I.S.

HELBER, HASTERT & KIMURA PLANNERS
GROSVENOR CENTER • PRI TOWER • 733 BISHOP STREET • SUITE 2590
HONOLULU, HAWAII 96813 • TELEPHONE: (808) 545-2055

2.2 DEVELOPMENT OBJECTIVES

The Kapolei Town Center is the major nucleus of the long range master plan for the applicant's 34,000 acres of Ewa lands (see related discussion of the Ewa Long Range Master Plan in Section 3.3). Major development objectives established by the applicant in designing the Town Center were to create a new city:

- which provides a balance between regional employment and housing.
- which minimizes commute trips to and from downtown Honolulu.
- which provides all public/private shopping services for Ewa residents.
- which provides amenities for the region and its existing population.
- which provides a place of relocation for business and residents currently in downtown Honolulu.
- with internal circulation systems which minimize the dependence on the private automobile.
- which takes into account the sensitive relationship between land and ocean historically viewed by native Hawaiians.

2.3 PROJECT RATIONALE

The basic market rationale for the Kapolei Town Center is provided by the market study prepared by Kenneth Leventhal & Company ("Projections of Future Employment, Population and Land Use for the Town Center"; March, 1986, Appendix A).[1] This section provides a brief summary of the market study including: (1) purpose and overview; (2) general approach and methodology; and (3) summary of the projections.

2.3.1 Purpose and Overview

The following types of parameters were projected for the Kapolei Town Center market study:

- Housing units and building space
- Land absorbed
- Population
- Employment

1. The Leventhal Market Study also included the 830-acre residential area referred to as the "Kapolei Village" located directly east of the Town Center. This area is being acquired by the State Housing Finance and Development Corporation for residential purposes.

The major project area land uses for which absorption projections were prepared are:

- Several types of housing units
- Light industrial/R&D/high tech
- Office
- Commercial
- Government office space and facilities
- Other public uses

To determine absorption projections, it was necessary to project population for the Ewa communities and developments outside Kapolei, and to project their populations it was necessary to project their housing units. Consequently, the projections include not only detailed projections for the Town Center and surrounding areas, but also housing unit and population projections for all major Ewa developments. Employment was also projected for the Ewa developments outside the Town Center in order to provide a complete set of total housing unit, population and employment projections for Ewa.

The projections include the following developments that exist today in Ewa: Makakilo, Honokai Hale/Nanakai Gardens, James Campbell Industrial Park, Barbers Point Deep Draft Harbor, Barbers Point Naval Air Station, Ewa Beach, and the Ewa Village. The projections also include the following developments which are expected to begin in the near future: Ko Olina (West Beach), Ewa Marina, Ewa Plantation (recently acquired by the Gentry Companies and now referred to as Gentry Ewa) and Kapolei Village. A more detailed description of each community is found in Section 3.3, "Regional Land Use Pattern."

2.3.2 General Approach and Methodology

2.3.2.1 Approach

The study and projections were based on or incorporate the following major approaches and assumptions:

- All market study projections were made in the form of high, mid and low range projections. Ranges were projected because of the uncertainty associated with projecting the rate at which the unique and pioneering Kapolei development, located in a largely undeveloped area of Oahu, might develop. The range of projections should represent the range within which actual future Kapolei Town Center development has a high probability of following.
- All projections were made for five year time periods covering the full projection period of 1986-2005.
- All projections were based on the Oahu population and employment projections made by DPED in July 1984 (Series M-F projections), and are long term average projections that do not project specific future business cycles or their effects.

- The range of projections describe the potential rate of future Kapolei Town Center development based on demand. The projections assume that the applicant, the County and the State will take the actions necessary to develop and supply the full range of Kapolei products and facilities at rates falling within the range of projections. The actions assumed are the typical kinds of actions taken to plan, design, approve, build, and market a multi-use urban center such as Kapolei Town Center.

2.3.2.2 Methodology

The projections were prepared by carrying out the following series of major analytical steps:

1. A large volume of data about the Oahu economy, demographics and competitive real estate markets was collected and organized.

2. The general kinds of land uses appropriate for the town center were defined. This definition process included incorporating the County's General Plan objectives for the Ewa secondary urban center concept and land uses to the greatest extent possible.

3. An extensive analysis of the historical and projected demand/supply relationships for the Honolulu, Central Oahu, and Ewa housing markets was done. Projections of Kapolei and other Ewa development housing unit absorptions were prepared based on the analysis.

4. The housing unit absorption projections were converted into population projections by applying appropriate persons per housing unit amounts to the projected housing units.

5. An analysis was made of the light industrial parks located in the western area of Honolulu, including the relationship of their absorption to growth in Oahu employment. Projections of light industrial space absorption in the Town Center were made based on the analysis.

6. Historical office space absorption in Honolulu was analyzed and related to growth in Oahu employment, and future absorption of Honolulu office space was projected. Projections of the Kapolei Town Center absorption of this type of regional office space were then made based on the analysis and on an analysis of Kapolei Town Center's competitive situation.

7. The absorption of local population-serving office space in Kapolei was projected by applying an office space per person demand factor to Ewa's projected population. Local population serving office space is defined as space occupied by firms that primarily serve local Ewa population.

8. The demand for land for various government facilities needed to serve the Town Center was projected by applying land use per population relationships to the projected populations for Kapolei and Ewa.

9. Demand in Kapolei for typical urban commercial centers and facilities needed to serve the Town Center and Ewa populations was projected by applying building space demand factors per person to the Town Center and Ewa population projections.

10. The historical patterns of land absorption in James Campbell Industrial Park (JCIP) were analyzed, and potential sources of future demand for JCIP land were studied including the effect of development and operation of the Barbers Point Deep Draft Harbor. Projections of future land absorption in JCIP were prepared based on these analysis.

11. Projections of Kapolei Town Center employment were generated by applying square feet per employee factors to building space projections, or employees per acre factors to land use projections, as appropriate.

12. Land absorption of some project area land uses was projected directly in acres. Land absorption for other uses was projected by applying floor area ratios to projected building space absorption, and by applying housing unit densities to projected housing unit absorption.

All of the projections were prepared using a large, complex computer model developed specifically to model the unique characteristics of Kapolei and the Ewa area.

2.3.3 Summary of Projections

The following section highlights some of the important points made by the study.

- Estimated year 2005 population of the Ewa communities ranges from 63,000 to 100,000 residents with Kapolei (mostly Kapolei Village) accounting for between 9,000 and 14,000 residents. This population represents an increase ranging from 30,000 to 60,000 residents over the 1985 Ewa area population of about 30,000.

- Present Ewa area civilian employment is approximately 4,400 and is projected to increase by about 22,000 to 30,000 employees by 2005. Kapolei Town Center is planned to be the primary employment location in Ewa, and the Town Center accordingly provides about 12,000 of the 22,000 increase in employment. The other significant generators of Ewa employment growth are Ko Olina and James Campbell Industrial Park.

- By the year 2005, the employment/population ratio for Ewa is projected to be about 42% percent. This represents an excellent balance between jobs and residents in Ewa, and is close to the projected Oahu ratio of 47%. The 42% ratio indicates that Ewa residents will probably generate only a limited number of peak hour commute trips into Honolulu.

2.4 DESIGN CONCEPT

The basic design concept of the Kapolei Town Center was initially developed by Pereira Associates in 1986 (See discussion of previous "Central Business District" plan in Section 7.4). The "Kapolei Town Center" plan is designed to provide an urban place, organized by a city grid directed toward views of locally prominent puus. The

proposed city blocks are adapted from those in old Honolulu, and like Honolulu, are intended to be utilized in a manner uniquely Hawaiian in character: intimate scale; low to medium building heights, utilizing native building material accents such as coral, lava and stone; buildings and arcades defining the street edge; generous siting for public buildings, including a government center with a satellite City Hall and State offices, an open air pedestrian shopping streets; use of warm earth colors; water elements and especially landscape: flowers, palms, and trees. The major emphasis within the Town Center is on employment generating land uses such as commercial/retail, office, and governmental offices and facilities.

2.5 LAND USES

The following sections review the general land uses envisioned for the project area in terms of the year 2005 market projections prepared by Kenneth Leventhal & Company and the Town Center master plan prepared by Pereira Associates (Figure 3). The discussion of each land use (light industrial, commercial, etc.) is followed by a more detailed review of the particular land use represented within the project area.

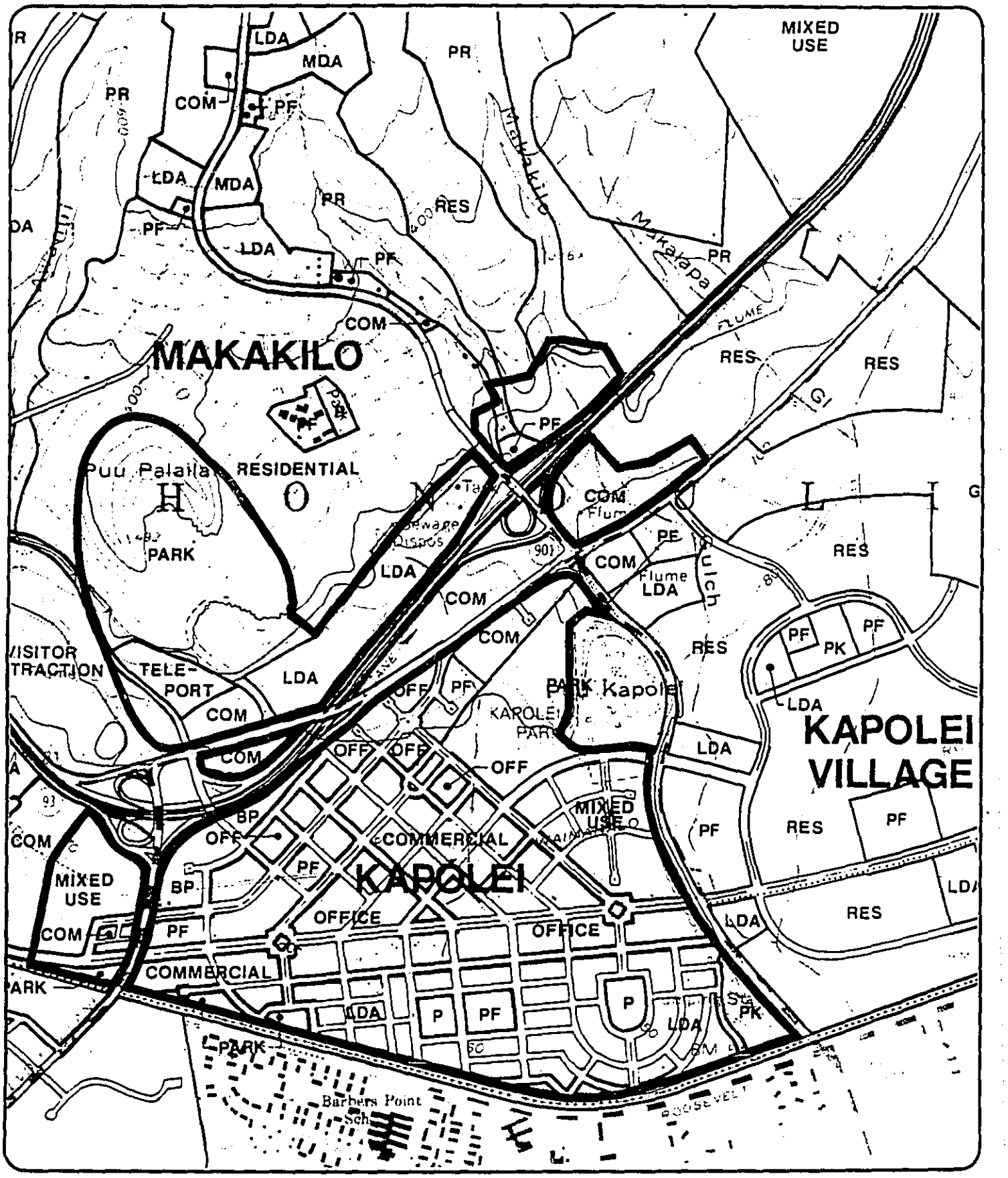
It is important at this time to recognize the distinction between master plan land uses and actual prospective tenant uses. The master plan serves a number of important functions: 1) it fulfills the applicant's development objectives and represents "the best guess" of marketing, development and land use planning experts as to what uses will *ultimately be attracted to the site*, based on studies of the existing and projected market demands and previous development and planning experiences; it provides spatial projections of employment, population and land uses necessary to evaluate project-related impacts needed to secure State and County planning approvals; 3) it provides an excellent communications tool to describe Town Center activities to Community groups and organizations; and, 4) it provides an excellent marketing tool. As with all long range plans, the master plan must be viewed as dynamic, with the ability to accommodate changes in market conditions and demands. As prospective Town Center tenants' space and use requirements are identified, the master plan must be both flexible enough to accommodate individual user needs and stable enough to fulfill existing tenant and public expectations.

The applicant has initiated a preliminary marketing program in anticipation of favorable Land Use Commission and Honolulu City Council land use approvals. Preliminary marketing results indicate considerable interest in Town Center locations from prospective users, similar to those identified in the master plan.

As noted in Section 2.2.3 below, development of the project area will be phased in major increments, in accordance with market demands and infrastructure availability. The first major increment has been identified as a 135-acre portion of the 569-acre Town Center. To facilitate review of the major land uses, the general discussion of the project-wide land uses is augmented by a review of first increment land uses to assist the reader in assessing the sequencing of development.

2.5.1 Office

Mid-range market study projections for the entire Town Center indicate absorption of about 842,000 square feet of regional and local serving office space by the year 2005. Employment in the offices is estimated at 3,370 jobs (four employees/1,000 s.f.) (Table 3).



Master Plan Land Uses

0 1450' Feet

Figure: **3**

Kapolei Town Center E.I.S.

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Regional office space is occupied by firms that primarily do not serve the local population but rather serve island or statewide firms and businesses. These space demands were determined by analyzing the historical and projected future absorption of office space in the downtown Honolulu office corridor.

Table 3: PROJECTED OFFICE USES
(Mid-range, 2005)

Land Use	Square Feet (1,000s)	Acres	Employment
Regional Office	655	50	
Local Serving Office	187	14	
Total	842	64	3,370

Source: Kenneth Leventhal & Co., 1986

Local-serving office space is occupied by firms that primarily serve local population and businesses in Kapolei. Demand estimates were derived from applying a demand factor to the projected populations for selected Ewa communities. Office uses will primarily occur in areas designated "office," but may also occur in the "mixed use" and "commercial" areas of the Kapolei Center.

First Increment. Office uses (regional and local-serving) are one of the principal land uses within the first increment (25 percent of first increment land area). The office uses occupy approximately 34 acres (573,000 square feet) and are largely located in the northern half of the first increment.

One of the first office tenants within the Town Center will be the applicant, The Estate of James Campbell. Pending forthcoming land use approvals, the applicant hopes to begin construction of its own office building on a site located at the entrance to the Town Center between Farrington Highway and the proposed Kapolei Boulevard. The present development program includes two 50,000 s.f. "U" shaped buildings of 3-4 stories each, organized around a central garden. Access to the site will be via the proposed Kapolei Boulevard. Automobile parking will be provided underneath the two building and in adjacent surface lots. The applicant will be a major tenant in one of the buildings, other prospective tenants are now being sought.

2.5.2 Commercial

A full range of commercial activities will be needed to serve the residential population, employees and businesses of Kapolei. In addition, the Town Center is the logical central location for certain kinds of commercial facilities and services for the whole Ewa area and even some peripheral areas. Such uses may include a regional mall, discount center, and auto sales/service center. Demand for commercial center space in Kapolei, estimated at 1.4 million square feet, was calculated by grouping all

of the various kinds of required commercial activities into the types of centers and facilities commonly developed for commercial activities. Employment for the commercial land uses is estimated at 3,944 jobs (range between 1.5-3.33 jobs per 1,000 s.f.)(Table 4).

Included within the commercial land use acreages is a 10-acre teleport facility located adjacent to the west side of Puu Palailai. Development of telecommunications facilities in this area will be closely coordinated with Federal (FAA, FCC, DOD, etc.) and State (DOT) agencies to assure compatibility with aircraft operations in the vicinity of Puu Palailai. The first tenant of the teleport site (American Satellite Company) is already in place.

Table 4: PROJECTED COMMERCIAL SPACE USES
(Mid-range, 2005)

Land Use	Square Feet (1,000s)	Acres	Employment
Shopping Center	417	38	
Discount, Home Improvement	339	31	
Automotive, Boats	249	29	
Commercial Recreation	101	7	
Regional Mall	289	19	
Total	1,395	124	3,944

Source: Kenneth Leventhal & Co., 1986

First Increment. Commercial uses comprise the third largest land use category within the first increment (approximately 24 percent). A total of 450,000 square feet of commercial uses located on 32-acres are proposed within the first increment. These uses are located adjacent to the soon-to-be-developed Kapolei Shopping Center at the northeast corner of the Kapolei Town Center and near the center of the first increment.

2.5.3 Government/Civic Uses

The two types of uses are anticipated to be: (1) Federal, State and County government offices and facilities serving the local area population, such as administrative offices, police and fire facilities, and a library; and (2) Federal, State and County government offices that provide administrative services for a much larger area than Ewa (regional governmental offices). Given Ewa's "Secondary Urban Center" designation in the Honolulu General Plan and the stated County objective of encouraging urban development and employment in the SUC, and the recent development and funding proposals by the State of Hawaii (acquisition of 830-acre Kapolei Village site, land-banking of adjacent 4,000-acre "golden triangle" site and continued funding of the Deep Draft Harbor), it is anticipated that various State and County agencies will ultimately establish substantial regional administrative operations within the Town Center. Levanthal mid-range projections estimated total government/civic employment at 1,690 jobs (Table 5). The

Government/Civic Uses discussed here are incorporated within the "Public Facilities" designation on the land use map (Figure 3).

Table 5: PROJECTED GOVERNMENT/CIVIC USES (Mid-range, 2005)

Land Use	Square Feet (1,000s)	Acres	Employment
Government Offices	240	18	
Local Admin.		4	
Library		2	
Police		2	
Fire		1	
Total		27	1,690

Source: Kenneth Leventhal & Co., 1986

First Increment. A total of 365,000 square feet (19.5-acres) of Government and Civic uses are *identified on* the master plan for the first increment. Occupying approximately 14 percent of the first increment, these areas could accommodate both government offices and municipal services such as a satellite City Hall, library and police station. The government/civic uses are generally located in two areas: adjacent to the Kapolei Park area, and near Kalaeloa Boulevard adjacent to the proposed Kapolei Parkway.

As noted above, the applicant is actively marketing Town Center locations to a number of prospective tenants, including State and City government agencies (OSP, DAGS and DGP). While both State and County agencies recognize the longer term need for space within the Town Center, neither are willing to commit to precise uses or locations at the present time. In recognition of the critical importance of the ultimate establishment of a major "civic center" within the Town Center, the applicant will continue coordinating its marketing effort with the appropriate State and County agencies. The Honolulu Fire Department has requested a site within the Town Center "to meet the fire protection needs of the immediate area" (p. 11-53). The applicant and Fire Department are presently considering an area located just south of the OR&L right-of-way, east of and adjacent to Kalaeloa Boulevard as a potential Fire/Emergency Medical Services Station (see related discussion in Sections 5.4 and 5.5).

2.5.4 Light Industrial Uses

Mid-range market study projections indicate absorption of about 535,000 square feet of light industrial space by the year 2005 (Table 6). Employment in the light industrial business parks is estimated at 1,765 jobs (3.33 jobs per 1,000 s.f.).

Light industrial activities, including high technology and research and development will be accommodated within an attractive and spacious business park environment. Demand for light industrial uses was estimated by analyzing historical absorption

rates of several light industrial parks on Oahu and the relationship of their absorption to Oahu employment growth.

Table 6: PROJECTED LIGHT INDUSTRIAL USES
(Mid-range, 2005)

Land Use	Square Feet (1,000s)	Acres	Employment
Light Industrial	535	35	
Total	535	35	1,765

Source: Kenneth Leventhal & Co., 1986

First Increment. Light industrial uses occupy approximately 7 percent of the first increment land area and include a total 288,000 square feet of business park/light industrial uses on 9.5 acres. These areas are generally located in the higher vehicular noise areas adjacent to the Farrington Highway/H-1 Freeway corridor and Kalaeloa Boulevard.

2.5.5 Other Civic Uses

The establishment of a true urban center that will serve the needs of present and prospective Ewa residents will require the development of schools, parks, recreational facilities, hospital and medical clinics, and churches within the Ewa region. Land absorption for these public uses was projected using demand factors related to both the Kapolei population and that of the Ewa region. Total employment generated by the development of these uses is estimated at about 1,600 jobs (Table 7).

Parks. Two major parks are designated within the project area: Palailai regional park and the Kapolei district park. The 115-acre Palailai park will be developed over the reclaimed Palailai Sanitary Landfill and will feature a large outdoor amphitheater (related discussion of landfill reclamation process presented in Section 5.2.3). The amphitheater will take advantage of the natural landscape by building into the existing contours. Proper siting will utilize the natural sound barriers of the surrounding land forms to mitigate any adverse noise and outdoor lighting impact on adjacent residential areas. The 50-acre Kapolei district park adjacent to the will be developed in coordination with the City and County of Honolulu Department of Parks and Recreation to assure that regional park needs are served.

Schools. One six-acre elementary school site has been reserved within the residential area south of Kapolei Parkway. A four acre neighborhood park site will be located adjacent to the elementary school site in accordance with accepted practices of the State Department of Education and the City and County Department of Parks and Recreation.

Table 7: PROJECTED DEMAND FOR OTHER PUBLIC USES
(Mid-range, 2005)

Land Use	Acres	Employment
Schools	180	
Churches	33	
Parks/Recreation	134	
Medical Clinics	5	
Hospital	20	
Total	372	1,646

Source: Kenneth Leventhal & Co., 1986

First Increment. None of the projected "other public uses" described above are included within the first increment. Kapolei Park, a proposed district park, is located south and adjacent to the first increment. A number of the uses described above (i.e., parks, churches and schools) will be provided in adjacent residential areas, such as the proposed Kapolei Village Residential Community located directly east of the Town Center and the existing Makakilo community located north of the Town Center.

2.5.6 Mixed Use

Two separate "mixed-use" parcels are identified within the Town Center totalling 73 acres. The largest parcel, located directly south of Puu Kapolei, is approximately 46 acres in size. The second mixed use parcel, located to the west of and adjacent to Kalaeloa Boulevard, is approximately 27 acres in size. These are generally large parcels which are being reserved for as yet unidentified, preferrably single-tenant land uses.

First Increment. No mixed use areas are included within the first increment.

2.5.7 Housing

An extensive analysis of historical and projected housing markets on Oahu was conducted as part of the market study. The market study indicated a strong demand for housing priced in the affordable range (under $120,000 for single-family detached houses; $65,000 for townhouses; under $50,000 for apartment condominiums). The study indicated a smaller market for mid-priced housing (between $120,000 and $200,000) and noted "a very low annual future demand for higher priced homes" (greater than $200,000). Study results indicated a total market demand for housing ranging from 1,965 to 4,740 units. Mid-range projections indicate a year 2005 demand for 3,040 homes (Table 8).

Table 8: PROJECTED DEMAND FOR HOUSING
(Mid-range, 2005)

Housing Type	Density	Units	Acres
Sgl. Family Det.	5/ac.	280	70
Sgl. Family Det.	7/ac.	1,090	156
Townhouses	12/ac.	425	35
Condominium	25/ac.	425	17
Apartment	25/ac.	820	33
Total		3,040	311

Source: Kenneth Leventhal & Co., 1986

A total of 1,708 dwelling units are identified within the project area in three separate residential areas. The master plan prepared by Pereira Associates identified a 110-acre area below the Ewa Parkway for residential uses. Based on an average density of 10 units per net acre, a total of 1,108 homes were identified for this area. An additional 470 homes are identified on a 50-acre site located in the lower Makakilo area, adjacent to the H-1 Freeway, between Palailai and Makakilo Interchanges. The 20-acre area east of Makakilo Interchange is basically an expansion of the existing Makakilo community and was not included in the Pereira analysis. Assuming slightly reduced residential densities, this area would accomodate 130 additional homes.

First Increment. No housing is being proposed within the first increment of the Town Center. Subsequent increments covering southern and northern portions of the project area will include residential land uses.

2.5.8 Roadways/Circulation

Much of the character and texture of a city is determined by its streets, edges and public spaces. Guidelines are now being established to control street widths and edge conditions, i.e., street sections throughout the Town Center. These guidelines not only provide a hierarchy of streets within the project area but also determine the relationship between automobiles and pedestrians within Kapolei. Internal boulevards, malls and roadways will provide a major part of the open space element within the Town Center. The commercial core will make extensive use of continuous pedestrian arcades emphasizing pedestrian movements and deemphasizing vehicular movement. Two major new roadways will provide the principal circulation elements within the Town Center: Kapolei Boulevard and Kapolei Parkway. A series of local streets will provide access to interior parcels within the project area.

Kapolei Boulevard. Kapolei Boulevard will provide a major access to the Town Center connecting with Farrington Highway at a new intersection makai of the proposed Kapolei Shopping Center and extending through the Town Center in a southwesterly direction ultimately connecting with the Kapolei Parkway near

Kalaeloa Boulevard.[2] Plans now being reviewed by the State DOT Highways Division propose phased intersection and roadway improvements corresponding with projected growth in vehicular traffic. The initial phase involves the widening of Farrington Highway in the vicinity of the proposed intersection from two lanes to a four-lane divided highway and the construction of two lanes of Kapolei Boulevard and connector road for two-way traffic and provide a "T" intersection with Farrington Highway. Ultimate plans call for the construction of two additional traffic lanes along Kapolei Boulevard and the completion of connector road improvements between Farrington Highway and Kapolei Boulevard. This ultimate plan will be triggered to commence when traffic volumes along Kapolei Boulevard can be projected to exceed volumes along Farrington Highway; this may be concurrent with the initial phase.

Kapolei Parkway. The proposed Kapolei Parkway bisects the Town Center in an east-west direction and will eventually become one of the major regional access points to the Town Center.

First Increment. A major segment of the initial phase of the proposed Kapolei Boulevard will be constructed within the first increment to provide primary access to the Town Center. Boulevards, malls and roadways provide the major land use within the first increment occupying 39 acres or 29 percent of the land area.

2.5.9 Land Use Summary

The first increment land use pattern represents an initial phase of the Kapolei Town Center, an integrated, functional and aesthetically pleasing urban center which will fulfill the mandate to develop a true Secondary Urban Center in Ewa. As discussed above, each of the major land uses are indicated in Figure 3. Table 9 presents a summary of the land uses within the first increment and the entire project area.

Table 9: LAND USE SUMMARY

	First Increment			Project Area			
Land Use	Size (Acres)	Percent of area	Sq. Ft. (1,000's)	Size (Acres)	%	Sq. Ft. (1,000's)	Dwelling Units
Residential	0	0	-	20	2		130
Low-Density Apt.	0	0	-	172	20		1,578
Commercial	32.3	24	450	117	13	1,034	
Office	34.2	25	573	101	11	1,320	
Mixed Use	0	0	-	73	8	689	
Public Facility	19.5	14	365	51	6	860	
Light Industrial	9.5	7	288	23	3	333	
Park	0	0	-	191	22		
Circulation/Open Space	39.5	29		131	15		
TOTAL	135.0	100	1,676	879	100	4,236	1,708

Source: Helber, Hastert & Kimura, Planners, 1988

2. Present master plan roadway network (Figure 3) shows Kapolei Boulevard intersecting with Kalaeloa Boulevard. Subsequent discussions with State DOT indicated potential safety problems associated with the indicated intersection's location relative to the Palailai Interchange ramps. A suitable alternative is now being proposed whereby Kapolei Boulevard will intersect with the proposed Kapolei Parkway, east of the Parkway's intersection with Kalaeloa Boulevard.

Park and residential uses account for almost half of the project area (22 percent each). The next-most extensive land use is circulation and open space (15 percent). Commercial uses follow accounting for approximately 13 percent, consistent with the development concept of providing a major employment center and nucleus of the secondary urban center. Office uses account for approximately 11 percent of the project area. Mixed Uses, reserved for a mix of commercial activities, comprise approximately 8 percent of the site. Public facilities consisting of various government/civic uses including administrative offices, a library, police and fire stations, elementary school and other municipal services occupy approximately 6 percent of the project area. Finally, Light Industrial Uses account for 3 percent of the project area.

2.6 INFRASTRUCTURE

This section presents information regarding on-site infrastructure. Impacts on regional infrastructure are discussed in Chapter V. Information regarding on-site infrastructure has been obtained from drainage, sewer and water master plans prepared for the applicant and now being reviewed by appropriate State and County agencies.

2.6.1 Water

Kapolei water needs will be serviced by a dual water system. Off-site potable water sources, storage and transmission facility requirements for the Town Center are addressed in the Ewa Water Master Plan (Belt Collins & Associates August 1987) prepared for the Ewa Plain Water Development Corporation and approved by the Board of Water Supply on October 15, 1987 (See regional discussion in Section 5.6). The Kapolei Water Master Plan (R.M. Towill Corporation February 1988) prepared for both the applicant and the State Housing Finance and Development Corporation addresses the necessary on-site water system requirements for both Kapolei Village and Kapolei Town Center. The report is currently being reviewed by the Board of Water Supply.

Major existing off-site components of the Town Center water system include the Honoulilui 228-foot reservoir, Barbers Point 215-foot reservoirs and the 30-inch Farrington Highway water main. Major additions to off-site infrastructure needed to serve projected growth in west Ewa include a new Kapolei 228-foot reservoir (to be located above the H-1 Freeway to the east of Makakilo Drive) and an additional 30-inch water main along Farrington Highway. Major onsite infrastructure within the Town Center consists of 12 and 16-inch waterlines under the major project roads.

As in other areas in Ewa, municipal potable water will be utilized inside residential, commercial, and business structures with private non-potable water supplying irrigation systems wherever possible. Non-potable systems will be developed for irrigation uses utilizing shallow wells drawing water from the underlying limestone aquifer. The use of the dual water system will be carefully controlled to assure that no possibility of cross-connections can exist between the potable and non-potable water systems. All water taps and hose bibs accessible to the public will be clearly labeled tap is non-potable.

Average daily demand[3] for the uses within the first increment (Table 10) is estimated at 0.206 million gallons per day (MGD) potable, and 0.177 MGD non-potable for a total of 0.383 MGD.

Table 10: ESTIMATED WATER DEMAND

	First Increment			Project Area		
	Potable	Non-Potable	Total	Potable	Non-Potable	Total
Average Daily Demand (MGD)	0.206	0.177	0.383	1.8417	1.1572	2.9989

Source: Helber, Hastert & Kimura, Planners, 1987.

2.6.2 Wastewater

The project area lies within the service area of the Honouliuli Wastewater Treatment Plant (WWTP) operated by the City and County of Honolulu's Department of Public Works, Division of Wastewater Management (DWWM). All wastewater generated within the project area will be treated and disposed of via the Honouliuli WWTP (See Section 5.8 for regional discussion of wastewater facilities). The applicant has recently resubmitted the Kapolei Sewerage Master Plan (May 1988) to DWWM for final approval. The sewerage master plan describes the necessary on-site and off-site sanitary sewerage system requirements for both the Kapolei Village and Town Center projects.

The permanent on-site collection system consists of 12-inch gravity sewers and smaller subsidiary lines. The system will be developed in incremental phases as described below. Initial development within the Town Center will be serviced by a gravity system connected to the existing Makakilo Interceptor (under Barbers Point Access Road) via a temporary (package-type) sewage pump station and eight-inch force main. When demands exceed capacity of the initial system, the temporary pump station will be removed and flows will be redirected as an expanded on-site gravity system. This system will be used to convey all flows from the Town Center to Segment 1 of the proposed West Beach Interceptor to be located near the southern boundary of the Town Center.

Wastewater flows for the first increment are estimated at 0.72 MGD, total average flow with a total peak flow of 3.17 MGD (Table 11).

3. Water demands are based on Board of Water Supply Dual Water System criteria. Average Daily Demand represents Average Water Use times a factor of 1.2.

Table 11: ESTIMATED WASTEWATER FLOWS

	First Increment	Project Area
Total Average Flow (MGD)	0.72	2.215
Total Peak Flow (MGD)	3.17	9.002

Source: R. M. Towill Corp., 1987

2.6.3 Storm Drainage

An evaluation of existing and future drainage conditions was conducted for the applicant and the State Housing Finance and Development Corporation by R.M. Towill Corp. in 1987. The investigation included both the Town Center and Kapolei Village projects. The pre-final report of this investigation (Kapolei Drainage Infrastructure Study, September 1987) was submitted to appropriate government agencies for review in late 1987. A review of existing and future drainage conditions described in the report are presented in Section 3.5.2. A brief summary of proposed on-site improvements is presented below.

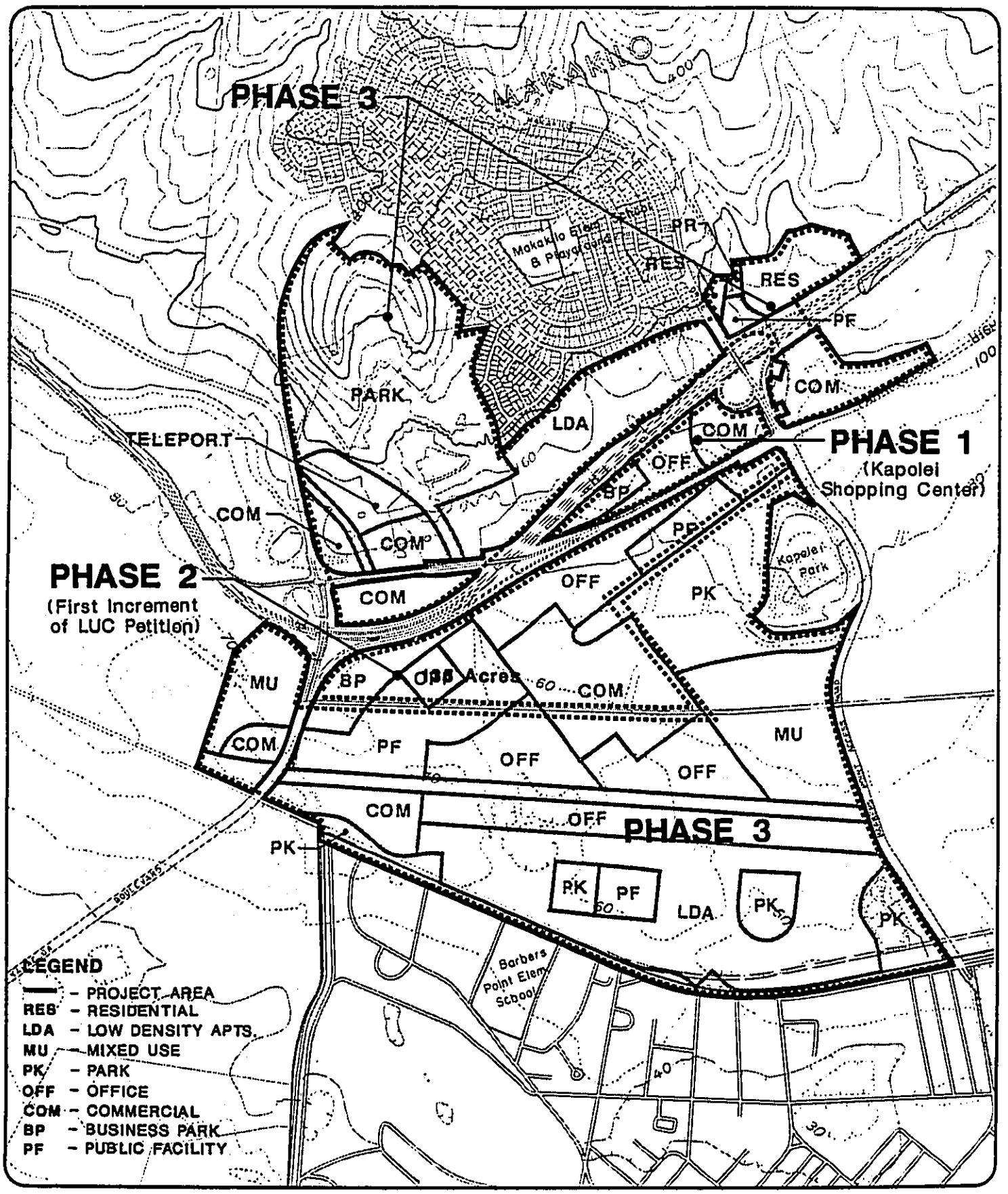
Proposed drainage improvements for the Town Center include a series of detention basins and channels or culverts sized to prevent any increases in runoff leaving the project area. The first detention basin will be constructed as part of the Kapolei District Park adjacent to Puu Kapolei and is expected to serve much of the initial development of the Town Center. A second detention basin will be constructed near the south central portion of the project area.

2.6.4 Power/Communications

An electrical substation and associated underground transmission and distribution systems will be installed and maintained by the Hawaiian Electric Company to service future Kapolei businesses and residents. Telephone switching stations and related infrastructure will be installed and maintained by the Hawaiian Telephone Company. Cable TV facilities will also be provided to service Kapolei community needs (see Section 5.9).

2.7 PROJECT PHASING

The initial phase of the Kapolei Town Center will begin shortly with a retail/commercial village (Kapolei Shopping Center) located west and makai of the Makakilo Interchange (Figure 4). This area lies within the State Urban District, has been designated Commercial on the Ewa DP Land Use Map and has received commercial zoning from the City and County. The next phase of the Town Center ("first increment"), is located directly south of this area and stretches from Kalaeloa Boulevard in the west to Barbers Point Access Road in the east. This increment will be developed in accordance with market demands. Some development will take place at the western end of the area adjacent to Kalaeloa Boulevard because of its accessibility to Palailai Interchange, the Deep Draft Harbor and the James Campbell



Project Phasing

0 1450' Feet

Figure: 4

Kapolei Town Center E.I.S.

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Industrial Park. Other development will occur adjacent to the proposed Kapolei Shopping Center. Future increments of the Town Center will gradually expand south toward the Barbers Point Naval Air Station, north to the Makakilo foothills and east above the Kapolei Village site in step with infrastructure development and prevailing market conditions.

2.8 PROJECT COSTS

Estimates of major infrastructure investments have been made for the entire Kapolei Town Center area. Major off-site improvements analyzed included pro rata shares of increasing the size of the Honouliuli interceptor sewer and the installation of a new 30-inch water line along Farrington Highway. On-site costs include site clearing, drainage, landscaping, roadways, sewers, water, electrical, telephone, street lighting and cable TV (Table 12). A separate cost breakout for the first increment has not been prepared.

Table 12: ORDER OF MAGNITUDE INFRASTRUCTURE COSTS
(Millions of 1986 Dollars)

Off-site Infrastructure	3.1
On-Site Infrastructure	35.9
Total	39.0

Source: R.M. Towill Corp., 1986; Kenneth Leventhal & Co., 1986

Assessment of Existing Conditions, Probable Impacts and Mitigating Measures -- Physical Environment

CHAPTER 3

KAPOLEI TOWN CENTER

THE ESTATE OF JAMES CAMPBELL

Ewa, Oahu, Hawaii

This Chapter describes the physical environment in which the proposed Kapolei Town Center will be situated. After a description of existing conditions, probable impacts (where appropriate) both to and from the proposed action, are analyzed. Where appropriate, mitigative measures are proposed to ameliorate or reduce adverse impacts.

Major sources of information for this chapter are drawn from public reports, communications with public and private agency representatives, public reports and the following reports found in the Appendix.

Appendix B:	An Evaluation of the Profitability Impact on Oahu Sugar Company Resulting from Secondary Urban Center Land Withdrawals
Appendix C:	Affordable Housing vs. Protecting Interior Residential Speech Perceptor: The State Airports Division Ldn 60 Issue
Appendix D:	Biological Survey
Appendix E:	Preliminary Archaeological Reconnaissance Survey
Appendix F:	Air Quality Impact Report

3.1 GEOLOGY, PHYSIOGRAPHY AND TOPOGRAPHY

The proposed Town Center is located at the foot of the Waianae range on the Ewa Plain. Encompassing much of the southwestern area of Oahu, it is underlain by an elevated coral reef partially covered by alluvium. Honolulu Series lava flows are interbedded with reef deposits suggesting that the two were formed at the same time (Soils International, 1985).

The area is gently sloping with average grades ranging between zero and three percent. Ground elevations within the project area vary from 50 feet MSL near the OR&L right-of-way to 492 feet MSL at Puu Palailai (at peak height it lies approximately 1.2 miles north of Town Center). The average elevation of the Town Center area is approximately 60 feet MSL. Puu Kapolei (peak height 166 feet MSL) anchors the east end of the project area and is the most important physiographic feature as it provides a major organizing influence for the Town Center. It is also the namesake of the proposed development (Kapo-lei, *lit.* beloved Kapo (sister of Pele) from Pukui, Place Names of Hawaii, 1984). Purchased by the County as a future park site, Puu Kapolei will be integrated into a major open space area in the Town Center.

The Palailai Sanitary Landfill lies just south of Puu Palailai, in the northwest portion of the site. The landfill area encompasses approximately 41.5 acres. This site slopes from a high point of approximately 500 feet MSL, down to

approximately 200 feet MSL. Prior to landfilling, the site was operated as a rock quarry.

Since much of the project area is under sugar cane cultivation, much of it has been graded with access roadways, a furrow-irrigation system and other appurtenant structures in place.

3.2 CLIMATE

The climate of the project environs is constant and relatively dry, with prevailing trade winds providing a cooling influence. Wind data is available from the Naval Air Station Barbers Point, located immediately south of the project area. The dominant wind regime in the Barbers Point area is the northeast tradewinds which blow 85 percent of the time at an average of 9 knots per hour.

Average temperatures in the project area range from 69 to 91 degrees Fahrenheit (F). Climactic data taken at Honolulu International Airport in 1983 show the warmest average monthly temperature is 80.7 F and the coolest monthly average temperature is 72.3 F. The highest temperature of record is 93 F and the lowest temperature of record is 53 F.

The Ewa Plain experiences light rainfall of about 20 inches per year.

3.3 REGIONAL LAND USE PATTERN

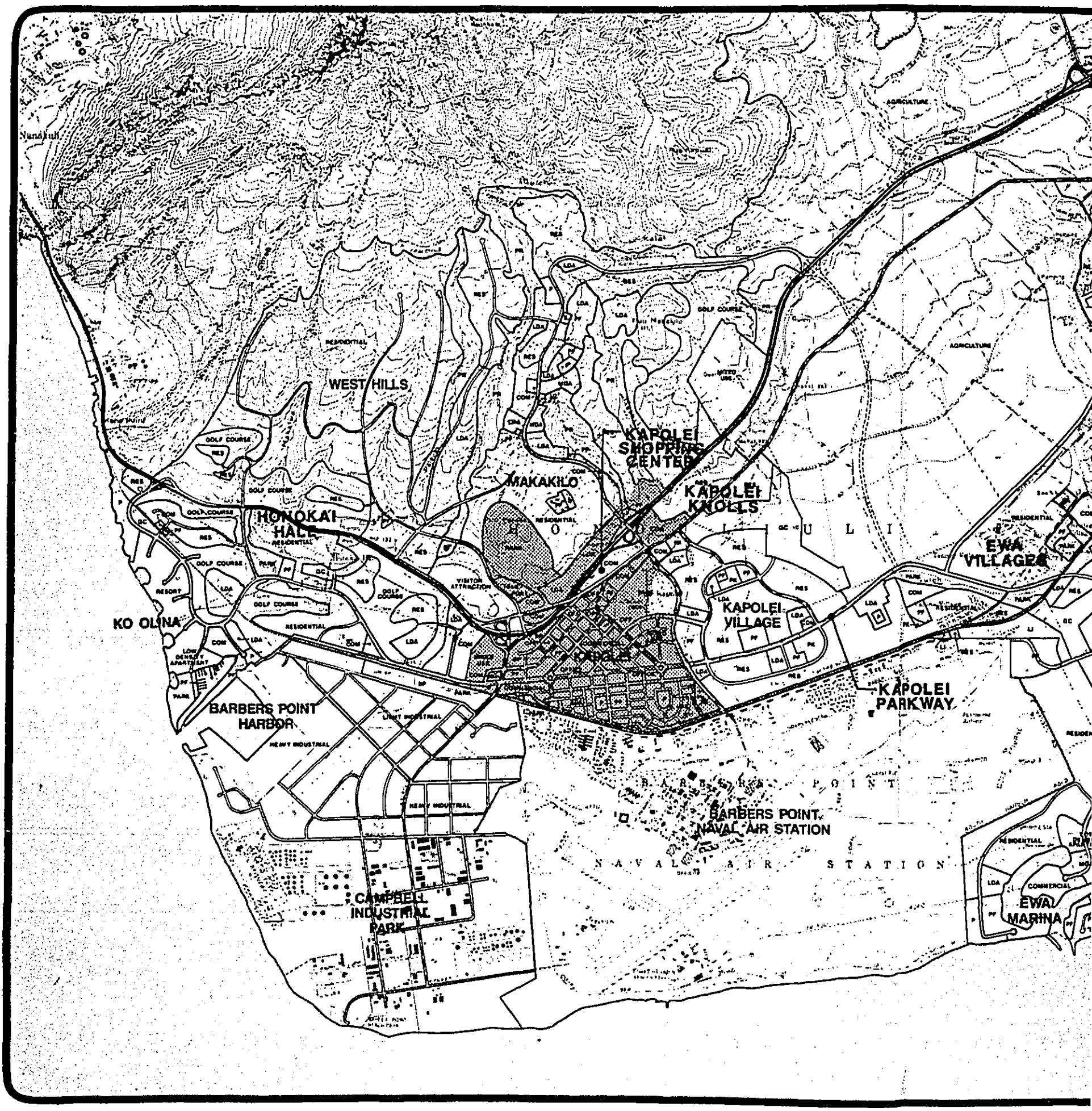
3.3.1 Ewa Long Range Master Plan

The Ewa Long Range Master Plan (Figure 5) is a long range land use plan representing a vision of a preferred land use pattern within the planning area towards the middle of the next century (c. 2050). The applicant maintains the Ewa Long Range Master Plan Map as a means of coordinating the development of various ongoing and proposed multi-year development projects and for disseminating information about long range plans for the planning region. In essence, the map represents the sum of numerous, oftentimes complex development proposals, proposed by a range of public and private developers, and unified by the dominant theme of creating a true secondary urban center. Because each of the individual projects are subject to social, economic and political forces, the overall master plan is in constant flux. The Plan is used here to provide spatial orientation with regard to the existing and proposed land uses discussed below.

3.3.2 Existing Land Uses

The Ewa area encompasses the entire Ewa Plain which stretches from Kunia Road in the east to Kahe Point in the west. Within this area lie four residential communities, one major industrial park, a deep draft harbor, a major military base, and a portion of Oahu's largest sugar plantation. In addition, there are a number of less extensive activities, such as quarrying operations and smaller scale agricultural operations (such as horticulture). A brief description of the major surrounding land uses is provided below.

Makakilo. A 22 year-old residential community consisting of mid-priced, single-family and multi-family housing is located on the lower slopes of the Waianae


WEST HILLS
KAPOLEI SHOPPING CENTER
MAKAKILO
KAPOLEI KNOLLS
HONOKAI HALE
KO OLINA
KAPOLEI VILLAGE
EWA VILLAGE
KAPOLEI PARKWAY
BARBERS POINT HARBOR
BARBERS POINT NAVAL AIR STATION
CAMPBELL INDUSTRIAL PARK
EWA MARINA
AGRICULTURE
GOLF COURSE
RESIDENTIAL
RESORT
LOW DENSITY APARTMENT
LIGHT INDUSTRIAL
HEAVY INDUSTRIAL
VISITOR ATTRACTION
COMMERCIAL
PARK
NAVAL AIR STATION

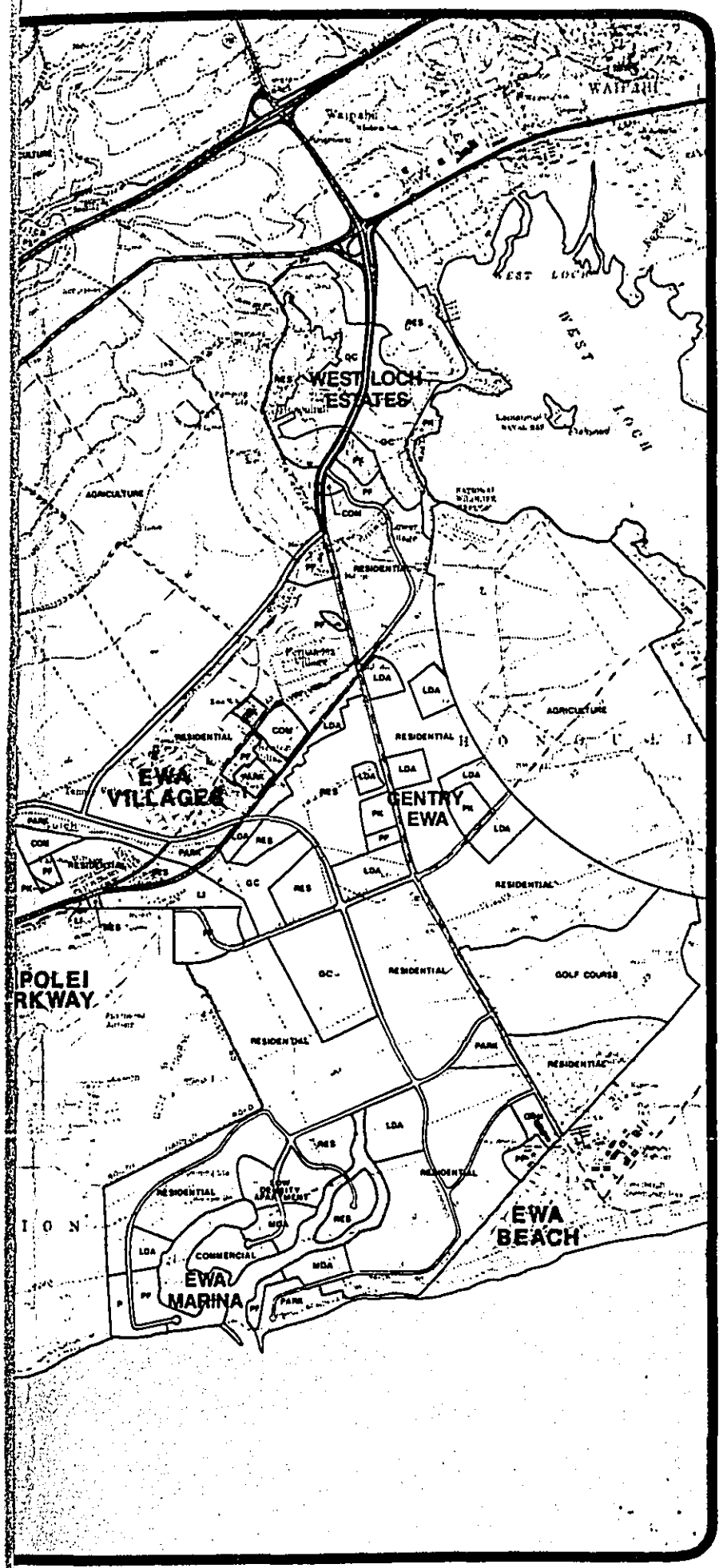


Figure: 5

Ewa Long Range Master Plan

Kapolei Town Center E.I.S.

0 4000'

HELBER, HASTERT & KIMURA PLANNERS
GROSVENOR CENTER • PRI TOWER • 733 BISHOP STREET • SUITE 2590
HONOLULU, HAWAII 96813 • TELEPHONE: (808) 545-2055

Range to the north of the subject site. About 2,400 housing units had been built by 1985, with an estimated 2,700 units remaining to be built. The population in 1985 was 9,000 with the ultimate future population estimated at 16,700.

Ewa Beach. An older, completed residential community with a small commercial center is located southeast of the subject site along the shoreline. Homes in Ewa Beach are moderately priced, except for some oceanfront property. The Ewa Beach community had 3,465 housing units and 14,500 residents in 1985.

Ewa Villages. A group of existing plantation villages (Varona, Tenney, Renton, and Fernandez) that are also known collectively as the Ewa Villages, are located east of the project site and west of Fort Weaver Road along Renton Road. Most of the existing Ewa Village housing units are very old and are low priced. As of 1985, 3,000 people lived in Ewa Villages. The City and County of Honolulu has initiated two low income housing projects within this area.

Honokai Hale/Nanakai Gardens. To the west of the project area, adjacent to and south of the H-1 Freeway lies the community of Honokai Hale/Nanakai Gardens. This is an older completed residential tract with 500 moderately-priced housing units and 2,000 population in 1985.

James Campbell Industrial Park (JCIP). An approximately 2,400-acre industrial park with 1,360 acres absorbed and the remaining acreage available for future expansion is located southwest of the subject site. JCIP users include a mix of heavy industrial and light industrial businesses. The businesses provided employment for 2,500 people in 1985.

Barbers Point Deep Draft Harbor (BPH). A deep draft harbor for which the primary basin has been completed is located north of JCIP to the west of the project area. Development of dock and terminal facilities, shore area storage yards, utilities and roadways currently out for bid, will be started in September 1988, with the first phase of shore-side development scheduled to be operating in Summer 1989 and the balance operating by summer 1990. Complete development of the harbor and all facilities is expected to take 10-15 years. Ultimate development plans call for an additional 84-acres for an ultimate project size of 330-acres (R.M. Towill Corp. 1983).

BPH will be the second commercial port for the island of Oahu and, in combination with the Port of Honolulu, will provide port facilities to meet Oahu's shipping needs for a 50-year period. Because of the limited expansion room around the Honolulu Harbor, it is expected that a number of water oriented businesses will locate at the BPH to expand and reduce costs. Most of the land and facilities used by these businesses will be located in the adjacent JCIP.

Naval Air Station, Barbers Point (NASBP). A Naval aviation facility that housed 2,900 residents in 1985 and provided about 1,500 civilian jobs is located south and southeast of the project site. "The mission of NASBP is to maintain and operate facilities and provide services and material to support operations of aviation activities and units of the operating forces of the Navy." (NASBP Master Plan, 1985)

Aircraft operations at NASBP are conducted on a 24-hour basis and consist primarily of fixed wing propeller driven aircraft, with most flights during daylight hours. Fixed wing jet and rotary wing aircraft operations occur at less frequent intervals. The station has three major runways. Runways 04/22 Right and Left are 8,300 feet in length and Runway 11/29 is 8,411 feet. These runways cross in a northeast/southwest and northwest/southeast pattern.

Oahu Sugar Company, Ltd. The Oahu Sugar Company (OSCO) is the island's largest sugar producer and cultivates about 13,540 acres of sugar cane land, approximately 8,000 acres of which are located within the planning area. After harvesting the cane, it is hauled from the fields to the OSCO mill in Waipahu for processing. Nearly all of the land which OSCO cultivates within the planning area is leased from the Estate of James Campbell with a lease expiration date of 1995. The lands above H-1 Freeway and west of Kunia Road have been designated to agriculture in special property assessments. Field, mill, and management employment at OSCO total approximately 490 workers. Indirect employment dependent upon OSCO is estimated to be 550 jobs (Decision Analysts Hawaii 1987).

Because of favorable growing conditions, good farming practices, and drip irrigation, sugar yields at OSCO are very high, about 14.5 to 15.5 tons per acre versus a 1986 statewide average of 12.5 tons per acre. However, even with high yields and very efficient operations, OSCO is only marginally profitable - the principal reason being low sugar prices (ibid).

3.3.3 Planned Developments in Ewa

A number of major development proposals located in the Ewa area are discussed below. Physical development has just begun on some of the projects while negotiations with prospective developers is ongoing with others. A brief discussion of each development follows.

Ko Olina Resort/Residential Community (West Beach). Ko Olina is a master-planned 1,000-acre destination resort/residential community being developed by West Beach Estates. The site is located on the western Ewa shore, north of the Barbers Point Harbor, south of Farrington Highway and west of Kalaeloa Boulevard west of the project area. The project is comprised of two major phases: a 620-acre first phase which is currently being developed, and a 350-acre second phase with no specific development timetable. First phase development plans call for a total of 5,200 housing units of which 3,700 units will be apartment/condominium units, primarily in highrise buildings, and 1,500 units will be designed as lowrise, lower density attached units located around the golf course. Four thousand visitor units, primarily consisting of hotel rooms grouped around man-made lagoons on the western shore are also planned within the first phase.

Major amenities currently under construction include: a 500-slip marina sharing the same entrance as the Barbers Point Harbor, a championship 18-hole resort golf course, four newly created sandy beaches, a Hawaiian cultural center, two shopping centers, one of which is planned to be a specialty center similar to San Francisco's Fisherman's Wharf, and a number of dinner house restaurants. Second phase development plans call for an additional 18-hole golf course, 2,800 residential units and a local-serving commercial center (Environmental Communications, Inc. 1983).

Current Project Status. Ground breaking for the first phase took place on December 2, 1986. Land and infrastructure development costing over $100 million began in early 1987 and will be complete in early 1989. The Estate of James Campbell has conveyed the entire first phase (620-acres) in fee simple to the developer. The second phase of 350-acres is still owned by the Estate, subject to an agreement with West Beach Estates to acquire it, and is presently under lease to the Oahu Sugar Company.

Campbell Industrial Park Expansion. As noted in Section 2.3.2, the industrial park is slightly over halfway through its development program with 1,360-acres developed and 1,040-acres of the entire 2,400-acre site yet to be developed (Kenneth Leventhal & Company 1986). Major new heavy industrial uses proposed for the park currently include the City & County's H-POWER facility (Honolulu Program Of Waste Energy Recovery) which will convert refuse and garbage into electrical energy, and the first two privately-owned electrical power generating stations built under contract to the Hawaiian Electric Company both of which should be operating by 1992. It is expected that significant market demands for shore-side, harbor-dependant facilities will be generated from the opening of the Barbers Point Harbor, located at the northwestern edge of the park. Development of lands adjacent to the OR&L right-of-way will be limited to light industrial uses, compatible with urban uses proposed in the neighboring Ko Olina and Kapolei Town Center projects.

Current Project Status. Sufficient added appropriately zoned lands are available for industrial expansion in the near term. Development of this land will commence prior to 1991 if Barbers Point Harbor, Ko Olina and other projects develop according to schedule.

West Hills. The proposed West Hills area is located to the west of Palailai Gulch and Makakilo, mauka of the Honokai Hale residential subdivision and Farrington Highway, east of Waimanalo Gulch and makai of Palehua Road. The entire area encompasses approximately 1,800 acres, rising in elevation from the 180-foot elevation adjacent to Farrington Highway to 1,200 feet, adjacent to Palehua Road. Long-term development plans for the site envision a major residential community similar in scale to what has and will be developed at Makakilo. Preliminary planning for an 18-hole golf course along the Farrington Highway frontage of the site has been completed as reflected in the master plan. A very preliminary development program for the site includes the development of approximately 6,500 homes on about 1,100 acres of the site, 30 acres of commercial land uses, 65 acres of parks, 60 acres of public facilities (fire and police stations, libraries, etc.), 100 acres of schools, a 180 acre golf course, and approximately 265 acres of major roads, circulation and open space elements.

Current Project Status. As noted above, planning for this area is at a very preliminary stage. No development approvals are being sought for any portion of the West Hills area at this time. The area is slated for development in the long-term, subject to market conditions and infrastructure feasibility.

Visitor Attraction. A 106-acre visitor attraction site is located mauka of the H-1 Freeway immediately to the west of Puu Palailai. In 1986, Amfac Hawaii, Inc. proposed to develop a "Pacific/Asian Basin Theme Park" at this location. Market

and environmental studies prepared for the project indicated both technical and market feasibility for the proposed project (Helber, Hastert & Kimura, Planners 1987). In addition, public opinion appeared to support the project because of the sizeable employment opportunities associated with the construction and operation of the $50 million facility and because of the public commitment expressed to the community by project representatives. In mid-1987, the developer withdrew its application to amend the Ewa Development Plan and suspended negotiations with the Estate of James Campbell for the acquisition of the site.

Current Project Status. At the present time, the site is being reserved for uses similar to that previously proposed by Amfac Hawaii, Inc. No specific development time frame has been identified.

Makakilo Expansion. As noted in Section 2.3.1 above, Makakilo is a major existing residential community approximately halfway through its development cycle. Presently the development encompasses approximately 290 acres and supports a total housing stock of approximately 2,600 homes. Future plans are to develop approximately 2,500 additional single- and multi-family homes at a rate of about 200 homes per year. A Golf Course is planned for the area around Puu Makakilo.

Current Project Status. Finance Realty, the developer, is currently marketing a number of different home-styles in various areas of the development.

Kapolei Shopping Center. The Estate of James Campbell (applicant) is in the process of developing the Kapolei Shopping Center located adjacent to the project area. The Kapolei Shopping Center is in the design development phase. The Center consisting of 130,000 square feet, initially will include a supermarket, superdrug, numerous smaller tenants and restaurant and fast food services.

Current Project Status. Zoning approvals have been secured. Construction will begin in summer of 1989 and shops will be open by Christmas 1990.

Kapolei Village Residential Community. Kapolei Village is a major residential community proposed by the State Housing Finance and Development Corporation (HFDC) in conjunction with the City & County Department of Housing Community and Development. The site is located immediately east of the project area. Major elements of the 830-acre project include: 4,871 homes of which approximately two-thirds will be "affordable," an 18-hole municipal golf course which will double as a major retention basin for on-site drainage purposes, two elementary schools, one intermediate school, one high school, and a number of parks and recreation centers. A master plan report and environmental impact statement have recently been completed for the project (Helber, Hastert & Kimura, Planners 1987, and R.M. Towill Corp. 1987, respectively). Absorption is expected to take approximately 15 years with about 300 homes developed and sold each year.

Current Project Status. As noted, a master plan has been prepared for the development indicating market and technical feasibility. HFDC plans to use its preemption powers granted by Act 337, SLH 1987 to "fast-track" the project through the State Land Use Commission and City & County of Honolulu land use permitting processes. Construction is expected to begin at the site in late 1988 with first home deliveries occurring in late 1989.

Kapolei Knolls. Kapolei Knolls is a small residential development being proposed by the Lusk Company, The project is located makai of the Makakilo Community between the H-1 Freeway and Farrington Highway, east of Makakilo Drive. The project involves the construction of approximately 500 single-family homes and all pertinent infrastructure on about 80 acres. This "market housing" is expected to provide for the demands of the proposed Kapolei Town Center. Homes are typically 1,100 square feet, including garages, and would be sited on 5,000 square foot minimum residential lots. Typical units which will consist of 3 bedrooms and 2 baths or 4 bedrooms and 2 1/2 baths will be sold at average sale price of $160,000, 1987 dollars.

Current Project Status. A Final EIS for the project is currently being circulated for public comment (Environmental Communications, Inc. 1988). State Land Use Commission action and subsequent City & County action on Development Plan, zoning and subdivision amendments are expected to commence when the Final EIS has been accepted.

Ewa Villages. As noted above, the Ewa Villages consists of a group of existing plantation villages located midway between east and west Ewa. With the development of the Kapolei Parkway, access to the Villages area will be increased, bringing the area closer to the developments being proposed in east and west Ewa. Long range plans for the area call for some residential infilling, and the possible development of local-serving commercial uses in a zoned area to the east of Renton Village to serve the needs of both the village communities and the adjacent Ewa Gentry community.

Current Project Status. Short to medium term goals for the area are for the existing homes and infrastructure to be gradually upgraded and sold to residents, as has been done in Fernandez and Dillingham Villages. The Estate is working with community residents to place certain important structures on the Historic Register in an effort to preserve historical ties to the past.

Ewa Marina Residential Community. The 734-acre Ewa Marina residential community is a master planned, water-oriented development that consists of land and water-oriented land uses organized around the central focus of the project, a 115-acre marina basin. The marina is the dominant physical element in the master plan, providing over 4.5 miles of water frontage to serve as the location for the residential and commercial purposes. The waterway also establishes the major design themes for residential and boating activities in coordination with the open space/recreation, major utility, and flood control systems (Dames & Moore 1985).

Of the total development area, 456 acres are allocated for residential use. The acreage is projected to support a total of 4,850 dwelling units, subdivided into 26 residential development areas. A range of residential unit types is planned in order to achieve maximum market penetration through a variety of housing offerings by different builders. Anticipated unit densities range from a low of 5 units per acre to a maximum of 33 units per acre. Generally, the higher density units are concentrated in areas offering the greatest locational and visual amenities such as on marina and oceanfront sites. Market studies performed for the properties suggest the majority of the units should be priced within a $100,000-$200,000 range, with lower density units along the marina waterway and ocean frontage commanding prices in the $200,000-$400,000 range. An estimated ten

percent of the residential program will be geared towards affordable housing prices. The plan also includes a commercial marina, restaurants, a retail shopping center, parks and a school.

Current Project Status. The original developer, MSM Associates, is no longer associated with the project. The applicant is anxious that the project proceed, pending resolution of current legal difficulties.

Proposed 27-hole Golf Course. A 27-hole golf course is being proposed by the Myers Corporation for a 270-acre site north of and adjacent to Ewa Beach, east of Fort Weaver Road. The course will be a privately-owned facility for public play and will be managed in similar fashion to other private clubs such as the Pearl Country Club, Olomana and Hawaii Kai. The Palmer Course Design Company has designed three nine-hole layouts approximately 3,500 yards each with a nine-hole rating of par 36. The dominant feature of the 27-hole layout is the extensive use of water in storage basins. This golf amenity serves a dual purpose of a water hazard as well as an effective storage system for irrigation purposes. Other proposed uses include a clubhouse facility with a golf pro shop, a snack bar, limited locker facilities, a golf driving practice range, putting green, parking and golf cart storage/maintenance facilities. All uses will be accessories to the golf course and no urban residential uses will be developed on the site. It is anticipated that the clubhouse facility will remain open during the evenings, in order to provide food and beverage service to the golfers as well as the surrounding community (Environmental Communications Inc. 1987).

Current Project Status. The project developer is seeking a zone change for the entire site from the Restricted Agricultural District (AG-1) to the General Agricultural District (AG-2) in order to develop the 27-hole golf course. The State Land Use Commission has commented that because the project site does not appear to impact agricultural lands rated with an overall productivity rating of A or B, no State special use permit (SUP) will be required for the project.

Ewa Gentry Residential Community. The center point of the proposed 887-acre Ewa Gentry project is the intersection of Fort Weaver Road, Geiger Road, and Iroquois Point Road in east Ewa. The development concept for the project is to provide for a residential community with recreational and public facilities. The implementation of the project concept will provide a variety of housing types and price ranges in the Ewa area. Major access to the site is via Fort Weaver Road and the H-1 Freeway is approximately three miles to the north (Gray, Hong & Associates, Inc. 1987). With the exception of 175-acres owned in fee by Gentry, the site is owned by the Estate of James Campbell with the majority of the site currently leased to Oahu Sugar Company for sugar cultivation.

The current master plan for the project provides for a total of 7,150 units, an 18-hole golf course, and community facilities including schools, parks and greenways. Major land uses reserved for housing comprise 70 percent of the site. Recreation, open space, and privately maintained greenways comprise an additional 22 percent of the site. The remaining 8 percent is devoted to public facilities that presently consist of a school (K-6) and public parks.

Current plans call for project buildout in eight years starting in 1988 with approximately 900 single-family and multi-family homes being produced each year.

Current Project Status. The Ewa Gentry development is an expansion of existing residential zoning and will require additional applications and land use approvals. Based on the current master plan, a Development Plan amendment will be sought changing 674-acres from Agriculture to a variety of urban uses. A Final EIS is currently being circulated for public review. The EIS and master plan documents will be used to support proposed State Land Use redesignations and amendments to the City and County of Honolulu's Ewa Development Plan.

West Loch Estates. The proposed 500-acre West Loch Estates residential community is located between Waipahu and Honouliuli, adjacent to the West Loch of Pearl Harbor. The project is being developed by the City & County of Honolulu's Department of Housing and Community Development (DHCD) as part of its commitment to provide affordable housing for Oahu's residents. Major elements of the master plan consist of 1,500 housing units on 260-acres, a 40-acre shoreline park, and a 175-acre municipal golf course which spans the Fort Weaver Bypass highway and includes some lands in the vicinity of Honouliuli. The golf course will also function as a major drainage/flood control facility.

The project will be developed in two phases. Phase one will include the golf course, shoreline park and approximately 600 residential units on an 86-acre site adjacent to the Farrington Highway/Fort Weaver intersection. Phase two involves the development of approximately 900 housing units, a district park, elementary school, park & ride/day care facility and a small commercial area on a 163-acre site north of Renton road to the east of the Fort Weaver Bypass highway (R.M. Towill Corp. 1987 and 1988).

Current Project Status. The project is classified Urban by the State Land Use Commission and DHCD is proposing to "fast-track" the project through City & County of Honolulu land use approval processes by utilizing the provisions of Chapter 46-15.1, HRS. Construction of phase one is scheduled to begin in late 1988. Completion of the entire project is projected for 1991.

3.3.4 Probable Impacts

The Kapolei Town Center will play a key role in integrating the existing and proposed developments of the Ewa Plain into a cohesive and functional urban form. Approval of the proposed action will facilitate the development of the Ewa area as a self-contained community, with a large portion of Ewa residents holding jobs in Ewa, and where the urban facilities and services required by Ewa residents and businesses will be provided within Ewa. The development of Kapolei will provide a true urban nucleus for the Ewa area. The recently proposed projects discussed above will further serve to strengthen and complement the Kapolei Town Center development.

3.4 SOILS AND AGRICULTURAL POTENTIAL

3.4.1 Existing Conditions

The project area is located on a relatively level coralline/alluvial plain, and has a variety of soil types including coral deposits in the flat lands, silty clays, and stony steep lands. In general, soil types within the project area include dark red-brown

to dark brown silty clays and dark grayish-brown clays (alluvial and residual). Coral, consolidated and unconsolidated marine deposits occur on lower-elevation flat lands and coastal areas. A natural resources study conducted for the applicant identified four principal soil types (Soils International, 1985):

1) Dark reddish-brown to dusky red brown silty clay and silty clay loam. These soils have low to moderate shrink-swell potential and are good for roadway fill and topsoil. They are suitable for support of low building foundations, except in areas where the slopes are steep.

2) Dark brown silty clay and clay loam. These soils have low to moderate shrink-swell potential and are good for roadway fill and top soil. They are suitable for support of low building foundations except in areas where slopes are steep.

3) Dark reddish-brown and gray-brown to dark grayish-brown clay and silty clay. Due to the high shrink-swell potential, these soils are poor for use as roadway fill, top soil and for support of low buildings. This soil type is very sticky and plastic which makes workability difficult.

4) Dark reddish brown silty clay loam, stony in places. At lower elevations, these soils have a relatively thin surface layer, underlain by coral or consolidated marine deposits. Soils found at higher elevations are underlain by gravelly alluvium. In areas where the surface layer is thick, the material may be used for roadway fill and top soil. Where the soil layer is thin or high percentage of stones are present, it may be impractical to use these soils for fill or top soil.

3.4.1.1 Soil Analyses

Soils within the project area have been identified in terms of four classification systems: 1) the United States Department of Agriculture Soil Conservation Service (SCS) system; 2) the University of Hawaii's Land Study Bureau (LSB) system; 3) the Agricultural Lands of Importance in the State of Hawaii (ALISH) system; and, 4) the proposed State of Hawaii's Land Evaluation and Site Assessment (LESA) system (each described in greater detail below).

The soil types within the project area were first identified using the SCS soils maps. Characteristics of each soil type were then described (See discussion on soil types and ratings, Section 3.4.1.2). LSB Overall Productivity Rating, the ALISH designation and the LE (Land Evaluation) score were then added to each description.

Soil Conservation Service. The Soil Conservation Service (SCS) classification method has an eight class capability system, rating the soils I through VIII with I representing the highest capability and VIII the lowest. The soils of the project area are rated between I and IV if irrigated, and between II and VIII if non-irrigated.

Land Study Bureau. The Land Study Bureau's (LSB) Detailed Land Classification system ranks soils in five overall productivity categories ranging from best, "A", to worst, "E". Factors in this ranking include machine tillability, stoniness, texture, clay properties, drainage, rainfall, elevation, and slope. The project area is

comprised of approximately 40 percent "A" soils, 40 percent "B" soils, and 20 percent "C" soils.

ALISH. The Agricultural Lands of Importance in the State of Hawaii (ALISH) map, prepared by the State Department of Agriculture, classifies lands into three categories: 1) prime agricultural land, 2) unique agricultural, and 3) other important agricultural land. Approximately 75% of the subject site has been categorized as "prime", 15% as "other important" and the remaining 10% was given no rating, due to the quarry nature of the soil. There were no "unique" agricultural lands on the site. "Prime Agricultural Lands" have been defined as "Land which has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops economically when treated and managed according to modern farming methods." "Other Important Agricultural" lands are defined as "Land other than "Prime" or "Unique" agricultural land that is also of statewide or local importance for agricultural use."

LESA. The Hawaii State Legislature in 1983 established the State of Hawaii Land Evaluation and Site Assessment (LESA) Commission to create a system which would identify and recommend for legislative adoption "important agricultural lands" (IALs). Specifically, the Commission was to recommend a set of agricultural production goals for the State including an assessment of economic feasibility and the identification of specific locational and land area requirements to meet this objective.

The 1986 and 1987 Legislatures declined to act on the Commission's 1986 report entitled A Report on the State of Hawaii Land Evaluation and Site Assessment System submitted in February 1986. The Commission lapsed after the 1986 session as the Legislature failed to appropriate monies for its continued operation, thus it is unclear what the present status of the Commission (and its findings and recommendations) is at this point.

Studies conducted for the Commission indicated a decline in agricultural production acreage goals for the island of Oahu from 63,200 acres in the base year (1983) to 57,600 acres in 1995. Production acreage of the two principal agricultural crops, sugar and pineapple, was expected to remain relatively constant over the projection period (1983 - 1995). Pineapple acreage remained stable at 11,800 acres with sugar lands declining from 27,200 acres to 25,300 acres.

LE ratings. After determining production goals, the next major task of the Commission was to evaluate, prioritize and map the estimated production acreages. The Commission developed a land evaluation (LE) system which used five separate interpretive or rating systems, all of which have been wholly or partly based on soils information. These soil ratings were weighted, totaled and averaged to derive a common index called the "LE rating." Each soil type was assigned a numerical value from 1 to 100, with a higher number representing more productive soil types.

SA Ratings. While the LE ratings which were developed express the quality of the land based on the physical characteristics of the soils, the site assessment (SA) ratings were designed to express the "relative" quality of a site or area based upon its non-physical characteristics or attributes. The SA factors or criteria indicate the agricultural viability of a parcel, site or area. Each area is scored against ten SA factors which are in turn weighted and totaled to provide the "SA rating." The

LE and the SA ratings for a specific parcel or site are then summed and averaged ((LE + SA)/2) to provide the final LESA score.

A numerical threshold or cut-off point was defined to provide sufficient acreage to meet the production goals of each county. For the City and County of Honolulu, threshold LESA scores ranging from 53 to 77 (depending on type of agriculture under consideration) were determined to provide sufficient acreage to meet the 1995 county-wide production goal of 57,600 acres. Soils meeting or exceeding these threshold scores were then identified and mapped within the existing State Agricultural District. Small discontiguous parcels were eliminated as were lands controlled by the federal government.

As expected, the results of the mapping analysis closely follows findings of previous soils-based studies such as ALISH and LSB. Most of Central Oahu, the Ewa Plain (including the project area) and the Mokuleia-Waimea region lie within the areas classified as "important agricultural lands" or IALs.

A major part of the Commission's legislative mandate was to recommend standards and criteria to evaluate requests for redesignation of IAL parcels to the State Urban District. These standards and criteria are examined in Section 3.4.2 below.

3.4.1.2 Soil Types and Ratings

The following is a listing of the soil types located within the first increment of the project, with the appropriate SCS, LSB and LESA ratings (see Figure 6).

Ewa Series. The Ewa series consists of well drained soils in basins and on alluvial fans. These soils developed in alluvium derived from basic igneous rock. The surface is nearly level to moderately sloping.

EaB Ewa silty clay loam, 3 to 6 percent slopes on alluvial fans and terraces. In a representative profile, the surface layer is dark reddish-brown silty clay loam about 18 inches thick. The sub-soil, about 42 inches thick, is dark reddish-brown and dark-red silty clay loam that has subangular blocky structure. The substratum is coral limestone, sand, or gravelly alluvium. The soil is neutral in the surface layer and subsoil. Permeability is moderate. Runoff is slow, and the erosion hazard is slight. The SCS rating for this soil type is II when irrigated and IV non-irrigated. The LSB rating for this soil type is "A", with a LE rating of 85.

EmA Ewa silty clay loam with 0 to 2% slopes. Runoff is very slow, and the erosion hazard is no more than slight. The SCS rating for this soil type is II for irrigated and IV for non-irrigated. The LSB rating for this soil type is "B",with an LE rating of 84.

Honouliuli Series. This series consists of well drained soils on the coastal plains and developed into alluvium from basic igneous rock. The surface is nearly level to generally sloping.

HxA Honouliuli clay, 0 to 2 percent slopes. This soil occurs in the lowlands along the coastal plains. In a representative profile, the soil is dark reddish-brown, very sticky and very plastic clay throughout. The surface

Soil Conservation Service Soil Types

Kapolei Town Center E.I.S.

0 1450' Feet

Figure: 6

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layer is about 15 inches thick. The subsoil and substratum have subangular blocky structure, and they have common to many slicken sides.[*sic*] The soil is neutral to mildly alkaline. Permeability is moderately slow. Runoff is slow, and the erosion hazard is no more than slight. The SCS rating for this soil type is I when irrigated and IV non-irrigated. The LSB rating for this soil type is "B", with a LE rating of 87.

Mamala Series. This series consists of shallow, well drained soils along coastal plains that formed in alluvium deposited over coral limestone and consolidated calcareous sand. The surface is nearly level to moderately sloping.

MnC Mamala stony silty clay loam with a slope of 0 to 12%. This soil type occurs along the coastal plains of Oahu. They are formed of alluvial deposits over coral limestone and consolidated calcareous sand. Permeability is moderate. Runoff is very slow to medium, and the erosion hazard is slight to moderate. The SCS rating for this soil type is III when irrigated and VI non-irrigated. The LSB rating for this soil type is "C", with a LE rating of 66.

Waialua Series. This series consists of moderately well drained soils on alluvial fans. These soils developed in alluvium weathered from basic igneous rock. They are nearly level to steep.

WkA Waialua silty clay, 0 to 3 percent slopes. This soil is on smooth coastal plains. Permeability is moderate. Runoff is slow, and the erosion hazard is no more than slight. The SCS rating for this soil type I if irrigated and IIIc if non-irrigated. The LSB rating for this soil type is "B", with a LE rating of 93.

WIB Waialua stoney silty clay, 3 to 8 percent slopes. This soil has a profile like that of Waialua silty clay, 0 to 3 percent slopes. Runoff is slow, and the erosion hazard is slight. The SCS rating for this soil type is IIIe if irrigated, and IIIs if non-irrigated. The LSB rating is "A", with a LE score of 83.

3.4.2 Probable Impacts

The impacts of the project on soils consist of two elements: erosion and indefinite loss of agricultural land.

3.4.2.1 Erosion

Minor increases in erosion would result from changes in topography, drainage patterns, and vegetative cover due to land clearing and construction. After construction is completed and vegetative cover has been replaced, the level of erosion will decrease depending upon soil stability conditions.

3.4.2.2 Loss of Agricultural Lands

A long term impact of the proposed project is the loss of lands identified as suitable for agriculture. Major elements of this long-term impact are: (1) The

impact on the profitability of the Oahu Sugar Company; and (2) the impact on "important agricultural lands."

(1) Impact on the Profitability of Oahu Sugar Company

Amfac's Oahu Sugar Company (OSCo) currently manages an approximately 14,200 acre plantation on lands which cover portions of Central Oahu on each side of Kunia Road above Pearl Harbor, and portions of the Ewa Plain to the west of Pearl Harbor. Nearly all the land which OSCo farms are leased, primarily from the Estate of James Campbell (applicant) and Robinson Estate. Leases for the former's lands are scheduled to expire in 1995 with the latter's expiring one year later. Both leases allow for partial withdrawal of lands for urbanization. OSCo currently operates two mill trains in tandem at their Waipahu processing facility.

A report prepared for the applicant (Larson, 1986), included in this report as Appendix B and summarized below, evaluated the impact of a phased withdrawal of about 700 acres on the profitability of the Oahu Sugar Company.

The report identified five major factors that determine the continuing profitability of OSCo:

1) Sugar production in Hawaii will depend upon the continued protection of the U.S. sugar industry by the U.S. Congress.

2) It is very likely that profitable OSCo operations will likely require about 100,000 tons of sugar annually in a double mill train system and 80,000 tons with a single mill train.

3) Operating cost reductions and yield increases will continue to be the primary objective of OSCo management.

4) Long-term crop land withdrawals for urban use remain compatible with profitable sugar operations at OSCo.

5) No alternative crop prospects were found that are economically feasible sugar crop replacements at OSCo.

A ten-year summary of HSPA data on the sugar industry (Table 1, Appendix D) shows that OSCo has averaged 100,000 tons annually with a range of 91,800 to 114,300 tons. In 1985 OSCo produced 97,500 tons of sugar harvested from 6,560 acres to report a record yield of 14.87 tons per acre (TSPA).

Over the past ten years, OSCo has increased average plantation yields from 11.0 TSPA in 1977 to the current 14.87 TSPA. By keeping production levels constant, the increased efficiencies of its operation have allowed it to reduce total plantation size by 4,400 acres between 1980 and 1983. The trend in increasing yields is expected to continue although the easiest yield improvements have already been made. If plantation projections attain 16 and 17 TSPA, then total plantation requirements will drop to under 12,000 acres while continuing to operate at 100,000 tons annually.

A recent report prepared for the Village Park Expansion EIS (July 1986) (Proposed Village Park Expansion: Impact on Agriculture. Decision Analysts Hawaii, Inc, February 1986) noted that OSCo could switch to a single train milling operation, releasing approximately 6,200 acres of land, and still remain viable.

> "OSCO could reduce acreage and production substantially without losing economies of scale. Of significance, Amfac's Kekaha Sugar Company, Inc., which has climatic conditions similar to those of OSCo and a similar yield potential, is one of the most profitable sugar operations in the State. Yet this plantation has only about 8,000 acres under cultivation, and produces only about 55,000 tons of sugar per year versus 14,200 acres and 90,000 to 95,000 tons per year for OSCo. Assuming OSCo could be reduced to a level similar to that of Kekaha Sugar Company without losing its economies of scale, which is regarded by Amfac as possible, then about 6,200 acres could be freed (14,200-8,000)..." (Decision Analysts Hawaii, 1986).

(2) Impact on Important Agricultural Lands

The withdrawal of the first 135-acre increment from the State Agriculture District will impact currently cultivated sugar lands classified as "Important Agricultural Lands" by the LESA Commission.

Article XI, Section 3 of the State Constitution mandates that important agricultural lands shall not be reclassified or rezoned without meeting standards and criteria established by the Legislature. Implementing Action B(5)(c) of the State Agriculture Functional Plan states that "Until standards and criteria to conserve and protect important agricultural lands are enacted by the Legislature, important agricultural lands should be classified in the State Agricultural District and zoned for agricultural use, except where, by the preponderance of the evidence presented, injustice or inequity will result or overriding public interest exists to provide such lands for other objectives of the Hawaii State Plan."

As noted earlier, standards and criteria regarding the reclassification of important agricultural lands to the Urban District have been promolgated by the LESA Commission as part of their legislative mandate. Although not officially adopted as public policy, they represent an important step and are presented below:

1. *The proposed designation conforms to the Hawaii State Plan.*

2. *The proposed designation conforms to the County General and/or Community Development Plans.*

3. *The proposed redistricting is based on a demonstrated need for non-agricultural use, such as housing, employment, economic development or public facilities, which overrides the IAL designation based on agricultural need, impact on production goals and feasibility.*

As discussed in Chapter 4 of this report, the proposed action conforms to the intent and spirit of the Hawaii State Plan, and implements General and Development Plan policies regarding the development of the Secondary Urban Center. The market study prepared to support the Kapolei Town Center (Appendix A) indicates a

significant and demonstrated need for employment in the Ewa area to implement public policy goals.

3.4.3 Mitigating Measures

The first development phase is located north of Waimanalo Road, one of Osco's main cane-haul arteries. Preservation of the Waimanalo Road artery through Kapolei is recognized as important to the continued farming of the fields to the west of the Town Center. Development of the first increment will not impede the continued agricultural use of Waimanalo Road. Incremental withdrawal of cane will be coordinated with OSCo to minimize crop damage.

3.5 HYDROLOGY

3.5.1 Groundwater

Groundwater in the Barbers Point area occurs in two aquifers, the deeper (and higher quality) Waianae Volcanics and the overlying (mostly brackish to salt water) coral aquifer. Materials of low-permeability including marine clay and silt sediments, alluvium and weathered volcanics, separate the two aquifers and form an aquiclude referred to as "caprock." Because of its low permeability, the caprock retards the flow of water between the two aquifers.

Precipitation in the Waianae and Koolau Ranges infiltrates to supply water to the Waianae aquifer. The coral aquifer (which may be several hundred feet thick at its seaward end) is recharged by direct infiltration of rainfall, infiltration of stream runoff, and infiltration of irrigation water applied in excess of crop requirements. A significant source of recharge is attributable to upward leakage from the underlying Waianae aquifer. The water in the coral aquifer consists of a thin lens of fresh to brackish groundwater which grades into sea water as it approaches the shore.

The project lies within the Pearl Harbor Ground Water Control Area (GWCA), withdrawals from which are regulated by the State Board of Land and Natural Resources (BLNR) under Chapter 177, HRS, and Administrative Rule Chapter 166 of Title 13. In 1980 the BLNR certified the sustainable yield of the Pearl Harbor GWCA at 225 million gallons per day (MGD). In 1984, the BLNR established three subareas within the Pearl Harbor GWCA: the Koolau subarea; the Waianae subarea; and the coastal caprock subarea. The sustainable yield for the Koolau subarea is now set at 200 MGD, The Waianae subarea is set at 25 MGD. A separate sustainable yield will be determined in the future for the coral aquifer. At the present time the Koolau subarea has an unallocated supply of 90,000 GD. The Waianae subzone has an unallocated supply of 6.46 MGD. A water use permit is required from DLNR if new groundwater resources are to be developed or if plans require the modification of present groundwater uses.

The first increment of the project area is located over the boundary of the Waianae and coastal caprock subareas of the Pearl Harbor GWCA. The Honolulu Board of Water Supply "No-Pass" line passes through the project area. The State Department of Health "Underground Injection Control" (UIC) line passes seaward (south) of the project area, roughly following the OR&L right-of-way.

3.5.2 Surface Drainage

A regional drainage study including the project area has been prepared and is now being reviewed by the City Department of Public Works (R.M. Towill Corp. September 1987). A review of existing conditions and proposed improvements is discussed below.

3.5.2.1 Existing Conditions

Much of the project area is now used for the cultivation of sugar cane and is situated on gently sloping fields with average grades ranging between 0 percent and 4 percent sloping north to south. The project area is transected Kapolei Gulch, originating below Makakilo City and terminating in a shallow depression near the central southern boundary of the Town Center with the Naval Air Station Barbers Point (NASBP) (Figure 7). The entire project area lies within Watersheds C and D. Other gulches in the area are (from west to east): Palailai and Awanui Gulches to the east of the Honokai Hale subdivision located within Catchment Area 2 (determined from previous Campbell Estate Drainage Study); an unnamed gulch which converges with Makakilo Gulch just to the east of Makakilo and which terminates in a dry well/coral pit installed by Ewa Sugar Company just to the east of, and inside the NASBP main gate; and, Makalapa Gulch which terminates in the same coral pit. These gulches are located in Drainage Shed B.

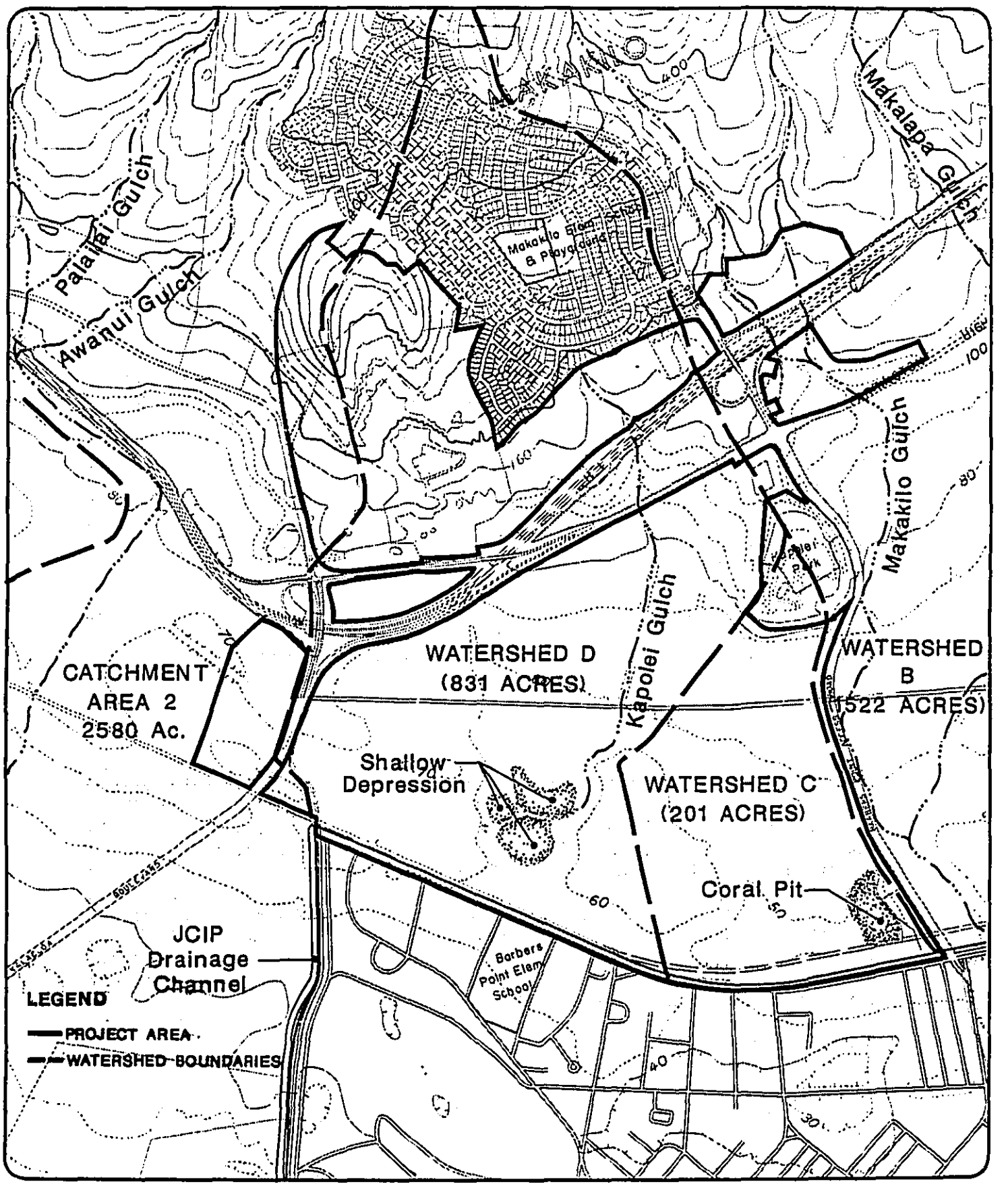
The NASBP lies directly downstream of the first increment. As a result of an intense rainstorm in January of 1969, the NASBP suffered considerable flood damage. The damage has been largely attributed to floodwater from Kapolei Gulch, referred to above, which crosses through the center of the project area.

3.5.2.2 Proposed Improvements

The drainage plan for the project area consists of controlling runoff from watersheds C and D. Runoff from watershed "C" will be diverted into the 220-acre foot capacity coral pit located at the southeast corner of the Town Center (Figure 8). Watershed D runoff, which includes the first increment, will be disposed of by the use of two on-site collection basins. The first basin (101 acre-feet) is located in the proposed Kapolei Park, just south of the first increment. This basin will serve to dispose of runoff generated from Makakilo and the upper watershed areas. The second basin (309 acre-feet) will dispose of water generated from the lower regions of watershed D and will accept any possible overflows from the first basin. A ground depression just above the NASBP provides a suitable location for this basin. The second collection basin would ultimately be redeveloped for urban uses with flows redirected to an improved JCIP channel.

3.5.3 Probable Impact

The development of the initial phases of the Town Center will result in the reduction of the groundwater recharge area due to the increase in impervious surfaces associated with urban development. Because the project area lies over the hydrologic boundary between the Waianae Aquifer and the coastal caprock, the reduction in recharge is estimated to be slight, relative to the size of the recharge area, and thus is not considered to be significant. Furthermore, the on- and off-



Existing Drainage

0 1450'
Feet

Figure: 7

Kapolei Town Center E.I.S.

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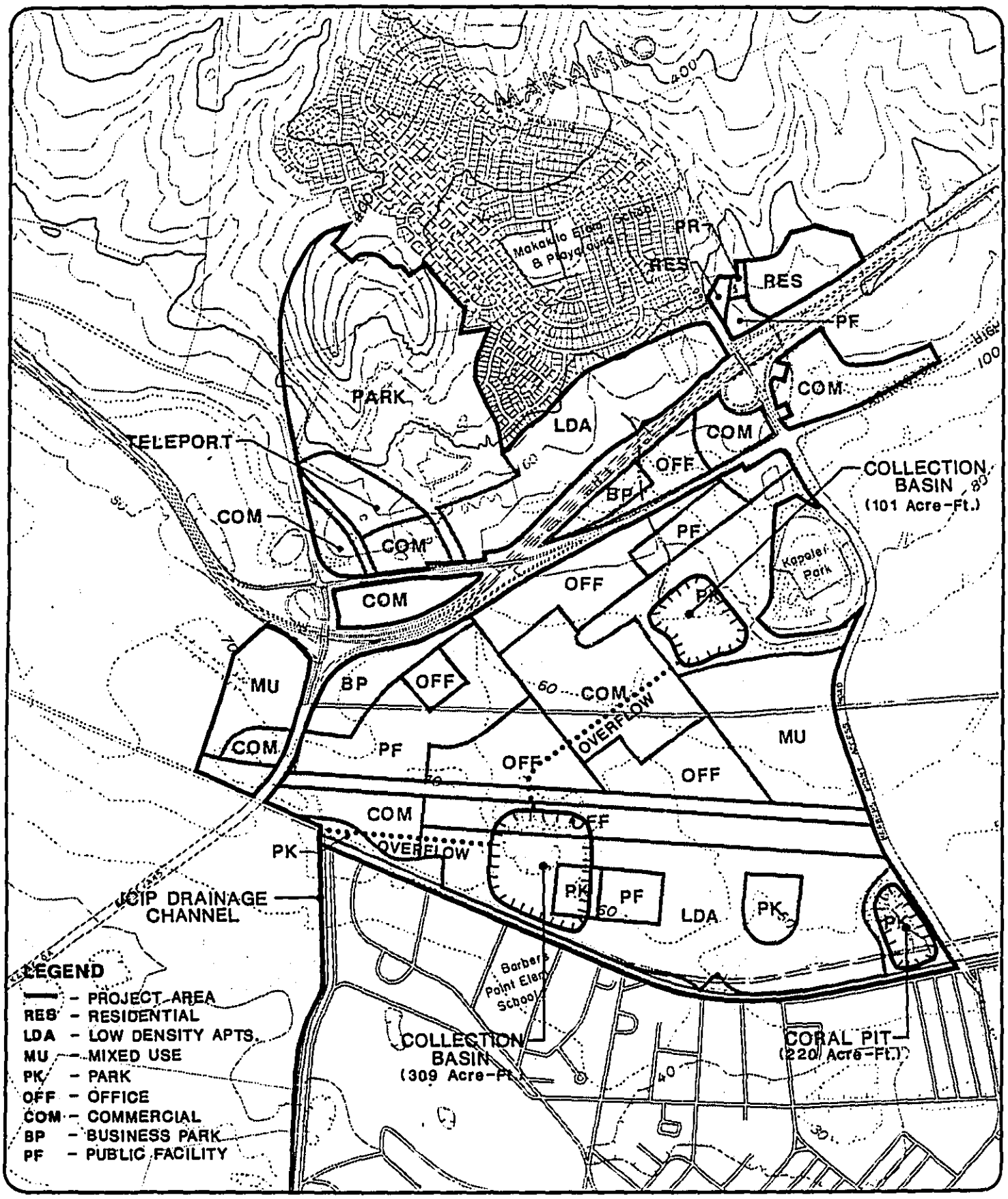

Proposed Draining Improvements

Kapolei Town Center E.I.S.

0 1450' Feet

Figure: 8

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site storm drainage storage measures discussed above will allow for storm waters to infiltrate and recharge the underlying aquifers.

Concern has been expressed by the U.S. Navy regarding the proximity of the proposed Town Center to the Navy's Barbers Point Water Shaft located approximately 4,000 feet east of the project site. Specifically, they are concerned that development near the shaft may result in contamination of the shaft "by insecticides, herbicides and other chemicals commonly used in Hawaii" (p. 11-23). Discussion of the Navy concern with Hydrologist Tom Nance of Belt Collins & Associates (Personal Communication March 6, 1988) raised the following points: 1) Analysis of existing wells in the Ewa area, including the Navy Shaft, indicate that the ground water gradient is moving in a south south-west direction. The location of the proposed Town Center is therefore "down gradient" of the Navy Shaft, indicating the unlikelihood that the proposed Town Center will adversely affect the Navy Shaft water quality; 2) The Makakilo residential community is located directly upgradient of the Board of Water Supply's Makakilo Well. A review of the Makakilo well records indicates that no contaminants or any other materials have ever appeared.

Questions have been raised by the Department of Land Utilization regarding: potential effects of drawdown of brackish water (via shallow brackish water irrigation wells) on underlying aquifer; related problem regarding build-up of salts in the soils (through the use of brackish water irrigant); and, effect of pumping brackish wells on "the fresh water lens." (p. 11-47). As noted in Section 3.6.1, the general direction of flow between the underlying Waianae aquifer and the overlying coral aquifer is upwards. Due to this pervasive upwards pressure, it is not likely that irrigating with brackish irrigation water will have any effect on the underlying aquifer. As to the concern regarding salt build-up, the Oahu Sugar Company and its predecessors have been irrigating vast areas of the Ewa Plain with brackish water for the past 100 years with no apparent adverse effects on underlying water quality. Thus, although brackish water irrigation will influence the selection of appropriate landscape plant materials, it is not expected to adversely impact ground water resources.

3.6 PHYSICAL HAZARDS

3.6.1 Flooding

The Army Corps of Engineers has noted that the first increment lies within Zone D, defined as "areas of undetermined, but possible flood hazard." Preliminary findings indicate that a flood hazard does exist for NASBP which experienced flood damage in an area just to the south of the first increment. The drainage study discussed above analyzed flooding potential in the area and has proposed a drainage plan which will minimize the existing flood hazard.

Because of its elevation and distance from shore, the project area is not subject to coastal hazards such as storm waves and tsunami inundations.

3.6.2 Vulcanism and Siesmicity

The last phases of the Waianae and Koolau volcanoes ended well over one million years ago. Hence, no danger from volcanic activity is expected.

The current edition of the Uniform Building Code places the entire island of Oahu within the Zone 1 area where distant earthquakes may cause structural damage with fundamental periods greater than 1.0 second. All structures built within the project area will be designed to meet Zone 1 standards, and are therefore unlikely to experience significant earthquake damage.

3.6.3 Aircraft Operations

The project area is located in the vicinity of Naval Air Station, Barbers Point (NASBP). From the orientation of the runways at NASBP, normal takeoffs and landings do not take any aircraft over the project site. However, there are fixed wing flight tracks which circle over the project site on an approach for landing or after takeoff. The tracks are numbered as Flight Tracks 7 and 11 and are briefly described as follows:

> Track Number 7: Runway 04L Touch-and-Go for all aircraft except H-2/H-3 Helicopters. Pattern altitude 1,000 feet for fixed wing and 500 feet for helicopters.
>
> Track Number 11: Runway 22R Touch-and-Go for all aircraft except H-2/H-3 Helicopters. Pattern altitude 1,000 feet for fixed wing and 500 feet for helicopters (utilized only in Kona or south wind conditions).

In addition, helicopter flight patterns run along the southern portion of the site near the railroad right-of-way. Civilian flights approaching Honolulu International Airport (ILS approach corridor to Runway 8 Left) also fly over the Naval Air Station close to the railroad right-of-way and south of the project area.

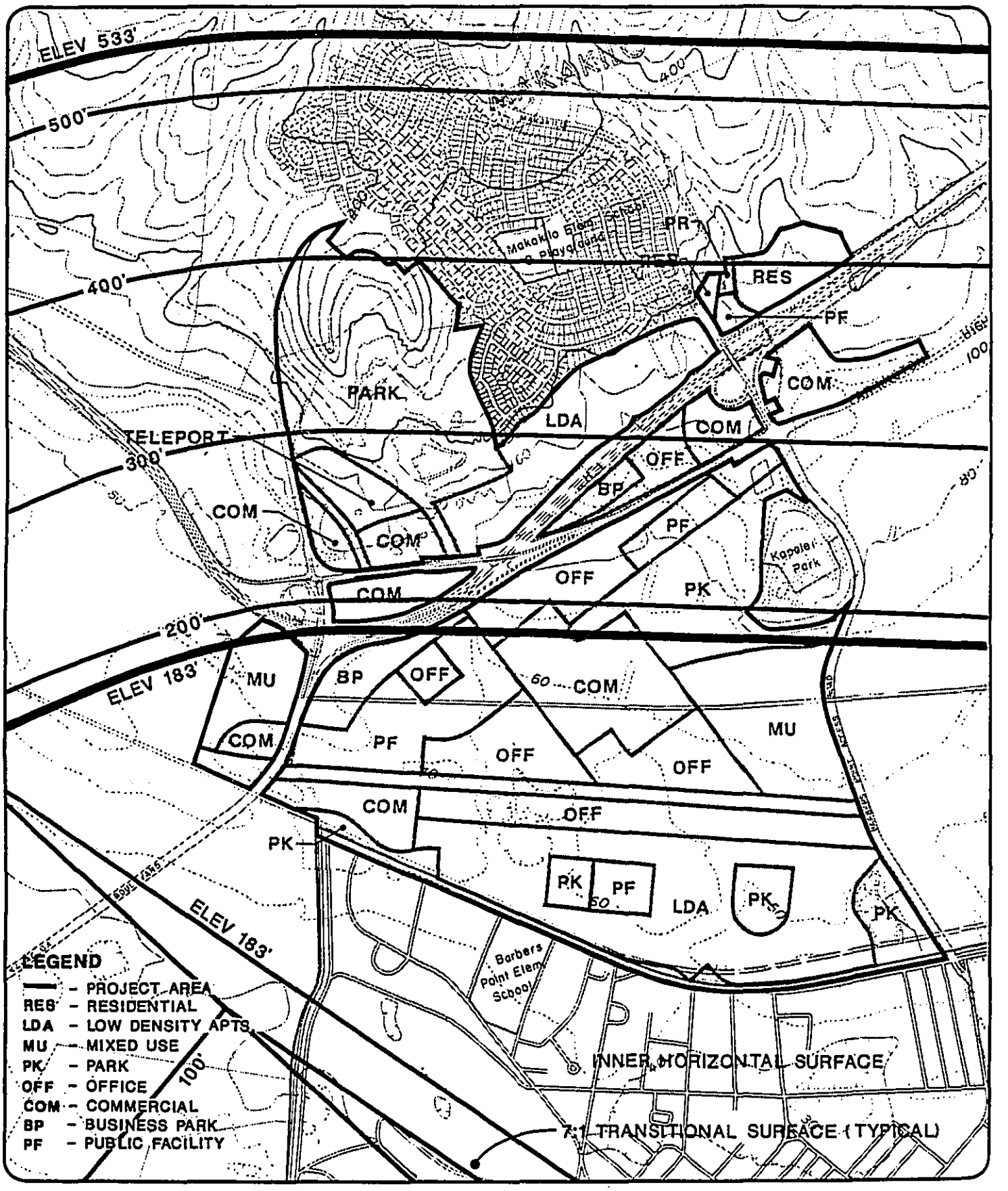
The project area lies well outside an area that is depicted in the 1984 NASBP AICUZ as an accident potential zone. The principal aircraft operating at NASBP, the P-3C Orion, is the safest aircraft in the Navy's inventory with an accident rate of 0.79 per 100,000 hours.

Vertical clearance requirements of the NASBP have been incorporated into the Kapolei design concept such that no structures within the project area will protrude through the identified imaginary surfaces extending from the NASBP runways (Figure 9). Maximum safe building heights within the Town Center would range from approximately 133 feet at the southern project boundary (183 foot imaginary surface height less 50 foot ground elevation) to c. 190 feet at the northeast corner of the Town Center, adjacent to the Makakilo Interchange (c. 300 foot imaginary surface height less 110 foot ground elevation).

3.7 NOISE

3.7.1 Aircraft Noise

Ambient noise levels in the project site and environs have been subject to study by the U.S. Navy as part of the Air Installations Compatible Use Zone (AICUZ) program for NASBP (U.S. Navy, 1984), by the applicant and the Hawaii Housing Authority (HHA). This section first examines the methodology and terminology common to aircraft noise analyses, it then reviews existing noise standards and



FAA Height Restrictions

0 1450' Feet

Figure: **9**

Kapolei Town Center E.I.S.

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guidelines and then examines the results of the NASBP AICUZ study and subsequent studies by the applicant and HFDC.

3.7.1.1 Aircraft Noise Analysis

This section provides a conceptual description of the acoustical metrics of the FAA approved "system" for aircraft noise measurement. Sound pressure, a minute variation in atmospheric pressure caused by vibrations, forms the basis to measure sound and is usually expressed as a sound pressure level in decibels which are dimensionless units expressing logarithmically the ratio of two values (i.e., a measured quantity and a referenced value). Another important characteristic of sound is its "frequency". The human ear is sensitive to frequencies of 20 to 20,000 hertz (cycles per second). The sounds to which people are usually exposed are complex, since they are composed of many frequencies, each occurring simultaneously at its own sound pressure level.

While people certainly respond to the noise of single events (particularly to the loudest single event in a series), the long-range effects of prolonged exposure to noise appear to best correlate with cumulative metrics. Such a unit provides a single number which is equivalent to the total noise exposure over a specified time period.

L_{dn} represents the equivalent A-weighted sound level during a 24-hour day after adding a 10-dB correction factor to the nighttime sound level to reflect the greater impact of noise during nighttime periods. A person walking along a crowded downtown street might experience noise levels in excess of 80 L_{dn}. A person living in a small suburban residential neighborhood might experience cumulative sound levels of say, 50 L_{dn}.

3.7.1.2 Existing Noise Guidelines and Standards

Federal. The U.S. Department of Housing and Urban Development (HUD) has established a land use compatibility matrix which sets an exterior average annual noise level of 65 L_{dn} as the noise level which should not be exceeded in residential areas in order to protect public health and welfare. This guideline is also used by other federal agencies such as the Veterans Administration (VA), the Federal Aviation Administration (FAA) and the Federal Housing Administration (FHA). Noise levels between 70 and 75 L_{dn} are considered normally incompatible for residential purposes. Noise levels between 65 and 70 L_{dn} can be considered compatible provided sufficient noise attenuation can be added to provide reduced interior noise levels.

State. A set of guidelines and policies has also been developed for the State by the Airports Division of the Department of Transportation (Peat, Marwick, Mitchell & Co. 1981). The guidelines recommend that for L_{dn} values between 60 and 65, all new or redeveloped residential structures be acoustically treated and aviation easements be granted for noise sensitive land use. The guidelines also recommend a truth-in-sales clause advising a potential buyer of land of the potential health problem. For L_{dn} values above 65, the guidelines recommend that no residential development occur.

U.S. Navy. The U.S. Navy's AICUZ Guidelines follow the HUD land use compatibility matrix discussed above. Between 60 and 65 L_{dn}, residential land use is "clearly compatible"; for L_{dn} values between 65 and 70 residential land use is "normally compatible"; for values between 70 and 75, "normally incompatible" and for values greater than 75, "clearly incompatible". The definitions for the various levels of land use compatibility are as follows:

Clearly Compatible: The noise is such that the activities associated with the land use may be carried out with essentially no interference from aircraft noise. (Residential areas: both indoor and outdoor noise environments are pleasant.)

Normally Compatible: The noise exposure is great enough to be of some concern, but common building construction will make the indoor environment acceptable, even for sleeping quarters. (Residential areas: the outdoor environment will be reasonably pleasant for recreation and play.)

Normally Incompatible: The noise exposure is significantly more severe so that special building construction is often necessary to minimize adverse impacts on people and reduce interference with performance of normal activities. (Residential areas: barriers are sometimes erected between the site and prominent noise sources to improve the outdoor environment; sound attenuation is recommended in some buildings.)

Clearly Incompatible: The noise exposure at the site is so severe that construction costs to make the indoor environment acceptable for performance of activities is significantly more expensive. (Residential areas: the outdoor environment would be significantly impacted for normal residential use.) (Calvin Kim & Associates, 1986).

3.7.1.3 AICUZ Program

A. U.S. Navy

The Department of Defense established the Air Installations Compatible Use Zone (AICUZ) Program in order to protect the public's health, safety, and welfare while maintaining the operational capability of military air installations. The purpose of the AICUZ program is to develop information which describes the noise levels, accident potential, and flight clearance requirements of military airfield operations. This information can then be used by landowners and regulatory bodies in achieving the highest and best use of adjacent lands while assuring the health, safety and welfare of existing and prospective residents.

A principal element of an AICUZ program is the analysis of aircraft noise based on aircraft flight data. The purpose of the noise analysis is to establish noise contours (isolines) in the vicinity of the air station. The standard planning metric used in aircraft noise analysis is the "average day-night sound level" or L_{dn}. The Navy AICUZ for NASBP averages annual operations over 260 days (i.e. weekday operations only).

The NASBP AICUZ, first established in 1976, was updated in November 1984. The 1984 update resulted in a reduction of affected acres (defined as off-station lands

located within Accident Potential Zones (APZs) and the 65 Ldn noise contour) from 2,029 off-station acres in 1976 to 1,501 acres in 1984.

A significant change to the pattern of the contours occurred in the 1984 update which directly impacts the project area. The 1984 AICUZ indicates a 65 L_{dn} contour "noise arm" radiating off of runway 4L/22R and crossing in an east-west direction through the project area (Figure 10). Subsequent to the initiation of litigation with the Navy by the applicant over the significant off-station noise impacts identified in the 1984 AICUZ, the Navy notified various governmental agencies that "The 65 L_{nd} noise exposure contour to the north of the NAS Barbers Point is no longer supported. Accordingly, the noise footprint of the 1984 AICUZ study should not be used to evaluate noise exposure impacts from aircraft operations . . ." (See Appendix I).

The U.S. Navy is presently undergoing an update of the 1984 AICUZ and expects to have revised noise contours available for public review at the end of June 1988. A full draft of the proposed revisions (including re-evaluated APZs) is scheduled for public review at the end of Summer 1988 (Personal Communication with Mr. Jack Busekrus, Pacific Division, Naval Facilities Engineering Command, May 27, 1988).

B. Campbell Estate Studies

The results of the 1984 AICUZ program indicated a significant and adverse economic effect on land areas adjacent to the NASBP resulting from aircraft noise and accident potential zones. Because of this, the applicant retained a group of consultants to evaluate the situation, and they identified a number of serious deficiencies in the AICUZ report. Despite numerous meetings and repeated attempts over the past three years to have the Navy correct the report, the Navy has refused to do so. Although the applicant's consultants identified a number of operational alternatives, the applicant's position is that the Navy need not make any operational changes whatsoever; only the AICUZ report needs to be corrected in order to approximate noise and accident potential conditions at the air station.

Because no progress was being made to cause the Navy to address the applicant's concerns and due to a statute of limitations constraint as of November 30, 1986 (two years after the final adoption of the 1984 AICUZ), lawsuits were filed by the applicant on November 28, 1986. A summary of the major issues raised in the lawsuits is presented below.

1. The Navy has overstated noise impacts by averaging flight operations over a 260-day period instead of the conventional 365 day "annual period."

   - An inherent conflict exists between (1) the land use compatibility matrix which assumes 365-day annual averaging of noise and (2) the computer-generated noise contours prepared utilizing 260-day averaging.

   - The Kaneohe Marine Corps Air Station (MCAS) AICUZ and the Honolulu International FAA Noise Studies utilize a 365-day average; applying the same land use matrix results in treating a landowner near NASBP differently.

- o The 365-day averaging causes the 65 L_{dn}+ noise "arm" crossing the project area seen in Figure 8 to disappear.

2. Jet fighter/trainer operations on Runway 4L/22R are overstated.

   - o The Navy allocated 99 annual F-4 and T-33 operations to Runway 4L/22R; in contradiction to (1) the previous noise study, (2) the base commander's estimate of utilization, and (3) current directives prohibiting such flights on this runway.

   - o The AICUZ assumes the F-4's use afterburners for 1.6 miles (contrary to F-4 operating procedure) full takeoff power for an additional 5.1 miles at 1,000' elevation (aircraft would accelerate to approximately 500 knots).

   - o Returning the F-4 and T-33 jets to the parallel (right) runway, where such flights are actually flown, practically eliminates the noise "arm" over the project area.

3. Overstated "civil" aircraft noise.

   - o The applicant contends that the AICUZ study utilizes erroneous noise levels to represent Navy Flying Club operations (light aircraft).

   - o The assumed noise level of 102.8 decibels compares with 91.2 decibels for the P-3, a large four-engine aircraft.

   - o A more representative aircraft would be the Piper Aztec at 85.1 decibels; since noise contours are logarithmic, it would take 59 Piper Aztec flights to equal the noise of one flight at 102.8 decibels.

   - o Correcting the computer input to a more representative aircraft causes the entire noise "arm" over the project area to disappear.

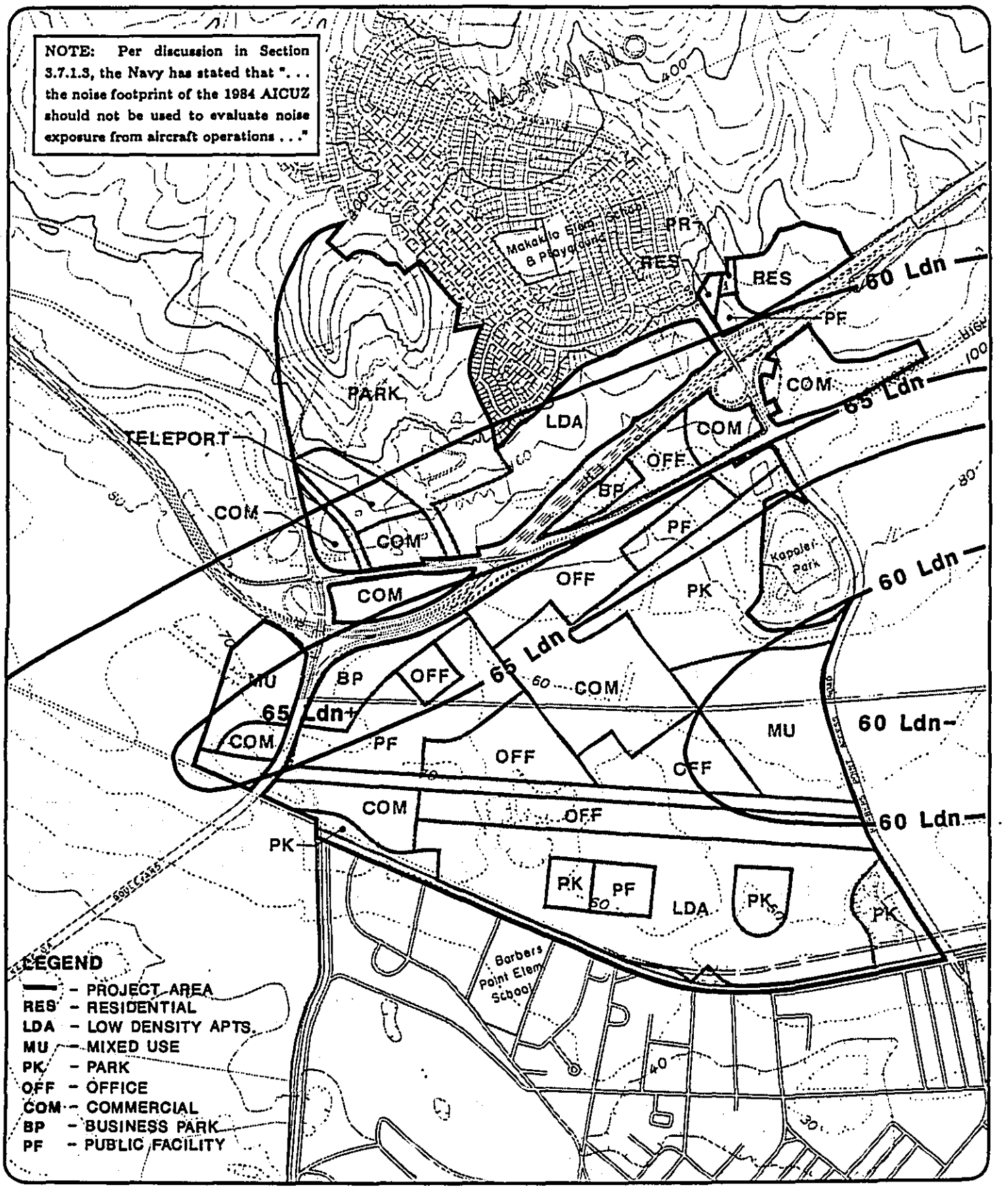
4. A fourth issue raised in the law suits concerns Accident Potential Zones (APZs) which do not impact the project area.

In summary, the applicant contends that if the three major noise discrepancies were corrected (items 1-3), the Navy could substantially increase the number of mission-related operations and still not approach having a 65 L_{dn} contour near the project area.

The AICUZ noise contours resulting from correcting only the three methodological errors discussed above indicates that: (1) there is no 65 L_{dn} noise in the project area whatsoever; (2) approximately half the project area experiences L_{dn} levels between 60 and 65; and, (3) the other half experiences sound levels below 60 L_{dn}.

The applicant further contends that the subject area, in all probability, does not even have any 60 L_{dn} aircraft noise, as confirmed by the findings of two other noise consultants (discussed below).

With regard to existing policies of the State Department of Transportation, the applicant maintains that the Airports Division is attempting to promulgate a



U.S. Navy 1984
AICUZ Noise Contours

Kapolei Town Center E.I.S.

0 1450' Feet

Figure: **10**

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guideline stricter than the national guideline without regard to cost or feasibility nor the impact on other desirable social goals of State and City Government, such as affordable housing. Attached as Appendix C is applicant's position paper on this issue.

The applicant respectfully proposes that restrictions or requirements associated with noise in the project area be in conformance with existing HUD, FAA, EPA, FHA and VA standards or guidelines and not the costlier, more restrictive guidelines suggested by the Airports Division.

C. HFDC Noise Study

In December 1986, the State Housing Finance and Development Corporation (HFDC- then known as the Hawaii Housing Authority or HHA) commissioned a study to "objectively review and comment on those portions of [the Navy AICUZ study and subsequent Campbell Estate Studies discussed previously] and data pertaining to aircraft noise impact on the proposed HHA/DHCD project site [Kapolei Village, located immediately east of the Kapolei Town Center] (Darby & Associates 1986:p. 2).

The principal findings of the HFDC noise study corroborate some of the findings of the Campbell Estate study. Major points raised in the report are:

1. Civilian aircraft noise levels used in the 1984 AICUZ study appear unreasonably large.

2. The high noise levels for jet aircraft operations (reported in the 1984 AICUZ study) over the HHA/DHCD project site appear to be overstated.

3. A 365-day averaging should be used in order to be consistent with other long-term noise impact analyses.

The results of the analysis indicate "that there should not be sufficient aircraft noise impact to place constraints on residential housing in the [Kapolei Village residential] project according to local and federal guidelines" (page 10). The consultant's "independent estimate of worst case L_{dn} values" shows a measurement of only 57.3 L_{dn} under the flight track in question (versus the 65 L_{dn}+ shown in the Navy's AICUZ).

D. Design-Engineering, Inc. Noise Study

In October 1986, the applicant retained Design-Engineering, Inc. to conduct an on-site study of the existing noise environment, examining all significant noise sources in the project area (traffic, aircraft operations, etc.). This study is reproduced as Appendix K and is summarized below.

The Design-Engineering study included the establishment of nine 24-hour noise monitoring sites on or near the project area. A noise contour map was then developed by combining, logarithmetically, the noise contributed by traffic, aircraft, and other sources. While the study confirmed the normal expected traffic noise, the contour map shows no 60 L_{dn} (or greater) aircraft noise in the project area. The study states:

1. Compared with the nearly steady flow of noise from traffic and other sources, the short duration aircraft noise adds little to the hourly equivalent noise level except where the noise from traffic and other sources is less than 55 dBa.

2. A study of the noise contour map shows that all of the Kapolei Town Center, except for narrow areas on both sides of roadways and around the quarry (outside the project area) falls into HUD's "Clearly Acceptable" noise category.

3. The analysis of aircraft fly-by noise indicates that few, if any, complaints in daytime (7 a.m. to 10 p.m.) of fly-by noise are expected from future residents of the Town Center and adjacent "Villages". Also nighttime (10 p.m. to 7 a.m.) complaints are not expected because the fly-bys, if any, are few and far between.

3.7.1.4 Probable Impact

After taking into consideration: (1) the conclusions of the consultants retained by the applicant in 1984; (2) the HFDC noise study; (3) the Design-Engineering study; and, (4) such other information as the discontinuation of the Navy Flying Club, the applicant contends that the noise contours shown in Figure 11 best reflect actual aircraft noise at the project area.

The HFDC and the Design-Engineering studies substantiate the Campbell Estate noise study findings which conclude that the 65 L_{dn} noise arm indicate on the 1984 AICUZ (Figure 9) does not exist (now acknowledged by the Navy) and, therefore, all land uses, including residential land uses, would be compatible for both the HHA/DHCD's Kapolei Village site and the Kapolei Town Center.

Flight operations from the NASBP will continue to overfly the project area. The applicant's noise consultants and other independent consultants have identified serious methodological errors in the Navy AICUZ which, if corrected, indicate that all land uses within the Kapolei Center (Figure 3) are compatible with the ambient noise environment. The indicated corrections to the Navy AICUZ report will not impact flight operations at the NASBP.

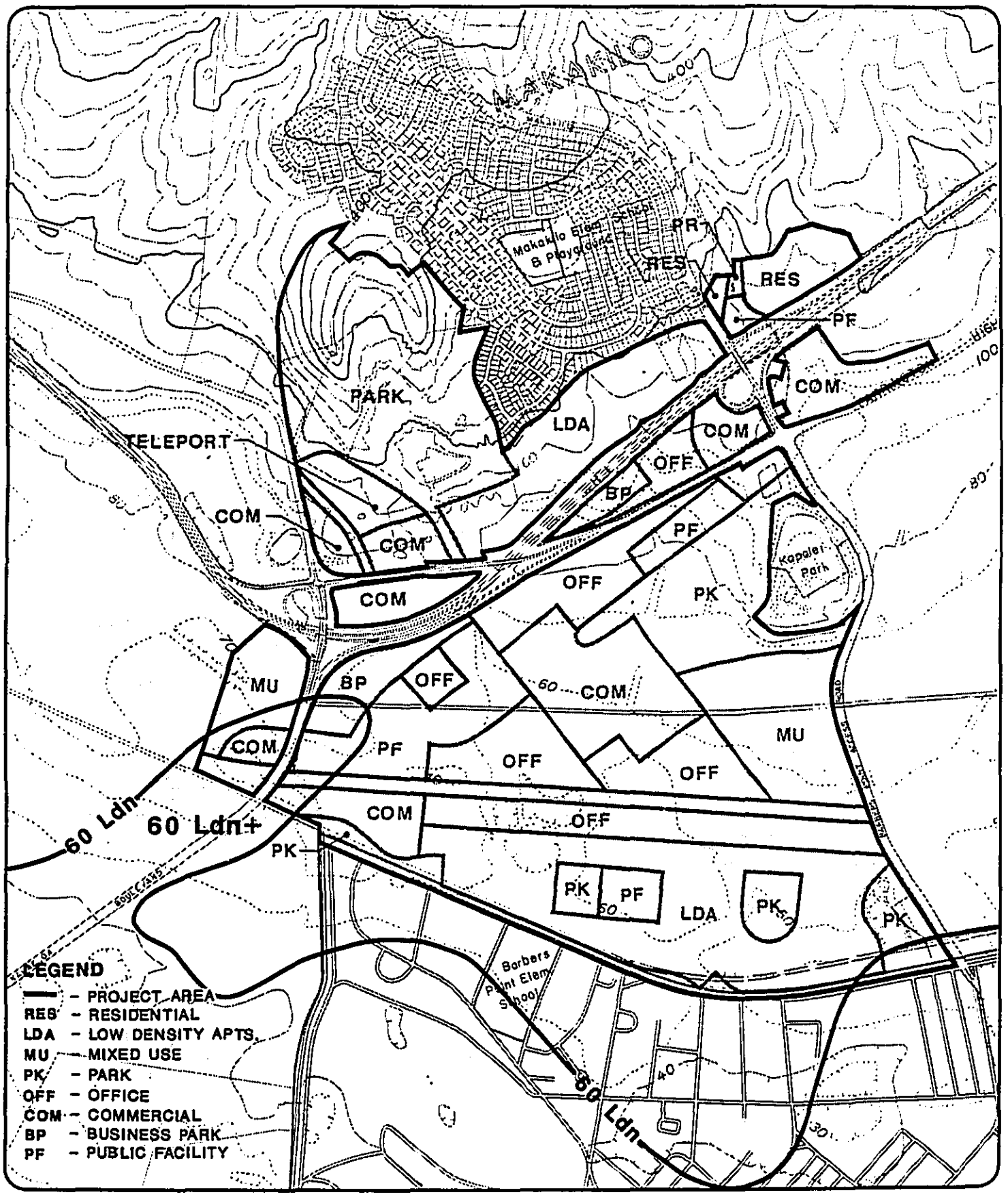
3.7.2 Non-Aircraft Noise

3.7.2.1 Vehicular Noise

1) Existing Conditions

The project area is well situated with respect to the regional transportation network with ready access to the H-1 Freeway and Farrington Highway. Ironically, this locational "plus" becomes a detriment with regard to vehicular traffic noise impacts. The noise levels adjacent to the major transportation corridors are described in the Noise Impact Study prepared by Design-Engineering, Inc. (Appendix K) and are briefly reviewed below.

Kalaeloa Boulevard and H-1 Freeway. The noise level on the 100-foot wide strip on each side of Kalaeloa Boulevard and H-1 Freeway is considered "not acceptable for residential use." The area within 100 to 400-feet from the above roadways fall



Campbell Estate Noise Contours

Kapolei Town Center E.I.S.

0 1450' Feet

Figure: 11

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into HUD's "normally unacceptable," residential land use category. These areas are proposed for commercial, light industrial uses and open space setback.

Barbers Point Access Road. Areas within 50 feet of Barbers Point Access Road are considered "not acceptable for residential use." Residences lying between 50 and 200 feet off of centerline are considered "normally unacceptable" and must be shielded from roadway noise via a barrier wall or through acoustical treatments to reduce interior noise to acceptable levels.

Farrington Highway. Noise levels along Farrington Highway west of the Barbers Point Access Road (50 feet to 200 feet from the roadway) fall within the "normally unacceptable" range for residential structures. Residences built in this area would require the same treatments as discussed above for residences fronting the Barbers Point Access Road (i.e., shielding via a barrier wall or through acoustical treatments to reduce interior noise levels).

The Town Center Master Plan envisions a realigned Farrington Highway west of the Barbers Point Access Road running through the commercial core of the Town Center. As the major city center access road, speeds, volumes and related noise levels of traffic using the realigned corridor will therefore be reduced to more closely resemble that of any major urban roadway, such as King Street and Beretania Street in downtown Honolulu. The realigned corridor noise levels would then be compatible with the abutting office and commercial development as proposed in the Town Center plan.

2) Future Conditions

Traffic volumes are expected to increase over the next 20 years. The resulting increase in noise levels at the Town Center is not expected to change the classification of the "acceptable" areas. The noise levels in the first few rows of residences along the referenced corridors within the "normally unacceptable" areas are expected to increase.

3.7.2.2 Other Noise Sources

Other potential noise sources affecting the project area include: (1) Palailai Landfill operations; (2) Internal land uses; and, (3) Construction activities.

(1) Palailai Landfill

The Palailai Landfill, located north of the project area ceased operating on May 31, 1988. Activities involved with closing and reclaiming the landfill will continue for at least a year beyond this time. Potential noise problems originating from these activities are not expected to pose any significant problems to the light industrial, commercial and office uses being proposed in the initial development phases.

(2) Internal Land Uses

Internal street system noise generated by residential and commercial vehicular movement and by buses anticipated to service the Town Center may exceed 65 L_{dn} at a 50-foot setback from an internal street curb edge. Bus noise is anticipated to

be a dominant noise source; however, it is not expected to occur between the hours of 10:00 p.m. to 7:00 a.m.

(3) Construction Noise

The primary source of noise during any construction project can be broken down by activity: 1) clearing, grubbing, demolition, grading and other site preparations, 2) excavation and embankment, 3) placing foundations, 4) frame erection, floors and roofs, walls and windows, and 5) finishing work and clean-up. The most obtrusive noise will occur during the first phases of construction because of the use of heavy-duty construction equipment.

3.7.3 Mitigating Measures

Ample setbacks and landscaping will be provided on residential areas fronting the H-1 Freeway to meet State and County noise standards. The light industrial/business park areas, considered to be one of the least noise sensitive land uses, will be sited along much of the H-1 Freeway frontage of the Town Center. These structures will act as partial noise shields which will serve to attenuate highway noise levels to within acceptable standards. Suggested mitigating measures to reduce the impact of internal street noise include use of 50- to 100-foot setbacks for residential units along main thoroughfares, minimizing heavy vehicle and bus traffic between the hours of 10:00 p.m. and 7:00 a.m. and encouraging the use of noise buffers through building design and landscaping. As internal street noise is unlikely to exceed the HUD maximum noise levels, interior residential lots can be developed to HUD and other federal and state noise criteria.

All development will be designed and constructed to comply with the provisions of Title 11, Administrative Rules Chapter 43, Community Noise Control for Oahu. Noise from stationary equipment such as air conditioning/ventilation units and exhaust units will be attenuated to meet the allowable noise levels. Design features such as the siting of compatible land uses, the use of noise barriers and special noise insulation treatments will be considered to mitigate traffic noise associated with the H-1 Freeway, the Palailai Interchange and major internal arterials.

Activities associated with the construction phase of development will also comply with the provisions of Chapter 43. Traffic noise from heavy vehicles travelling to and from the construction site will be minimized near existing residential areas and will comply with the provisions of Title 11, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.

3.8 FLORA AND FAUNA

A Biological Survey of the project area (Char and Associates, November 1986) was conducted during October 1986.[1] The report is attached as Appendix D and is summarized below.

1. The biological survey encompassed an approximately 1,400-acre area including the project area.

3.8.1 Flora

3.8.1.1 Description of Vegetation Types

Four major vegetation types were recognized on the approximately 1,400 acre survey area. Sugar cane fields cover more than 75% of the site. The fields mauka of the H-1 Freeway and behind Honokai Hale have been taken out of cultivation since 1982. A scrubland of mixed grass and shrub species now covers these abandoned fields.

In some areas, such as along the Barbers Point Naval Air Station boundary, there are kiawe and koa-haole thickets. These vary in structure and composition. Associated with the paved roadways are narrow bands of vegetation which are periodically maintained. The ruderal plant communities are found in these areas.

1) *Cane Fields* The sugar cane fields along with their associated network of cane-haul roads and irrigation and drainage systems cover more than 75% of the project site. This vegetation type occurs on fairly deep, well-drained soils overlaying a coralline base. Sugar cane (saccharum officinarum) forms large mono-dominant stands. Agricultural lands are dynamic systems, changing with the different stages of cultivation practices. Cane fields may vary from newly harvested, bare fields to short stature, open stands to tall stature, very dense stands.

2) *Scrubland* This vegetation type covers the abandoned sugar cane fields mauka of the H-1 Freeway and behind Honokai Hale next to the Ko Olina Resort area. Oahu Sugar Company stopped farming these fields in 1982. Weedy species have since invaded these fields and now form an open, low prairie structure. A few, very scattered, small clumps of sugar cane (saccharum officinarum) can still be found. The network of cane haul roads and irrigation systems is still evident, although overgrown in many places.

3) *Ruderal Vegetation* The ruderal vegetation has been defined as that narrow band of vegetation which borders the paved roads - principally the H-1 Freeway, Farrington Highway, and Makakilo Drive. The ruderal or weedy roadside vegetation is subject to continued disturbance from vehicular and pedestrian traffic as well as periodic maintenance. Continued disturbance prevents the normal stable associations from being formed.

4) *Kiawe Koa-Haole Thicket* This vegetation type covers a relatively small portion of the project area. It generally consists of an open kiawe forest (Prosopis pallida) with a subcanopy layer of koa-haole shrubs (Leucaena leucocephala). For this study, a number of different structural types have been "lumped" under this vegetation type (see Appendix D).

3.8.1.2 Rare, Threatened or Endangered Species

Two officially listed endangered plant species, the Ewa Plains 'akoko (Euphorbia skottsbergii var. kalaeloana) and Achyranthes rotundata, are known from the nearby Barbers Point Naval Air Station and Deep-draft Harbor site. However, none of these plants were found on the project site during the course of this survey. Char and Balakrishnan (1979), during their comprehensive survey of the

Ewa Plains area, also did not find any plants considered rare, threatened or endangered (Fosberg and Herbst 1975, U.S. Fish and Wildlife Service 1980) within the project area.

Of a total of 113 plant species inventoried, 100 (88.5%) are introduced, 11 (9.7%) are native and 2 (1.8%) are of Polynesian introduction. None of the native species are considered rare, threatened or endangered. The vegetation on the project area has been disturbed and greatly modified for a long period of time. Most of the land within the project area is actively under sugar cane cultivation. Other portions of the project area have been used for grazing, growing sisal, quarrying coral, or are periodically maintained. Because of these past and present disturbances, introduced plant species dominate the landscape and form the major components of the four vegetation types.

3.8.2 Fauna

3.8.2.1 Faunal Habitats

A total of 17 bird species was recorded. Due to the highly disturbed nature of the vegetation, as well as the dry climate on this part of Oahu, all but one of the observed bird species were introduced (non-native). The sole native species, the Pacific Golden Plover, (Pluvialis dominica), is a wide-ranging migratory species. The 16 introduced species were Cattle Egret, Ferel Rock Dove (the Common Pigeon), Spotted Dove, Zebra Dove, Black-rumped Waxbill, Chestnut Mannikin, House Finch, House Sparrow, Northern Cardinal, Nutmeg Mannikin, Red Avadavat, Red-breasted Cardinal, Red-vented Bulbul, Common Myna, Common Barn Owl and Japanese White-eye.

The only mammal actually observed was the Feral Cat, but cat and tracks of the Indian Mongoose (Herpestes auropunctatus) were found along the edge of the cane fields.

The Pueo (Hawaiian Owl) is considered rare on Oahu. It was not observed in the project area during the field survey. The Pueo prefers open grasslands and forested areas. Since the entire site project area is under sugar cultivation, it is probably not used by the Pueo. The areas mauka of H-1 Freeway, principally the proposed Palailai Park area, may be used by the Pueo.

No terrestrial reptiles or amphibians were noted during the study. The Hawaiian Islands do not have any native amphibians or terrestrial reptile species. It is likely, however, that geckos such as the Mourning Gecko (Lepidodactylus lugubris) and several other gecko and skink species occur in the areas with thickets.

3.8.3 Potential Impacts

Some bird species will likely increase in numbers, as subsequent phases of the Town Center involve the development of park areas. This will increase suitable nesting and feeding sites -- trees and grassy areas. Species commensal with man, such as the Common Mynah and House Sparrow, are also expected to increase in numbers. Development in the mauka areas may impact the habitat of the Pueo. Because the major land use proposed in this area is the Palailai regional park, the potential impact on the Pueo habitat is considered to be minimal.

While the proposed project will result in the loss of vegetation and some faunal habitat, it is expected to have only a minimal impact on the total island populations of the species involved.

3.9 HISTORIC AND ARCHAEOLOGICAL RESOURCES

A preliminary archaeological reconnaissance survey of the project area[2] was conducted during November 1986 (Paul H. Rosendahl, Ph. D., Inc., November 1986). The survey is attached as Appendix E and is summarized below.

3.9.1 Existing Conditions

No archaeological remains are known to exist within the project area. Two historic sites within the project area, an irrigation ditch and a WWII military structure, were identified, examined and described by the archaeological consultants. Both sites appear to be less than 50 years old and are presumably well documented in Oahu Sugar Company/Campbell Estate files and military records.

Although no archaeological remains are known to exist within the project area, one previously identified site and a second reported site are adjacent to it. The Oahu Railroad and Land Company right-of-way (Site 50-80-12-9714), which bounds the project area on the seaward side is listed on the National Register of Historic Places. A *heiau* and large rockshelter are reported to have been located on Puu Kapolei by McAllister (1933); however, these were said to have been destroyed prior to McAllister's 1930 field work.

3.9.2 Probable Impacts

A tentative evaluation of the archaeological significance of sites identified within the project area indicates that all are of minimal research, cultural, or interpretive significance, primarily because they all appear to be less than 50 years old. Therefore it is expected that the project will have no effect on significant historic or archaeological sites. By letter dated April 11, 1988 (p. 11-38), the Department of Land and Natural Resources notes that, based on a review of the archaeological reconnaissance survey, "...we believe that the project will have 'no effect' on significant historic sites. The Draft EIS should contain a 'no effect' statement and a copy of the archaeological report."

Notwithstanding this finding, in the event that any previously unidentified sites or remains are encountered during construction and site work phases, work in the immediate area will cease until the State Historic Preservation Officer has been notified and is able to assess the impact and make further recommendations for mitigative actions, if warranted.

2. The reconnaissance survey encompassed an approximately 1,400-acre area including the project area.

3.10 AIR QUALITY

An Air Quality Impact Report has been prepared by J. W. Morrow, Environmental Management Consultant (Appendix F). Findings, conclusions and suggested mitigative measures of the study are summarized below.

3.10.1 Existing Air Quality

Existing air quality in the project area appears to be in compliance with federal and state standards. Concentrations of the automotive-related pollutants (CO, NO_2 and O_x) are believed to be relatively low and within standards due to the current low level of source activity in the immediate area.

3.10.2 Probable Impact

3.10.2.1 Construction Impacts

The principal source of short-term air quality impact will be construction activity. Construction vehicle activity will increase automotive pollutant concentrations along the H-1 Freeway as well as on roadways in the vicinity of the project area itself. Site preparation and earth moving will create particulate emissions as will building and on-site road construction.

3.10.2.2 Mobile Source Activity

The principal long-term air quality impact associated with the project request will be automotive-related pollutants. By its inherent ability to generate and attract motor vehicle traffic it constitutes an "indirect source" of air pollution. The 1986 Parsons Traffic Impact Study (Appendix J) served as the basis for the mobile source air quality impact analysis. Because of the higher probability of simultaneous occurrence of high traffic volumes and adverse meteorological conditions during the early morning hours, the a.m. peak traffic volumes were used in the study. Due to the available traffic data, the study focused on freeflow sections of roads and highways.

Microscale screening analyses were performed for the following segments of roadways: 1) Farrington Highway - Kahe to Honokai Hale, Honokai Hale to Palailai Interchange, and Palailai Interchange to Ft. Weaver Road; 2) H-1 Freeway - Palailai Interchange to Kunia Interchange; 3) Ft. Weaver Road - South of Farrington Highway; 4) Renton Road - Palailai Interchange to Ft. Weaver Road; and, 5) Kalaeloa Boulevard - South of Farrington Highway.

The results of the modeling study indicate a general trend over the twenty-year forecast period (1996-2005). There is initially a decline in maximum 1-hour CO levels, which tends to increase after 1995. In all cases the federal 1-hour CO standard (40 ug/m^3) was complied with. Under worst-case conditions[3] possible violations of the State 1-hour CO standard (5 ug/m^3) occur along the H-1 Freeway between Palailai and Kunia by the year 2000. Concentrations along Farrington

3. Stable Atmosphere and 1 meter/second wind speeds during the a.m. peak hour with 20-degree wind angles to produce maximum pollutants. Cold start percentage assumed to be 20.6%.

Highway west of Palailai and Kalaeloa Boulevard also exceed the 1-hour standard by 2000. (It should be noted that the highest concentrations occur within 10 to 20 meters of the highway and tend to decline sharply with distance away from the road).

3.10.2.3 Other Off-Site Impacts

The development of Kapolei will also result in off-site impacts as a result of: generation of electricity to meet project demand (combustion of fuels resulting in the emission of additional pollutants); and, incineration of project-generated solid waste (should solid wastes be disposed of via incineration or the proposed resource recovery facility).

The agricultural burning of sugar cane fields will both affect and be affected by the proposed development. Cane fields are burned every two-years and the ensuing fires result in the emission of particulates, carbon monoxide, and trace amounts of other organics. The fires are very intense and last only about 20 to 30 minutes. As urbanization closes in around agricultural operations, it is inevitable that complaints about air pollution will arise. Arguably, it can be said that the withdrawal of the project area from cultivation will reduce the acreage subject to burning and thus alleviate one form of air pollutant.

The industrial sources at the James Campbell Industrial Park affect air quality in the project area. The maximum concentrations of total suspended particulates (TSP) and sulphur dioxide (SO_2) are in compliance with existing federal and state air quality standards. The impending construction of the proposed resource recovery facility and future construction of other as yet unidentified sources in the industrial park will all contribute additional increments of regulated and unregulated pollutants to the Ewa air. These activities will have to be monitored by the responsible governmental agencies to assure continued compliance.

3.10.3 Mitigative Measures

Short-term construction-related impacts are principally in the form of fugitive dust emissions. Department of Health regulations stipulate control measures that are to be employed to reduce this type of emission. Primary control consists of wetting down loose soil areas, good housekeeping on the job site and the prompt pavement or landscaping of bare soil areas.

Long-term air quality impacts of the project are expected to be related to automobile emissions. The mitigation measures proposed in the traffic impact studies (Appendix J), such as structural improvements and demand reduction strategies, will serve to mitigate these potentially adverse air quality impacts by decreasing traffic congestion. Moreover, because of the major employment-emphasis of the Kapolei Town Center and its related "balancing" effect on regional traffic conditions, development of the Town Center may have a mitigative effect on the air quality along critical transportation corridors, such as between the Waiawa and Halawa interchanges of the H-1 Freeway.

3.11 SCENIC AND VISUAL RESOURCES

3.11.1 Existing Conditions

Much of the Ewa Plain adjacent to the principal thoroughfare, the H-1 Freeway, is under sugarcane cultivation. As one leaves the Kunia Road intersection with the H-1 Freeway, ewa-bound, one is immediately struck by the open expanse of waving fields of sugar cane both above and below the Freeway. The town of Ewa Beach can be seen in the distance as can Diamond Head and much of downtown Honolulu. On the mauka-side, Puu Makakilo and the slopes of the Waianae Range predominate. As one approaches the project area, the Campbell Industrial Park comes into view (still some four miles distant) with its characteristic industrial towers, fuel farms and smokestacks. The Barbers Point Naval Air Station can also be seen in the distance.

Approaching the Makakilo Interchange, Puu Kapolei comes into view in the foreground along with the lower slopes of the Makakilo residential community. Beyond Makakilo travelling towards the Palailai Interchange, Puu Palailai becomes visible mauka of the Freeway. To the south and west the open expanse of the Ewa Plain (including the project area, the deep draft harbor and the Ko Olina Resort site) begins to open up. Beyond Palailai and adjacent to the Freeway lies the residential community of Honokai Hale/Nanakai Gardens. Mauka of the H-1, are the Barbers Point water tanks with the occasional Makakilo home visible on the ridge above Puu Palailai. About this point the H-1 Freeway turns into the Farrington Highway which continues out of the Ewa Plain at Kahe Point to service the Waianae Coast communities.

3.11.2 Probable Impact

The Ewa area is about to undergo a significant development cycle with the ultimate objective of more than doubling its current resident population within the next twenty years. This scale of development will alter the current scenic and visual resources of the area through the loss of open space.

The applicant recognizes the need to retain the scenic and visual resources of the area in order to assure that the proposed urban center has a "sense of place." The town center has been designed with a series of major mauka-makai streets which will provide views of the local puus, the Waianae range and the Pacific Ocean. The two major physiographic features of the area, Puu Palailai and Puu Kapolei, will become major park areas and anchors for an extensive open space system.

Assessment of Existing Conditions, Probable Impacts and Mitigating Measures -- Socio-Economic

CHAPTER 4

KAPOLEI TOWN CENTER

THE ESTATE OF JAMES CAMPBELL

Ewa, Oahu, Hawaii

This Chapter describes the existing socio-economic environment and probable changes due to the implementation of the proposed petition request. Major sources of information for this Chapter are drawn from the 1980 Census of Population, public reports such as environmental impact statements, agency reports, and the following reports/information found in the Appendix of this assessment:

Appendix A: Projections of Future Employment, Population and Land Use for the Ewa Town Center

Appendix G: West Oahu Training Corporation Pamphlet

Appendix H: Minutes of Community Advisory Committee on the Ewa Secondary Urban Center

Appendix I: Ewa Secondary Urban Center: Workshops on Community Facility Needs and Solutions

4.1 POPULATION

4.1.1 Population Trends

The planning region is roughly coterminus with the City & County of Honolulu's Ewa Development Plan area. During the past decade, the planning region population grew significantly, both in absolute terms and relative to other areas of Oahu. The Ewa Development Plan area's population of 36,234 in 1980 constituted 4.8 percent of the island's total population. The 1970 Census enumerated a total of 24,087 persons for the Ewa DP area with a corresponding islandwide share of 3.9 percent. Growth within the planning region over the 1970-1980 decade represented a 150 percent increase corresponding to an annual growth rate of 4.17 percent, well above the islandwide annual rate for the same decade of 1.96 percent.

Official population projections for the Ewa Development Plan area prepared by the City & County of Honolulu's Department of General Planning (DGP), under the guidance of the General Plan project a continuation of the significant growth experienced during the past decade, again, both in absolute terms and relative to other areas on Oahu (DGP 1987). The increases in projected growth within the area are consistent with the General Plan policies of establishing the Second Urban Center in Ewa. Table 13 below presents the projected population trends for Oahu by Development Plan area between 1985 and 2005.

Table 13: POPULATION PROJECTIONS BY DEVELOPMENT PLAN AREA: 1985-2005

Development	1985		1995		2005	
Plan Area	Total	% Total	Total	% Total	Total	% Total
PUC	440,201	54.0%	467,500	52.1%	480,008	50.3%
Ewa	36,845	4.5%	64,499	7.2%	83,096	8.7%
Central	116,839	14.3%	127,640	14.2%	139,849	14.7%
East Honolulu	46,533	5.7%	52,106	5.8%	58,509	6.1%
Koolaupoko	114,631	14.1%	120,795	13.5%	124,225	13.0%
Koolauloa	12,334	1.5%	13,109	1.5%	13,826	1.4%
North Shore	14,200	1.7%	15,041	1.7%	15,635	1.6%
Waianae	33,716	4.1%	36,211	4.0%	39,350	4.1%
Total Oahu	815,299	100.0%	896,901	100.0%	954,498	100.0%

Source: DGP 1987, HH&K tabulations

As can be seen, population within the Ewa region is expected to grow rapidly from 36,845 in 1985 to 83,096 in 2005. The region's share of the Oahu population is expected to increase from 4.5 percent to 8.7 percent during the same period. This represents an absolute gain of 46,251 persons or a 225 percent increase over 1985 population levels. On an annualized basis this corresponds to a significant 4.15 percent increase each year, versus an projected islandwide annualized growth rate of 0.79 percent for the same period.

Existing Ewa population centers include: (1) Ewa Beach (1985 population: 14,500), which is situated between Pearl Harbor and the Barbers Point Naval Air Station; (2) Barbers Point Naval Air Station located adjacent to the southern boundary of the petition area (1985 population: 2,924); (3) Honokai Hale/Nanakai Gardens, a stable residential community located adjacent to the H-1 Freeway to the west of the petition area (1985 population: 1,989); (4) Makakilo, a growing residential community located on the lower slopes of the Waianae Range to the north of the petition area (1985 population: 8,992); and (5) The Ewa Villages located to the east of the project site (1985 population: 3,000) (Kenneth Leventhal & Company 1986).

In order to prepare the various projections for Kapolei Town Center, the Leventhal Market Study (Appendix A) made population projections for the other residential developments in Ewa. The Kapolei population projections (includes Kapolei Town Center and Kapolei Village), when combined with the population projections for the other developments, provide a total projected population for the whole Ewa area. The market study population projections (Table 14) were based on specific communities in the Ewa area and not the entire Development Plan area, thus current and projected populations in the aggregate (i.e., Ewa area) will be less than DGP projections for the Ewa D.P. area.

Table 14: EWA AREA POPULATION PROJECTIONS (1985-2005)

Community	1985	2005 Midrange	2005 Highrange
Ewa Beach	14,500	14,500	14,500
NASBP	2,924	2,924	2,924
Honokai Hale/ Nanakai Gardens	1,989	1,989	1,989
Makakilo	8,992	15,704	15,714
Ewa Villages	3,000	7,853	25,006
Ko Olina	0	4,946	12,640
Ewa Marina	0	5,994	12,993
Kapolei*	0	8,909	13,685
Totals	31,405	62,817	99,452

Note: includes both Town Center and Kapolei Village

Source: Kenneth Leventhal & Co. 1986

The communities expected to have no residential development in the future are developments where all of the residential land has been developed. It was assumed that the estimated 1985 populations of these communities would remain constant during the projection period.

The population projections were derived by applying average numbers of persons per housing unit to the housing unit projections for these communities. Various average persons per housing unit amounts were used for different housing unit types in different communities.

4.1.1.1 Selected Demographic Characteristics

An analysis of selected demographic characteristics of the Ewa population compared to the island of Oahu (Table 15) shows that the Ewa population as a relatively younger, possibly more transient group with higher high school but lower college level graduates. The ethnic composition differs from the general population with more Caucasians, Filipinos and Hawaiians and fewer Japanese and Chinese.

Table 15: SELECTED DEMOGRAPHIC CHARACTERISTICS (1980)

	City and County of Honolulu	Ewa D.P. Area (C.T. 83-86.02)
Total Population	762,545	36,234
Ethnicity	(percent)	(percent)
Caucasian	41.2	44.5
Japanese	24.9	8.8
Chinese	6.9	2.0
Filipino	12.6	24.8
Hawaiian	10.5	12.4
Other	5.5	7.5
Age		
Less than 5 yr.	7.9	10.7
5 - 17 yr.	20.2	27.8
18 - 64 yr.	64.6	58.6
65 or more yr.	7.3	3.0
Median age	28.1 yr.	N/A
Place of Birth		
Hawaii	55.1	49.6
Other U.S. ***	30.1	36.0
Foreign Country	14.8	14.5
Residence 5 Yrs. Previous** (people aged 5+ yrs.)		
Same house	48.2	44.0
Same island	25.5	23.6
Different island	1.3	0.8
Different state	18.4	26.1
Different country	6.6	6.1
Education (people aged 25+ yrs.)		
0-8 years only	14.4	14.3
High school only	35.5	43.0
College, 4+ yrs.	21.7	12.4

Notes:
- * In this and immediately following table, the small Central Oahu town of Kunia (1980 pop. 829) is counted with Ewa because it falls in one of the Ewa census tracts.
- ** Except for Total Population and Age, all figures based on 15% sample.
- *** Including persons born in U.S. territories, and abroad or at sea to American parents.

Source: Community Resources, Inc., 1986

4.1.2 Probable Impacts

By the year 2005, according to midrange projections, the Kapolei Town Center/Kapolei Village area could accommodate 14.2 percent of the Ewa area population (8,909 residents). The Kapolei Town Center and the Kapolei Village would represent the third largest residential community in the Ewa area next to Ewa Beach and Makakilo.

4.2 ECONOMY/EMPLOYMENT

The modern economic history of Ewa dates from September 22, 1879 when the first artesian well was drilled by James Campbell on his Honouliuli ranch. Until then the Ewa plain was a relatively dry, barren land of minimal productivity.

Since 1879, Ewa has participated in the agricultural growth of Hawaii as a major sugar cane producing area. Like other sugar plantations, the Ewa area absorbed the many Filipino, Japanese, Korean, Spanish and Portuguese immigrants who came to Hawaii. For many years the Ewa Plantation Company (now the Oahu Sugar Company) has been one of the region's major employers. Following the general trend throughout the State, the Ewa economy has significantly diversified its economic base from one dependant on plantation agriculture.

4.2.1 Existing Conditions

A comparison of labor force characteristics of the Ewa D.P. area with that of the island as a whole show several trends (Table 16). A relatively high proportion of the labor force is employed in armed forces activities. Pearl Harbor and Barbers Point employ 18 percent of the Ewa D.P. area labor force compared with only 10 percent of the islandwide population.

Table 16: LABOR FORCE SIZE AND CHARACTERISTICS (1980)

	CITY AND COUNTY OF HONOLULU	EWA D.P. AREA (C.T. 83-86.02)
POTENTIAL LABOR FORCE (aged 16+/-)	574,903	23,862
not in labor force	30.8%	31.9%
armed forces	10.1	18.5
civil. labor force	59.1	49.5
CIVILIAN LABOR FORCE	339,863	11,821
unemployed	4.6%	8.0%
TOTAL EMPLOYED CIVIL LABOR FORCE	324,113	10,873
OCCUPATION		
service	17.6%	19.5%
manager/professional	24.7	14.2
technical, sales & admin.	33.8	31.0
farm/fish/forest	1.8	3.9
precision, craft, repair	11.3	15.5
operators, fabricators, laborers	10.9	16.3
INDUSTRY (selected)		
agric., forest, fish, mining	1.7%	6.1%
construction	6.6	7.5
manufacturing	7.7	12.0
retail trade	20.5	20.1
financial, insurance, real estate	8.1	5.2
personal, entertain. & rec. svcs.	8.1	5.9
health, educ., & professional	18.5	12.7
public adminis.	10.9	13.4

COMMUTE TO WORK		
45 minutes or more	12.0	22.6
mean travel (min.)	22.6 m.	25.8 m.

Notes: All figures based on 15% sample; hence, numbers represent estimates

Sources: Community Resources, Inc., 1986

1980 unemployment levels in the Ewa area were almost double that of the general population (8.0% vs. 4.6%). The occupational profiles of the Ewa labor force show a larger number of blue collar occupations (service, farm, precision, craft, repair, laborers, etc.) than islandwide. Conversely, white collar occupations (manager/professional, technical, sales and administrative) were underrepresented. This is also reflected by agricultural jobs within the Ewa area being three times as high as in the general population. A significant characteristic that almost twice as many Ewa residents endure a commute time in excess of 45 minutes than that of the rest of the island.

4.2.2 Future Conditions

Existing and projected civilian employment (Table 17) in Kapolei and JCIP was estimated by applying the following kinds of factors to the projections for the Town Center and JCIP uses: (1) For projections of building space - number of employees per 1,000 square feet of space; (2) For certain acreage projections - number of employees per acre; (3) For certain public uses - number of employees per 1,000 population. These are based on typical factors experienced in mainland urban areas on Oahu.

Table 17: SUMMARY OF PROJECTED EMPLOYMENT (Midrange - 2005)

Stable Employment Group	1985	Totals As Of 2005
Makakilo	100	100
Ewa Villages	100	100
Ewa Beach	700	700
Barbers Point N.A.S.	1,500	1,500
Increasing Employment Group		
Ko Olina	0	4,958
Ewa Marina	0	0
Kapolei Town Center	0	12,432
Campbell Industrial Park	2,000	6,380
Other	0	0
Totals	4,400	26,170

Source: Kenneth Leventhal & Co., 1986

Employment at Ko Olina was based on the estimates made by the developer. Employment in certain other Ewa developments was assumed to remain at current levels (Ewa Beach, Barbers Point NAS, Makakilo).

Market study projections indicate that the Kapolei Town Center will become the major employment center in the year 2005. An estimated 12,432 jobs (range: 9,282-19,373) will be provided representing almost 50 percent of the Ewa employment base. Other significant sources of employment will be Ko Olina and JCIP.

4.2.3 Probable Impacts

A corollary to the General Plan policies of encouraging population growth in the secondary urban center (i.e. residential growth) is a corresponding need for growth in local employment opportunities--balanced growth. The major thrust of the Kapolei Town Center development concept has been to provide a well designed urban infrastructure, with a full complement of housing and recreational opportunities, combined with a variety of shopping opportunities and services which would encourage businesses to locate there. The major potential impact of the rapid growth envisioned for the secondary urban center is associated with the dislocative effects of rapid employment growth.

4.2.4 Mitigative Measures

The petitioner recognizes the need to significantly increase employment and is participating in a program to mitigate adverse social impacts that could occur as a result of rapid employment growth. In 1984, the applicant, developers of several Leeward area projects and the Provost of Leeward Community College began a series of discussions concerning new permanent employment opportunities from the development of the secondary urban center. All agreed that a plan for vocational and educational training be designed, that other service providers be invited to participate and that the private sector and community be encouraged to support this effort (Paige Barber and Associates, 1986). The basic objective of the approach was to "establish a working partnership between business, government, service providers and communities of the Leeward region for the purpose of maximizing employment-related educational opportunities for residents, thus ensuring more equitable access to the job market created by Leeward area development projects" (Barber 1986).

The West Oahu Employment Corporation (WOEC), a non-profit 501 (c)(3) program, was established in January 1987 after three years of intensive research and planning. WOEC addresses and provides the means to meet the need to link Leeward Oahu residents to the employment and training opportunities created by the developments in the Ewa area. The major objectives of the WOEC are:

1. To secure a commitment from business labor and government to make more employment opportunities available in Leeward Oahu for residents of these communities.

2. To establish community education centers to take new and redirected programs and services direct to the community.

3. To create a wide variety of educational programs and services (emphasizing basic skills, education and vocational training) designed with the help of community groups, business and labor to meet the needs of residents and industry.

4. To form a network of programs and services, working cooperatively with existing agencies and institutions to make the best use of existing resources and to insure a minimum of duplication of effort.

5. To establish a community scholarship program specially created to insure that residents have the opportunity to further their education at any college or university.

The Corporation Board is composed of nine members who represent the community, the service providers, landowners and the developers. Memberships include representatives from the Waianae Coast, Ewa, and Makakilo, the City & County of Honolulu's Office of Human Resources, Alu Like Incorporated, Leeward Community College, Estate of James Campbell (applicant), Finance Realty & Sales and West Beach Estates.

4.3 HOUSING

4.3.1 Existing Conditions

The Department of General Planning has estimated that in 1984 the Ewa D.P. area contained a total of 9,300 housing units, about 3.5 percent of the total Oahu housing stock (DGP, 1985).

Existing residential communities in the Ewa area consist of: (1) Makakilo, located on the lower foothills of the Waianae Range north of the petition area (1985 housing, 2,700 units); (2) Ewa Beach, an older residential community located southwest of the project site (1985 housing, 3,465 units); (3) Ewa Villages, existing plantation-era villages to the east of the petition area (1985 housing, 900 units); (4) Honokai Hale/Nanakai Gardens, an older residential community lying to the west of the petition area (1985 housing, 500 units); and (5) Barbers Point Naval Air Station, directly south with military housing for enlisted personnel (1985 housing, 850 units).

4.3.2 Future Conditions

A number of residential housing projects are planned for Ewa. Ewa Marina, a master planned water-oriented residential development is expected to take 15 years to complete 4,800 housing units. Because negotiations with interested developers is currently ongoing, no starting date for this project is available. Gentry Ewa is a planned residential area adjacent to the older Ewa Villages community and Fort Weaver Road. Construction of an estimated 7,150 housing started in 1988 and is expected to take about 8 years to complete with c. 900 single and multi-family homes being produced each year. The Ko Olina Resort has begun site preparation and infrastructure improvements and will begin construction of 5,200 housing units in the near future. The existing Makakilo residential community will be adding an additional 2,700 housing units over the next 10-15 years. The Lusk Company's Kapolei Knolls residential development is expected to provide 500 single-family

homes when necessary land use permits have been secured. The State Housing Finance and Development Corporation's Kapolei Village project, to be developed adjacent to the Town Center, will provide 4,871 dwellings in a range of densities and prices. Approximately 60 percent of these units will be "affordable" units. Within the "affordable" category, portions will be reserved for elderly and government assisted housing. The balance of the affordable units will be sold to "gap-group" households. The homes are expected to be developed at a rate of 400/year starting in late 1989. The City DHCD's 1,500 home West Loch Estates residential community is expected to start construction in 1989 with build-out reached three years later.

The housing study conducted by Kenneth Levanthal and Company (Appendix A) indicates strongly that considerable potential demand exists for low and moderate priced housing in and around the Town Center for the following reasons:

- The vast majority of planned housing production in the Ewa/Central region will be offered at prices that are not affordable by large numbers of households.

- Many employees of the Kapolei Town Center and other Ewa area firms will need affordable housing close to their employment locations.

- There is significant latent demand from portions of current and future renter households that would purchase a home if enough homes were offered at affordable prices.

Midrange market study estimates indicate a potential Ewa-wide absorption for 20,200 dwelling units by the year 2005 within a range of between 16,200 to 33,900 units. Estimates for the Kapolei Area (including Kapolei Town Center and Kapolei Village) range from 2,000 to 4,700 units with the midrange at 3,000 units.

Kapolei Town Center. A total of 1,708 dwelling units are identified within the project area in three separate residential areas (Section 2.5.6). An area for 1,108 homes is located in the general area south of the Kapolei Parkway. An additional 470 home sites are identified in the lower Makakilo area, adjacent to the H-1 Freeway, between Palailai and Makakilo Interchanges. A 20-acre area east of Makakilo Drive could accommodate 130 homes. As noted previously, initial development phases of the Town Center will not include any residential land uses.

4.3.3 Probable Impact

Employment growth generated by the commercial/office uses within the project area and adjacent development will stimulate demand for housing in neighboring areas (and vice-versa). Development plans from Ewa-area residential developers indicate that the supply of houses for all housing markets will keep pace with growing residential demands.

4.4 COMMUNITY PARTICIPATION

Community participation in the design and planning of the Kapolei Town Center is recognized as an important element in the petitioner's planning program. The petitioner has assembled a group (Community Advisory Committee on the

Secondary Urban Center) comprised of representatives of Ewa-area community organizations for the specific purpose of providing community input into the planning process. The nature of the Advisory Group meetings is represented in meeting minutes found in Appendix H.

A major contribution of the Community Advisory Group has been their input in identifying needed services and facilities. In 1987, a series of community workshops were held in order to define community issues and needs for community services and facilities. The workshops focused on discussions in three categories of community concern: Governmental Services, Education and Recreation/Culture/Art. The findings are presented in a report entitled "Workshops on Community Facility Needs and Solutions" reprinted as Appendix I. The conclusions of the series of workshops have been incorporated into the Kapolei Town Center Master Plan.

Assessment of Existing Conditions, Probable Impacts and Mitigating Measures -- Public Facilities and Services

CHAPTER 5

KAPOLEI TOWN CENTER

THE ESTATE OF JAMES CAMPBELL

Ewa, Oahu, Hawaii

This Chapter describes the existing conditions of public facilities, utilities and services in the Kapolei Town Center service area and the relationship of these systems to the proposed development. Public facilities are those systems which are provided, staffed, and maintained by the government to serve the public health, safety and welfare. They include roadways, schools, fire and police protection, and refuse disposal. Public utilities are distributed services, such as electricity, water, wastewater, and communications, that are provided either by a public agency or by a publicly regulated utility. Project related impacts are discussed primarily in terms of anticipated requirements generated by the development. Mitigation measures are preliminary proposals for how that demand may be satisfied.

Major sources of information for this Chapter are drawn from written public agency comments reproduced in Chapter 11.0; public reports such as environmental impact statements and public agency reports; verbal communications with public agency representatives; and, the following reports found in the Appendix of this assessment.

Appendix I: Ewa Secondary Urban Center: Workshops on Community Facility Needs and Solutions

Appendix J: Traffic Impact Reports:
- Traffic Impact Study, Ewa Town Center, September 1986
- Kapolei Town Center Transportation Issues, 1985-2005, October 1987
- Kapolei/Ewa: Major Roadways Evaluation, November 1987

5.1 SCHOOLS

5.1.1 Existing Facilities

Enrollment in the Leeward School District (which includes the project area) more than doubled in size from 15,227 students in 1960 to 33,420 in 1972 as a result of intensive construction of large tract type housing at Pearl City, Waipahu, Makakilo, and Ewa Beach. However, due to the aging of the communities, even with continued home construction, enrollments leveled off over the next five years, and have declined from 33,640 students in 1976 to 29,022 in 1984. A comparison of existing enrollments with design capacity indicates that most Ewa schools have between 20 percent and 60 percent of their capacity available to accommodate future growth (page I-7).

Schools in the Kapolei Town Center service area include Barbers Point, Makakilo, Mauka Lani and Ewa, Iroquois Point, Kamiloa, Pohakea Ewa Beach Elementary Schools, Ilima Intermediate, and Campbell High School. The State Department of Education (DOE) has indicated that Barbers Point, Makakilo, Ilima Intermediate and Campbell High will be able to accommodate the initial enrollment generated

by the Town Center project (p. 11-35). Table 18 shows the enrollment increase expected to occur as a result of the 1,708 dwelling units to be built in within the project area.

Table 18: ESTIMATED ENROLLMENT INCREASE IN AREA SCHOOLS

School	Grade	Approximate Enrollment
Barbers Pt./Makakilo Elem.	K-6	200-300
Ilima Intermediate	7-8	40-60
Campbell High	9-12	80-120

Source: State of Hawaii, Department of Education (p. 11-35)

5.1.2 Proposed Facilities

The Ko Olina development has designated an elementary school site within the project area. The HFDC's Kapolei Village development (adjacent to the Town Center) has provided areas to accommodate two elementary schools, one intermediate school, and one high school. A combination 6-acre school/4-acre neighborhood park site is designated within the residential area located in the southern half of the Kapolei Town Center.

DOE notes that monitoring the major subdivisions in the Ewa area will be necessary to assure the availability of classroom space (p. 11-35). Due to the large number of projected subdivisions in the area, they would appreciate being kept informed of the incremental development schedule.

5.2 RECREATIONAL FACILITIES

5.2.1 Existing Facilities

There are no existing parks or recreational facilities within the project area. Adjacent to the eastern border lies the 28-acre Fort Barrette Park, a former military reservation, a portion of which has been acquired by the City for park

use. The park is not improved or maintained at the present time. A shortage of recreational park areas exists in the Makakilo area where youth sporting activities must use Ewa Beach sports facilities for many recreational activities. (Personal Communication with Mr. Jason Yuen, Department of Parks and Recreation, November 17, 1986)

5.2.2 Proposed Facilities

A major design theme throughout Kapolei is a system of parks interlinked by greenbelts containing bikeways and pedestrian paths. The greenbelt system connects all of the different land uses, and provides active and passive recreation for all residents and visitors.

The market study for the Kapolei area has projected a need for parks to serve future residents. Based on service area populations and applicable net acreage-per-person factors, estimates of acreages were determined. According to the market study mid-range population projection of 8,909 persons (includes Kapolei Village), 134 net acres of park areas will be necessary by the year 2005.

The HFDC's Kapolei Village residential development (east of project area) has provided for two 6-acre neighborhood and one 14-acre community park within the major residential areas.

The approximately 78-acre Kapolei Park, just south of the first increment (includes 28-acre Fort Barrette Park), has been identified as the site of a district park. The development of the Kapolei District Park will be coordinated with the City Department of Parks and Recreation to assure that regional needs are met. In addition to the district park, the Kapolei Town Center plan includes a number of smaller parks within the residential areas in the southern part of the Town Center, including a combination 4-acre neighborhood park/6-acre elementary school identified on the land use plan. Along the southern boundary of Kapolei and OR&L right of way, a proposed linear park extends from Kalaeloa Boulevard to the Barbers Point Access Road.

Puu Palailai, located mauka of the H-1 Freeway and the Town Center, (currently used as a sanitary landfill), will be reclaimed and developed into a regional park. A portion of the park will provide the site for an outdoor amphitheatre which will take advantage of the natural landscape by building into existing contours. Proper siting and design controls will be incorporated to prevent any adverse visual or noise impacts to adjacent residential areas.

The Department of Parks and Recreation has reviewed the proposed recreational facilities and finds them to be "conceptually acceptable." Discussions with County park planners regarding the final specifications for park layouts will be ongoing throughout the development process to assure that community needs are met.

5.2.3 Probable Impacts

As noted above, the proposed Puu Palailai park will be located on lands reclaimed from the privately-operated Palailai Sanitary Landfill. As noted earlier, the Landfill ceased operations on May 31, 1988. The Landfill will be closed and improved in accordance with permit requirements established by the State

Department of Health and contractual obligations of the operator (Grace Pacific Corporation) toward the landowner (applicant). The closure process will include: placement of a final soil cover and landscaping over the landfill; construction of benches and roads; and, implementation of a surface water management plan to control runoff from the covered landfill and prevent run-on of water onto the landfill. A closure plan to deal with the specific issues of leachate management, gas management, surface and ground water and post closure operation and maintenance is now being prepared by the Landfill Operator for submittal to both the State Department of Health and the applicant for review and approval. Upon the successful closure of the Landfill, the applicant will initiate the necessary planning and engineering studies to determine the appropriate means of reclaiming the closed Landfill for Park purposes. The preparation of this plan will be coordinated with the appropriate State and City agencies to assure that public needs are met.

5.3 POLICE PROTECTION

5.3.1 Existing Facilities

Police service to the Ewa area is provided from the Pearl City station, which is staffed by 161 police officers who rotate on three different shifts. The Pearl City Station patrols three districts: Waianae Coast; Waipahu/Ewa Beach; and Aiea/Pearl City.

5.3.2 Proposed Facilities

The present level of police service will be affected by the Kapolei population of 8,909 as projected by the mid-range market study figures (includes both Kapolei Town Center and Kapolei Village). The market study predicts that within 20 years of development, there will be a need for new police facilities in the vicinity. According to the market study's net-acreage-per-person factor for police services, approximately 1.7 acres would be necessary to service the needs of the projected population. A police station could easily be accommodated within the 51-acres of public-facility-designated land uses within the project area.

The Police Department has reviewed the EISPN for the proposed action and "have no objections to the modification of the designated land uses at this time" (p. 11-55). The Department would also like to be kept informed of the Kapolei Town Center Development Plan as further details are established

5.4 FIRE PROTECTION

5.4.1 Existing Facilities

Fire services to the proposed development site are now provided from the Makakilo station, which houses an engine company and five fire fighters. Additional City Fire Department units are available from the Waipahu and Nanakuli stations.

The City and County of Honolulu Fire Department has noted that, due to recent developments at West Beach and the deep draft harbor near JCIP, fire response and medical co-response capabilities are considered marginal (page 11-53).

5.4.2 Proposed Facilities

The Fire Department has requested that a site of about 25,000 square feet be set aside. The proposed station is expected to house a one-engine company with a total complement of eleven on-duty personnel at all times. To accommodate the Fire Department, the applicant is currently looking at a site to the south of the Town Center, east of and adjacent to Kalaeloa Boulevard. This location is seen as ideal with ready access to the Industrial Park, Town Center and the Palailai Interchange.

Close coordination with the Fire Department will be maintained to assure that no service gaps occur as a result of project implementation.

5.5 EMERGENCY MEDICAL SERVICES AND HEALTH CARE FACILITIES

5.5.1 Existing Facilities

Currently, residents in the vicinity of the project site use the Waipahu Clinic which has a staff of 70 doctors, nurses and aides. The service area of the Waipahu Clinic extends from Waipahu to Waianae. A variety of services are offered, such as physical, occupational, speech therapy, public health nursing, children's health, a leprosy clinic, and mental health services. Presently, the nearest hospital to the project area is the Moanalua Kaiser Medical Center. The closest emergency ambulance service is located in Waipahu and requires an eleven minute response time to the project area.

5.5.2 Proposed Facilities

The Kapolei Town Center market study has projected a need for new health care facilities to serve the Ewa population. The present level of service will be affected by the overall growth of the Ewa area (30,000 to 60,000 new residents over the next 20-year period) as projected by the mid-range market study figures. The market study predicts that within 20-years of the initial development in Kapolei, there will be a need for new health care facilities in the vicinity, including clinic and hospital services. St. Francis Hospital is nearing completion of its new medical facility near the Farrington/Fort Weaver Road intersection, approximately four miles east of the project area. Construction of this facility began in early 1987. An Emergency Medical Facility to service the Town Center and environs could be co-located with the proposed Fire Station discussed in Section 5.4.2.

5.6 WATER

5.6.1 Existing Facilities

The proposed development is located within the Board of Water Supply's Ewa - Waianae district. At the present time there are restrictions imposed by the Board against new developments until water improvements have been completed. Applicable features of the existing water system are as follows:

Sources:
Kunia I Wells (4.81 mgd)
Hoaeae Wells (6.61 mgd)

Booster Pumps
Honouliuli Line Booster Station (four 7.0 mgd pumps)

Transmission Main:
30-inch in Farrington Highway from Honouliuli Booster Pump Station to Barbers Point Reservoir

Reservoirs:
Barbers Point 215-foot tanks - 4.0 mg and 5.0 mg

5.6.2 Proposed Facilities

As noted in Section 2.5.1, the Board of Water Supply has approved the Ewa Water Master Plan (Belt Collins & Associates August 1987) which reserved off-site source, storage and transmission capacity for the proposed Town Center. The BWS is presently reviewing the Kapolei Water Master Plan (R.M. Towill February 1988) for the project area. Details of the on-site water system and demand figures are found in Section 2.5.1. As a member of the Ewa Plain Water Development Corporation, the applicant is participating in the development of water sources in upper Honouliuli to service the projected growth projected for the Ewa Plain.

- The first increment of the project area is located within the 228-foot service area and therefore can be immediately serviced off the existing 30-inch Farrington main. Additional storage tanks will be required when the 9.0 MG capacity of the Barbers Point 215-foot tanks are exceeded. Sites for the additional storage tanks have been identified mauka of the project site.

- A parallel 30-inch main along Farrington Highway to Makakilo Drive will be required to service west Ewa developments when maximum day transmission requirements exceed 20 +/- mgd capacity of the existing 30-inch Farrington main.

- The Town Center will utilize private, small-scale non-potable systems supplied by wells in the limestone aquifer for irrigation purposes.

Concern has been raised by the Department of Land Utilization regarding the particular source of potable water for the Town Center: "What is the status of the wells that showed evidence of pesticide contamination? Will any of these wells (Kunia Wells I and II, and Waipahu Well) be used as sources of potable water?" (p. 47). Review of this concern with Hydrologist Tom Nance of Belt Collins & Associates (Personal Communication May 5, 1988) indicates that the concerns are generally unfounded. As noted above, the major new water source being developed to support growth in the Ewa Plain (including the proposed action) is located in upper Honouliuli where no traces of organic contaminants have ever been found. Granulated carbon filters are installed and operating at Kunia Well II and Waipahu Well (no contamination has ever been registered at Kunia Well I) which has effectively removed pesticide contaminants. Notwithstanding these two points, it should be recognized that the Board of Water Supply operates a fully

interconnected transmission system, connecting a number of well sources with common transmission mains, thus making it virtually impossible to identify the exact source of any given volume of water received through the BWS system.

5.7 SOLID WASTE DISPOSAL

5.7.1 Existing Facilities

Currently, residential areas near the project site are serviced by the City and County of Honolulu, Division of Refuse. Non-residential uses and multi-family residential areas are serviced by private refuse collection companies. Solid wastes are disposed of either at the Palailai Landfill or the Waipahu Incinerator.

5.7.2 Probable Impact

Private refuse collectors will service the commercial, office and light industrial areas of the project area.

The Palailai Sanitary Landfill ceased operation on May 31, 1988. The Waipahu Incinerator is currently operating at capacity and the disposal site adjacent to the incinerator is estimated to reach capacity in 1989. The City and County of Honolulu is exploring new means and locations to dispose of solid wastes. Waimanalo Gulch, a new landfill site, is scheduled to begin operations in mid-1989. The City is in the process of developing a waste energy recovery facility (H-POWER) within the Campbell Industrial Park which is also scheduled to become operational in 1989. It is expected to have a capacity of 560,000 to 750,000 tons/year, a capacity sufficient to accommodate most of Oahu's solid waste, including that generated within the project area. Ash and residue from the H-POWER facility will be disposed of at the proposed Waimanalo landfill.

5.8 WASTEWATER DISPOSAL

5.8.1 Existing Facilities

The Ewa area is largely sewered by the City and County's Honouliuli Wastewater Treatment Plant (WWTP) which lies adjacent to Barber's Point Naval Air Station (NASBP). The Honouliuli WWTP, which is part of the Mamala Bay Sewerage District, also services Central Oahu and the Primary Urban Center DP districts west of Red Hill, not including Pearl Harbor Naval Base, JCIP, Schofield-Wheeler and Wahiawa-Whitmore Village. The primary treated wastewater is disposed of via the Barbers Point Ocean Outfall. Gravity and force mains and pump stations exist at Honouliuli, Ewa Beach, Makakilo, Waipahu and Pearl City. The Makakilo trunk sewer runs along the NASBP Access Road (adjacent to the eastern boundary of the project area) to the OR&L right-of-way where it follows the railroad right-of-way to the Honouliuli WWTP. This sewer serves the residential community of Makakilo, and is the closest facility to the project site.

Wastewater from the Kapolei Town Center will be treated at Honouliuli WWTP. The current capacity of this WWTP is 25 mgd. Presently, flow to the plant averages 21 mgd. The major components of the plant's treatment and disposal systems were designed for an average flow of 50 mgd based on the 1971 projected 2020 population of 387,800 people (Department of Public Works/Division of

Wastewater Management March 1988). Pumping equipment was designed for 1990 flows, and 2020 capacity would be gained by the installation of more or larger pumping units into pre-installed, in-station, pipings. The Barbers Point Outfall has a capacity of 112 mgd, the projected peak flow for the year 2020. Expansion of the WWTP to 37 mgd is now underway and should be completed about mid-1990. The Makakilo interceptor currently has an excess capacity of 6.9 mgd. This surplus capacity can be shared by Makakilo and the upper portions of the proposed Kapolei developments (Ibid).

The County Division of Wastewater Management (DWWM) is asking for funds to expand the plant to the 51 mgd capacity by 1994 to accommodate proposed developments in Central and Leeward Oahu. Funding uncertainties exist; no state funds have been appropriated and the project may not be EPA supported, in which case other sources of revenue will be sought.

5.8.2 Proposed Facilities

Initial phases of Kapolei Town Center wastewater collection system will be connected to the Makakilo Interceptor along the Barbers Point Access Road. Pump stations will be added, as needed, to direct wastewater flows to the Makakilo Interceptor. Later phases will hook directly into the proposed Ko Olina (West Beach) interceptor sewer linking the Ko Olina project with the Honouliuli WWTP. Phase One of the Ko Olina Interceptor Sewer (between Ko Olina and the Barbers Point Access Road) is under construction. This facility is a 30 to 33-inch diameter sewer which is being installed along the OR&L railroad right-of-way from Ko Olina to the Barbers Point Access Road, where it will be connected to the existing Makakilo Interceptor. The design flow of the sewer is currently 14 mgd. Phase Two of the Ko Olina Interceptor will involve the installation of an additional line (currently sized at 42 to 48-inch diameter) paralleling the existing Makakilo Interceptor between the Barbers Point Access Road and the Honouliuli WWTP.

Evaluations of the off-site contributions were necessary to determine the available capacities of the existing Makakilo and proposed Ko Olina interceptor sewers. Off-site contributors to the Makakilo interceptor include the existing and planned expansion of the Makakilo community. Off-site contributions to the Ko Olina interceptor include the proposed Ko Olina resort, inclusive of nearby developments and the existing Honokai Hale subdivision.

5.8.3 Probable Impacts

As noted previously, a result of the Town Center development will be an increase in wastewater generation. This will, respectively, result in an increase in the amount of treated wastewater discharged from the Barber's Point Ocean Outfall. Daily waste loads of biochemical oxygen demand and suspended solids discharged into the receiving waters of West Mamala Bay will also increase.

The City and County has applied for a Federal Clean Water Act 301(h) permit, which would allow continued treatment at the primary level. Such a permit is granted only if water quality standards are maintained. With an increase in the outfall at Barber's Point, the ability to maintain water quality standards could be affected. However, the discharge of primary effluent through a properly designed ocean disposal system should not add undue stress to the marine ecosystem.

5.8.4 Mitigation Measures

Monitoring data is collected regularly at the Sand Island and Barber's Point sewage outfalls in order to support the City and County application for the federal 301(h) permit. This data confirms that ambient water quality standards have been maintained to date. Monitoring for the permit will continue for five years. If the conditions of the permit cannot be met or corrected when permit renewal is due, secondary treatment facilities will need to be constructed. Part of the Honouliuli WWTP has been reserved for this purpose. When the plant is expanded to its full capacity of 50 mgd, additional standby process units will provide adequate redundancy in the event of outages due to routine maintenance or emergency repairs.

There are presently no known industrial or commercial sources of toxic wastes that are discharged into the Honouliuli system. Should sources of toxic waste be developed, the source will have to meet pretreatment standards in Chapter 11, Revised Ordinances of Honolulu (1978). Chapter 11 requires industrial discharges to obtain and comply with the provisions of an Industrial Wastewater Discharge Certificate, and pretreatment may be required before discharge is allowed to enter a public sewer.

The project will comply with all provisions of Act 282, SLH 1985.

5.9 POWER AND COMMUNICATIONS

5.9.1 Existing Conditions

The project area is presently not serviced by power and telecommunications utilities. Hawaiian Electric Company (HECO) maintains a 138 KV overhead transmission line (Kahe Power Plant to Campbell Industrial Park) which passes to the west of the project area mauka of the H-1 Freeway near the Honokai Hale subdivision and terminates at the Industrial Park substation to the west of the project area. HECO also maintains a 48 KV overhead transmission line servicing the NASBP which runs along the NASBP access road to the east of the site.

A number of below-grade fuel lines originating from the Chevron USA and Hawaiian Independent refineries are present in the area. An existing 8-inch Kahe Power Plant fuel oil pipeline runs from the industrial park along Kalaeloa Boulevard and thence along the makai side of the OR&L right-of-way (ROW) to the Kahe Power Plant. Chevron maintains a fuel pipeline (servicing HECO's Waiau power plant and Iwilei tank farm) which runs along the makai side of the OR&L ROW south of the project area. A third underground pipeline easement (Transmission of Sources of Energy Easement No. 707) extends from the industrial park along Kalaeloa Boulevard and turns eastward running along the mauka side of Farrington Highway, traversing a portion of the project site.

Hawaiian Telephone Company also maintains telecommunications facilities in the project area at Makakilo, NASBP and the Honokai Hale subdivision.

5.9.2 Probable Impact

Preliminary consultations with HECO, Hawaiian Tel and CATV providers indicate that the project area can be serviced by the respective utilities with no adverse impact to existing and projected service levels. All utilities have requested to be kept informed throughout the development process so that they may incorporate development plans into their respective construction schedules.

The pipeline easement lying along the mauka side of Farrington Highway which traverses the project site will not be relocated. Current land use plans incorporate the easement into front- and side-yard setbacks and landscaped buffer areas of non-residential land uses (commercial, office and business park) within the Town Center. Provisions have been made to provide service access to this easement at all times.

5.10 TRAFFIC

This Section describes the existing transportation network affected by the proposed Town Center, reviews the findings of the three major traffic studies prepared thus far for the Town Center, summarizes the probable impacts expected to occur as a result of developing the Town Center, and identifies mitigating measures proposed to minimize adverse impacts to transportation facilities. A final subsection reviews work currently in progress.

The traffic studies prepared to date have analyzed local and regional consequences of the proposed action, consistent with the level of planning detail generally available at the Development Plan stage in the development process. As noted in Section 6.6, the applicant is in the process of preparing a zoning application for a 96-acre portion of the 135-acre first increment. Necessary traffic studies analyzing all major interior streets and major internal intersections within the zoning parcel are currently being prepared and will be submitted as part of the zoning application.

5.10.1 Existing Conditions

The project area is presently either vacant or under sugar cane production. A network of private cane haul roads run through much of the area and connects to Waipahu. Traffic generated by the existing activities onto public roadways consists of agricultural vehicles which have a negligible impact on peak hour traffic.

Roads in the vicinity of the project area fall under the jurisdiction of either the State Department of Transportation (DOT) or the City & County Department of Transportation Services (DTS). DOT administers the H-1 Freeway (including the Palailai and Makakilo Interchanges), Farrington Highway, Fort Weaver Road, Makakilo Drive between H-1 and Farrington, and Barbers Point Access Road. DTS oversees Makakilo Drive. Proposed roadways, such as internal streets and the Kapolei Parkway will be dedicated to the City and turned over to DTS. The applicant is now in the process of transferring ownership of Kalaeloa Boulevard to the DOT.

Two existing interchanges (Makakilo and Palailai) and the Ko Olina Interchange now under construction provide three on-ramp and three off-ramp lanes in the easterly direction.

Existing roadways operate well during peak periods, with traffic volumes ranging up to about 50% of capacities. Traffic on Makakilo Drive exhibits the typical pattern of a residential area, i.e. high directional splits reflecting the home-to-work and work-to-home commuting. To the west, volumes on Farrington Highway at Keananoio Bridge near Kahe Point show a similar pattern, although not as pronounced because of the greater variety of activities along the Waianae Coast.

To the east of the project area, however, peak hour traffic volumes are evenly distributed between the east and west bound directions (Parsons 1986). The major employment areas at Campbell Industrial Park and NAS Barbers Point attract traffic in the morning which balances the east bound commute traffic produced in residential areas.

Fort Weaver Road serves east Ewa communities of Ewa Villages and Ewa Beach as well as the proposed communities of Ewa Gentry and Ewa Marina. Traffic conditions along the divided four-lane highway are good, with peak hour volumes approximately one-third of capacity (Parsons 1986).

Existing travel for school trips from Makakilo to Campbell High School in Ewa Beach is along the H-1 Freeway to Kunia Road and Fort Weaver Road.

5.10.2 Traffic Studies

As part of an ongoing process, the applicant has conducted three major traffic studies assessing various impacts of the proposed growth of the Ewa Plain (including growth contributed by the Kapolei Town Center) on major transportation corridors serving and within the Ewa region. A brief review of theses studies is presented below, followed by a summary of significant findings and conclusions.

The first major study was conducted by Parsons Brinckerhoff Quade & Douglas, Inc. in September 1986 ("Parsons Study"). The Parsons Study identified five major subareas within the island of Oahu for use in a mathematical model to predict the impacts of the proposed Town Center on future traffic volumes. Basic data inputs consisted of State Department of Transportation Traffic Counts, Oahu Metropolitan Planning Organization (OMPO) Hali 2000 traffic projections and the Leventhal land use and absorption projections for the proposed Kapolei Town Center.

The next study was conducted by Engineering Concepts, Inc. and Pacific Planning and Engineering, Inc. in September 1987 ("Issues Study"). An important element of the Issues Study focused on the existing and projected traffic volumes of the Kapolei-to-Honolulu corridor, relative to three screen lines located at Waipahu, Pearl City and Halawa. The evaluation was conducted with and without projected Kapolei employment. The data used in the study were based on the most recent version of the Year 2005 land use projections issued by DGP, in contrast to the earlier Parsons Study which was based on DGP's Year 2000 land use projections.

In November 1987, Engineering Concepts, Inc and Pacific Planning & Engineering, Inc. completed the third traffic impact evaluation entitled: Kapolei/Ewa: Major Roadways Evaluation. This study addressed road needs between Kapolei Town Center and east Ewa to the Year 2005. It basically reviewed the need for two roadways: the east-west (proposed Kapolei Parkway) and north-south roads. Similar to the "Issues Study," this report utilized the recent 2005 land use projections provided by DGP to identify projected impacts.

5.10.3 Probable Impacts

The development of the Kapolei Town Center will increase traffic volumes in the Ewa Plain and alter travel patterns on Oahu by providing a Town Center in which major economic activity will occur. The increased employment offered within the Town Center will provide residents living in the area the opportunity to live and work in Leeward Oahu and to not travel in the congested corridors leading into downtown Honolulu.

To date, traffic impact studies conducted for the Town Center have focused on regional traffic impacts and general evaluations of corridor capacities. The regional traffic studies conducted thus far indicate that increased traffic demands will exceed highway system capacities at several locations within the next 20 years as discussed below.

5.10.3.1 Local Implications

Kapolei: Ultimate traffic conditions within the proposed Kapolei Town Center are expected to be similar to existing local traffic conditions within downtown Honolulu. In the near term, Kapolei Boulevard will provide access to the commercial uses sited adjacent to it. As Kapolei Parkway usage grows, internal streets linking the Parkway to the Boulevard will be increasingly utilized. The predictions of population and employment in Kapolei indicate that travel patterns to and from the project will be changing as the Town Center develops. Internal trips, or trips which begin and end within the Town Center, will increase.

As discussed in Section 2.4.7, a major access point to the Town Center will be via a proposed intersection of Kapolei Boulevard and Farrington Highway. Plans for this intersection are currently being reviewed by the State DOT.

Makakilo: The Parsons Study estimates that 2,100 vehicles per hour will be traveling between Kapolei and Makakilo. Adequate traffic service could be provided by the existing Makakilo Drive beyond the Year 2000, with near capacity conditions occurring in the peak direction in Year 2005 peak hours.

Campbell Industrial Park: The capacity of Kalaeloa Boulevard is estimated by the Parsons Study to be 2,200 vehicles per hour. The volumes predicted by the study indicate that near-capacity conditions will be reached by 1995.

5.10.3.2 Regional Implications

West of Kapolei: Travel demands are projected to increase between Kapolei and Waianae. Farrington Highway, a four lane divided arterial, provides the only improved ground transportation link into Waianae. The capacity of the highway

between the two is estimated by Parsons to be 3,200 vehicles per hour. Near-capacity conditions are expected to be reached during afternoon peak hours by the Year 2005.

East of Kapolei: In the easterly direction from the Kapolei Town Center, traffic volumes are much higher. Traffic demands between Kapolei and the Fort Weaver area are expected to increase as both areas develop. The four lanes of Fort Weaver will have congestion at times but would be adequate to the Year 2005 (sufficient right-of-way exists for an additional lane in each direction). Travel between the two areas would use the H-1, Farrington Highway and Fort Weaver Road (Section 5.10.4 discusses proposed Kapolei Parkway). The Parsons Study identified the critical location on the existing highway network for these movements as being at the Kunia Interchange; specifically, the interchange's capacity to serve westbound traffic is limited to approximately 470 vehicles per hour. It is estimated that this capacity will be exceeded in 1998.

Kapolei/Honolulu Corridor: Evaluation of the three corridor screenlines (Waipahu, Pearl City and Halawa) by the "Issues Study" indicates that the inbound flows (into the PUC) increase with or without Kapolei employment factored in. With Kapolei, the volumes would increase at less than the volumes without Kapolei. The percent difference between the two scenarios would be on the order of 8 to 12 percent. In the outbound (Out of PUC) direction in the morning peak hours, the percent increase "with Kapolei" is greater than "without Kapolei." This condition would mean that the opposite roadway would be better utilized. With Kapolei, traffic would be 13 to 29 percent greater than without Kapolei. The 29 percent value for traffic west of the Waiawa Interchange is a result of the growth in jobs and population in Central Oahu, Waipahu and Pearl City/Aiea. For afternoon peak hours with Kapolei, volumes outbound from the PUC are 7 to 13 percent less than without Kapolei. Volumes are projected to increase 11 to 70 percent for both scenarios. The largest difference occurs again at the screenline west of Waiawa Interchange. The inbound direction to the PUC is the usual off-peak direction at these screenlines during the afternoon. The volume with Kapolei would be 18 to 35 percent greater in this direction than without Kapolei. Again, the greater use is indicated for the off-peak lanes and less use in the peak direction lanes with Kapolei.

5.10.4 Mitigating Measures

- The "Major Roadways Evaluation" study released in November 1987 reviewed the need for two roadways: the east-west road (Kapolei Parkway) and the north-south road, in recognition of the projected overcapacity conditions of westbound movements at the Kunia Interchange. The study recommends that partial links of the two roads be implemented prior to 1995 to mitigate projected Fort Weaver Road congestion. Specifically, the study recommends the construction of a segment of the north-south roadway, originating in the vicinity of Ewa Marina and extending through to the vicinity of the Ewa Villages area where it turns to the west, passing through the proposed Town Center and intersecting with Kalaeloa Boulevard (Figure 5). The extensions of the north-south road to Farrington Highway and the H-1 Freeway, and the extension of the east-west roadway to Fort Weaver Road are not required to the Year 2005.

- DOT is contemplating widening of Farrington Highway from its current two lanes to four lanes. This will provide an additional lane within the east-west corridor.

- The results of the "Issues Study" forecast analysis indicate that the proposed Kapolei Town Center will result in slower traffic growth in the Leeward to PUC corridor during both the morning and afternoon rush hours.

- Traffic reduction strategies should be pursued immediately. HOV lanes proposed for the highway system can be utilized to mitigate congestion. As residential areas within the Town Center are developed, the applicant will cooperate with adjacent residential communities in coordination ridesharing programs and other traffic reduction strategies.

- Use of contraflow lanes on highway corridors to increase peak hour capacities in existing peak directions should be carefully evaluated, in light of the rapid increase in traffic demands projected to occur in the "off-peak" direction.

5.10.5 Unresolved Issues

The State Department of Transportation has indicated concern over the impact of growth in the vicinity of the Town Center on the H-1 Interchanges at Makakilo and Palailai. DOT has requested that the applicant "investigate this proposal, coordinate his efforts with our Highways Division, and dedicate the necessary right-of-way." (p. 11-40). Based on a subsequent follow-up meeting with DOT Highways Division, the applicant is now in the process of evaluating probable impacts to the two interchanges. The final report of this investigation will be submitted as part of the Final EIS. Necessary traffic studies analyzing major internal roadways will be submitted as part of the forthcoming zoning applications.

5.11 PUBLIC TRANSPORTATION

5.11.1 Existing Facilities

The City and County of Honolulu, Department of Transportation Services (DTS), operates The BUS on a supply and demand basis, subject to the availability of resources. Existing public transit service to the vicinity is provided by the City, with Route 51 between Honolulu and Makaha passing on Farrington Highway in front of the project area. A bus stop is located at the Kalaeloa Boulevard intersection for westbound buses. Eastbound buses exit the four-lane Farrington highway to a bus stop at Makakilo Drive before proceeding back onto H-1. Existing weekday bus service is four buses per hour with weekend service approximately two buses per hour.

5.11.3 Proposed Facilities

The Kapolei Town Center and adjacent Kapolei Village include a variety of land uses, ranging from single family residential to light industrial. Planned as a balanced community, Kapolei residents will have the opportunity to live and work within the same area. Routine bus service within Kapolei will develop on routes which offer sufficient market support. The provision of jobs in Kapolei may also

employ people who live east of the project site, such as Aiea, Mililani or Honolulu. The use of public transit by these residents will help balance bus service in the morning and evening, to and from Kapolei Town Center, by reducing the present deadheading run. Due to the self-contained nature of Kapolei Town Center, no adverse impacts are anticipated.

The State Department of Transportation has established a program of transportation improvements which can be incrementally upgraded as demands increase due to future developments in Central and Leeward Oahu. The program includes short, mid- and long range phases. One of the mid-range phases is to provide an exclusive busway along the OR&L right-of-way. The busway would begin in the Halawa area, and provide service north to Mililani and west toward Ko Olina Resort. An alternate corridor for mass transit is being considered by the City Department of Transportation Services which would utilize Farrington Highway from Waipahu to Ko Olina. Since both the OR&L right-of-way and Farrington Highway are readily accessible to the Town Center, it would be directly linked to several residential communities. This linkage would contribute to the Kapolei Town Center's desirability as an employment center.

Relationship to State and County Land Use Plans and Policies

CHAPTER 6

KAPOLEI TOWN CENTER

THE ESTATE OF JAMES CAMPBELL

Ewa, Oahu, Hawaii

This Chapter analyzes the relationship of the project request with existing public plans, policies and controls of the State of Hawaii and the City and County of Honolulu. Relevant State plans and policies are examined first, followed by a discussion of the relevant City and County of Honolulu plans and policies.

6.1 THE HAWAII STATE PLAN

The Hawaii State Plan (Chapter 226 Hawaii Revised Statutes, as amended) establishes a set of goals, objectives and policies which are to serve as long-range guidelines for the growth and development of the State.

> ...[T]he Hawaii State Plan... shall serve as a guide for the future long-range development of the State; identify the goals, objectives, policies, and priorities for the State of Hawaii; provide the basis for determining priorities and allocating limited resources, such as public funds, services, manpower, land, energy, water and other resources; improve coordination of state and county plans, policies, programs, projects, and regulatory activities; and to establish a system for plan formulation and program coordination to provide for an integration of all major state and county activities (Chapter 226-1: Findings and Purpose, HRS).

In this section, the proposed action is analyzed with respect to relevant State Plan goals, objectives and policies.

<u>Sec. 226-5 Objectives and Policies for Population</u>

(b)(1) Manage population growth statewide in a manner that provides increased opportunities for Hawaii's people to pursue their physical, social, and economic aspirations while recognizing the unique needs of each county.

Comment: The proposed Kapolei Town Center, with a full range of urban services, housing, jobs, businesses and public facilities, would help alleviate future congestion in the Primary Urban Center, Honolulu. Having a Secondary Urban Center would also help distribute the projected population growth on Oahu in a desirable, manageable manner.

(b)(3) Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands.

Comment: The economy in the area of the proposed project has traditionally been based on agriculture. Recently, it has begun to diversify. As a Secondary Urban Center, the subject site as proposed would provide a balance between employment and housing for the region.

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

(a)(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people.

(a)(2) A steadily growing and diversified economic base that is not overly dependent on a few industries.

(b)(2) Promote Hawaii as an attractive market for environmentally and socially sound investment activities that benefit Hawaii's people.

(b)(3) Seek broader outlets for new or expanded Hawaii business investments.

(b)(4) Expand existing markets and penetrate new markets for Hawaii's products and services.

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

(b)(8) Encourage labor intensive activities that are economically satisfying and which offer opportunities for upward mobility.

(b)(9) Foster greater cooperation between the public and private sectors in developing Hawaii's employment and economic growth opportunities.

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

(b)(12) Provide equal employment opportunities for all segments of Hawaii's population through affirmative action and non-discrimination measures.

(b)(13) Encourage businesses that have favorable financial multiplier effects within Hawaii's economy.

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

(b)(15) Increase effective communication between the educational community and the private sector to develop relevant curricula and training programs to meet future employment needs in general, and requirements of new, potential growth industries in particular.

(b)(16) Foster a business climate in Hawaii--including attitudes, tax and regulatory policies, and financial and technical assistance programs--that is conducive to the expansion of existing enterprises and the creation and attraction of new business and industry."

Comment: The proposed Kapolei Town Center would provide a new location for businesses to locate and expand, and would increase the number of and variety of jobs on Oahu. Since the plan is to provide a balance between housing and employment, a de-emphasis would be placed

on commuting to Honolulu, increasing the quality of life for residents in both the Primary and Secondary Urban Centers.

Development of the Kapolei Town Center will begin with a retail/commercial village located west of and makai of the Makakilo Interchange ("Kapolei Shopping Center"). The "first increment" represents the second major development phase, located south of Farrington Highway, near the proposed Kapolei Shopping Center. The Town Center would then gradually expand over the next 15 to 20 years in step with infrastructure development and prevailing market conditions. The development of the Kapolei Town Center will represent a significant contribution towards the maintenance of a healthy construction industry in the Ewa area, the island of Oahu and the State.

The Kapolei Town Center is a true public/private cooperative venture. Conceived by the applicant pursuant to public policies promulgated in the Honolulu General Plan, the project offers unique opportunities to expand Hawaii's employment and economic growth. The proposed Kapolei Town Center in conjunction with the adjacent Ko Olina Resort and the JCIP is expected to increase the number of civilian employees from the approximate 4,400 today to a projected forecast of 26,000 to 34,000 in Ewa by the year 2005. Kapolei is planned to be the primary employment location in Ewa, and accordingly will provide approximately 50 percent of the future Ewa employment. The Town Center will provide residents of the Waianae Coast with a range of employment opportunities, and will reduce the number of residents that commute to Honolulu for employment.

The multiplier effect of the proposed Kapolei Town Center is manifold. Segments of the economy that would benefit from the development of the proposal include, but are not limited to, construction, commercial/retail, research and development, real estate and the visitor industry.

The design of the proposed Town Center is sensitive to Hawaii's scenic beauty and aloha spirit by being oriented to views of prominent puus such as Puu Palailai and Puu Kapolei. The city blocks are adapted from those in old Honolulu, uniquely Hawaiian in nature, with intimate scale, low building heights, utilizing native building materials such as coral, lava and stone, broad roofs, balconies and verandas. There will be a heavy use of warm colors, water elements and especially landscaping.

Sec. 226-7 Objectives and Policies for the Economy - Agriculture

(a)(1) Continued viability in Hawaii's sugar and pineapple industries.

(a)(2) Continued growth and development of diversified agriculture throughout the State.

(b)(1) Foster increased public awareness and understanding of the contributions and benefits of agriculture as a major sector of Hawaii's economy.

(b)(2) Seek the enactment and retention of federal and state legislation that benefits Hawaii's agricultural industries.

(b)(6) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.

(b)(8) Expand Hawaii's agricultural base by promoting growth and development of flowers, tropical fruits and plants, livestock, feed grains, forestry, food crops, aquaculture, and other potential enterprises.

(b)(9) Promote economically competitive activities that increase Hawaii's agricultural self-sufficiency.

(b)(10) Promote and assist in the establishment of sound financial programs for diversified agriculture.

Comment: With much of its Oahu lands under lease for farming, the applicant has a vested interest in the continued viability of agriculture on Oahu. Although the first increment would result in the loss of approximately 135-acres of agricultural lands, the crop removal has been determined compatible with continued profitable operations at Oahu Sugar Company (See discussion in Section 3.4).

The applicant has been actively involved in the search for alternative crops which can viably replace sugarcane. A suitable replacement crop is yet to be found.

Sec. 226-8 Objectives and Policies for the Economy - Visitor Industry

(a) Planning for the State's economy with regard to the visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawaii's economy.

(b)(1) Support and assist in the promotion of Hawaii's visitor attractions and facilities.

(b)(2) Ensure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawaii's people.

(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)(8) Foster an understanding by visitors of the aloha spirit and the unique and sensitive character of Hawaii's cultures and values."

Comment: The proposed Kapolei Town Center will directly interact with the Ko Olina Resort. The project area will provide a location for the indirect employment opportunities generated by the Ko Olina project.

A major design theme of the Kapolei Town Center plan is to adapt a city block style similar to "old Honolulu", which is uniquely Hawaiian in nature. Elements of this architectural style include intimate scale; low building heights; native building materials such as coral, lava and stone; broad roofs; balconies and verandas; buildings and arcades defining the street edge, pedestrian malls; warm earth tones; water elements and especially landscaping. The design theme of the Kapolei Town Center will help to perpetuate the aloha spirit to visitors and residents.

Sec. 226-10 Objectives and Policies for the Economy - Potential Growth Activities

(b)(2) Expand Hawaii's capacity to attract and service international programs and activities that generate employment for Hawaii's people.

(b)(3) Enhance Hawaii's role as a center for international trade, finance, services, technology, education, culture and the arts.

Comment: An expanded economic base will result with the development of Kapolei. This will expand Hawaii's capacity to attract new businesses and activities internationally, thereby providing jobs for Hawaii's people.

The proposed Kapolei Town Center is of such a grand scale, it has the potential to be recognized worldwide. Due to Hawaii's strategic location and cultural connection between the western and eastern worlds, Kapolei could have a significant effect on the economic base of Hawaii, as a center for trade, finance, services and technology.

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

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

Comment: A design emphasis of Kapolei is to orient the street pattern toward prominent *puus*. Native building materials used will include coral and lava in warm earth tones which are indicative of Hawaii's natural beauty.

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

(a)(1) Maintenance and pursuit of improved quality in Hawaii's land, air and water resources.

(a)(2) Greater public awareness and appreciation of Hawaii's environmental resources.

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

(b)(3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.

(b)(4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawaii's people.

(b)(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.

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

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

(b)(8) Foster recognition of the importance and value of the land, air, and water resources to Hawaii's people, their cultures and visitors.

Comment: Much of the project area is relatively flat and so there will be little need for extensive site grading. The applicant has been one of the pioneers in the use of dual water systems. The proposed development will be serviced by such a system aiding in preserving the vital potable water resource. Caprock groundwater in the vicinity is unsuitable for human consumption but can be used for irrigating the large landscaped areas of the Kapolei Town Center. The preservation of existing air and visual quality is a major concern of the applicant. The central core of the town center has been designed to be "walkable" thus obviating the need for automobiles and their attendant air pollution characteristics.

Sec. 226-14 Objectives and Policies for Facility Systems - in General

(a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and communication systems that support statewide social, economic, and physical objectives.

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

(b)(2) Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.

(b)(3) Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.

(b)(4) Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.

Comment: Development of the project area (including the Kapolei Town Center) is expected to occur over a ten to twenty year time period in

accordance with the 2005 population projections for the Ewa region. Public facilities and services necessary will be planned and coordinated with the appropriate State and County agencies as development occurs.

Sec. 226-15 Objectives and Policies for Facility Systems - Solid and Liquid Wastes.

(a)(1) Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.

(a)(2) Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility and other areas.

(b)(1) Encourage the adequate development of sewerage facilities that complement planned growth.

(b)(2) Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.

(b)(3) Promote research to develop more efficient and economical treatment and disposal of solid and liquid wastes.

Comment: Wastewater generated by the project is expected to be disposed of through the Honouliuli Wastewater Treatment Plant located about 4 miles east of the project. The construction of the sewage system will be closely coordinated with the appropriate County agencies and other private developments in the area to assure a minimum of disruption to present levels of service. Solid wastes generated by the project will be collected and disposed of in accordance with accepted policies of the City and County of Honolulu. The City and County of Honolulu is constructing a "garbage-to-energy" facility (H-POWER) in the Campbell Industrial Park, which could ultimately process the solid wastes generated by the Town Center.

Sec. 226-16 Objectives and Policies for Facility Systems - Water.

(a) Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.

(b)(1) Coordinate development of land use activities with existing and potential water supply.

(b)(2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.

(b)(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs."

Comment: As noted earlier, the applicant is recognized as one of the pioneers in the adaptive use of limited water resources. James Campbell is remembered for having sunk Hawaii's first artesian wells on the Ewa Plain in 1879. Plans for the development proposal include the use of a dual water system with brackish water providing for necessary irrigation and potable water reserved for use in the residential areas and for human consumption within the commercial and light industrial areas.

Sec. 226-17 Objectives and Policies for Facility Systems - Transportation

(a)(1) An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.

(a)(2) A statewide transportation system consistent with planned growth objectives throughout the State.

(b)(3) Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties.

(b)(4) Provide for improved accessibility to shipping, docking, and storage facilities.

(b)(6) Encourage transportation systems that serve to accommodate present and future development needs of communities.

(b)(8) Increase the capacities of airport and harbor systems and support facilities to effectively accommodate transshipment and storage needs.

(b)(11) Encourage safe and convenient use of low-cost, energy efficient, non-polluting means of transportation.

Comment: Transportation planning for the Ewa area has long envisioned the use of the old OR&L right-of-way as the corridor for a mass transit system serving Ewa. The Ewa Long Range Master Plan (Figure 3) includes a couple of proposed multi-modal transportation options such as a light rail system (along the OR&L ROW) with a transit station; a marine bus system providing service between the marinas at Ko Olina, Ewa Marina and Honolulu, and the possibility of a limited-access "Parkway" facility which would connect the Ewa area with Honolulu via a 1.1 mile tunnel under the Pearl Harbor Channel.

The traffic impact analyses prepared for the Kapolei Town Center note that the development of the Town Center as a major employment center can be expected to ease the increasing traffic demand within urban Honolulu during peak periods. A major asset for the proposed project will be the development of the Barbers Point Deep Draft Harbor which is expected to provide jobs and enhance the commercial/light industrial uses planned for the Town Center. The gradual development of the SUC will require close coordination with the State and County transportation planning agencies.

Sec. 226-18 Objectives and Policies for Facility Systems - Energy/Telecommunications.

(a)(1) Dependable, efficient, and economical statewide energy and telecommunication systems capable of supporting the needs of the people.

(a)(2) Increased energy self-sufficiency.

(b) To achieve the energy/telecommunication objectives, it shall be the policy of this State to ensure the provision of adequate, reasonable priced, and dependable power and telecommunication services to accommodate demand.

(c)(1) Support research and development as well as promote the use of renewable energy sources.

(c)(2) Ensure a sufficient supply of energy to enable power systems to support the demands of growth.

(c)(3) Promote prudent use of power and fuel supplies through conservation measures including education and energy-efficient practices and technologies.

(c)(4) Ensure that the development or expansion of power systems and sources adequately consider environmental, public health, and safety concerns, and resource limitations.

(d)(1) Facilitate research and development of telecommunication systems and resources.

(d)(2) Encourage public and private sector efforts to develop means for adequate, ongoing telecommunication planning.

Comment: All energy and telecommunication services necessary for the development of Kapolei will be planned and coordinated with the appropriate federal, state and county agencies and public utilities. Applications of appropriate energy technology will be examined with respect to the heating and cooling needs of the proposed development. Uses of telecommunications equipment will be examined within the context of site planning the proposed business parks and offices within the Town Center.

Sec. 226-19 Objectives and Policies for Socio-Cultural Advancement - Housing

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

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

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

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

(b)(3) Increase home ownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.

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

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

Comment: Proposed housing for the Town Center area and environs will range in density between 5 to 10 dwelling units per acre. A broad variety of housing types are envisioned to provide an ample selection for prospective homebuyers. The State Housing Finance and Development Corporation is proposing to develop the Kapolei Village Residential Community with approximately 5,000 homes for market, gap group, and low/moderate income households on a 830-acre site adjacent to the project area. The majority of these houses will be detached single family homes. Within the project area, north of the first increment, areas for lower density (5-7 units per acre) have been located. South of the first increment, areas for higher density housing have been identified. High priority will be placed on providing outdoor garden and/or recreation areas for every unit in this area, reflecting Hawaii's traditional outdoor orientation. A high priority will be placed on the provision of affordable housing consistent with the findings of the Leventhal market study.

Sec. 226-20 Objectives and Policies for Socio-Cultural Advancement - Health

(a)(1) Fulfillment of basic individual health needs of the general public.

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

(b)(1) Provide adequate and accessible services and facilities for prevention and treatment of physical and mental health problems, including substance abuse.

(b)(2) Encourage improved cooperation among public and private sectors in the provision of health care to accommodate the total health needs of individuals throughout the State.

(b)(5) Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.

Comment: Medical and health care facilities are now located in Waipahu and Honolulu areas. Emergency patients in the Ewa area are treated at the Kaiser's Moanalua Hospital or at the Waianae Comprehensive Health

Center. However, as population increases a number of medical facilities and services will be attracted to the Ewa area. St. Francis Hospital has begun construction of a new hospital facility located approximately four miles east of the project area.

Sec. 226-21 Objectives and Policies for Socio-Cultural Advancement - Education

(a) Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities and aspirations.

(b)(2) Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.

(b)(3) Provide appropriate educational opportunities for groups with special needs.

(b)(5) Provide higher educational opportunities that enable Hawaii's people to adapt to changing employment demands.

(b)(6) Assist individuals, especially those experiencing critical employment problems or barriers, or undergoing employment transitions, by providing appropriate employment training programs and other related educational opportunities.

Comment: The applicant will closely cooperate with the State Department of Education and private school operators to assure the adequate provision of a wide range of educational services. A potential college/university site has been identified and discussions with potential operators is ongoing.

Sec. 226-23 Objectives and Policies for Socio-Cultural Advancement - Leisure

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

Comment: The Town Center plan encourages the elements of traditional Hawaiian culture such as a garden setting, blurring the distinction between indoors and outdoors and the use of indigenous building materials. The plan proposes neighborhood (loku) and regional parks interlinked by a linear greenbelt containing bikeways and pedestrian paths providing passive and active recreation opportunities to the residents.

Sec. 226-103 Economic Priority Guidelines

(c)(1) Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.

(c)(2) Continue efforts to maintain federal support to provide stable sugar prices high enough to allow profitable operations in Hawaii.

(e)(1) Maintain and improve water conservation programs to reduce the overall water consumption rate.

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

(e)(4) Explore alternative funding sources and approaches to support future water development programs and water system improvements.

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

(f)(4) Encourage the development and use of energy conserving and cost-efficient transportation systems.

Comment: As one of the State's largest agricultural landlords, the applicant has a vested interest in the long-term viability of agriculture. Removal of crop lands from the proposed project site is consistent with continued profitable operations at Oahu Sugar Company. A thorough discussion of the impacts of the proposed project on both the Oahu Sugar Company and important agricultural lands is found in Chapter 3.5.

The Kapolei Town Center Plan responds to such current issues as conservation of potable water by proposing the use of a dual water system, utilizing brackish water for landscape irrigation. The use of energy conserving technology is favored by the applicant and will be considered in the design process. Innovative means of transportation to reduce reliance on the automobile, such as designing urban amenities at a "walkable" scale have been considered in the preparation of the land use plan.

Sec. 226-104 Population, Growth and Land Resources Priority Guidelines

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

(a)(2) Manage a growth rate for Hawaii's economy that will parallel future employment needs for Hawaii's people.

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

(b)(1) Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of life styles.

(b)(2) Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.

(b)(3) Restrict development when drafting of water would result in exceeding the sustainable yield or in significantly diminishing the recharge capacity of any groundwater area.

(b)(5) In order to preserve green belts, give priority to state capital-improvement funds which encourage location of urban development within existing urban areas except where compelling public interest dictates development of a non-contiguous new urban core.

(b)(6) Seek participation from the private sector for the cost of building infrastructure and utilities, and maintaining open space.

(b)(12) Utilize Hawaii's limited land resources wisely, providing adequate land to accommodate projected population and economic growth while ensuring the protection of the environment and the availability of the shoreline, conservation lands, and other limited resources for future generations.

(b)(13) Protect and enhance Hawaii's shoreline, open spaces, and scenic resources.

Comments: County General and Development Plan policies clearly indicate the *public* need to develop a Secondary Urban Center in Ewa, thus the proposal is consistent with the needs and desires of the residents of the City and County of Honolulu. Notwithstanding the compelling public need, it is important to create a desirable development pattern which can accommodate the needs of the growing population while minimizing the adverse effects often associated with urban development. The applicant's plan for Kapolei represents a well-balanced plan for urban development which respects the natural, social and physical constraints of the region.

A basic premise of the Secondary Urban Center concept is that it be wholly withdrawn from the existing primary urban center-so as not to encourage urban sprawl. By definition, the development of the Kapolei Town Center will require the construction of new infrastructural systems which will require a public/private partnership. Some of the regional infrastructure is already in place (Honouliuli Wastewater Treatment plant, H-1 Freeway, deep draft harbor, etc.), and other components are now being planned and implemented (water source development, storage and transmission systems, schools, parks, roadways, etc.).

<u>Sec. 226-106 Affordable Housing. Priority Guidelines for the Provision of Affordable Housing</u>

(2) Encourage the use of alternative construction and development methods as a means of reducing production costs.

(4) Create incentives for development which would increase home ownership and rental opportunities for Hawaii's low and moderate-income households, gap-group households, and residents with special needs.

(6) Encourage public and private sector cooperation in the development of rental housing alternatives.

(7) Encourage improved coordination between various agencies and levels of government to deal with housing policies and regulations.

Comment: The applicant is working with State and County housing agencies to address the community needs for affordable housing. As noted above, the HFDC has plans to develop both market and affordable homes (4,871 housing units) on lands adjacent to the Town Center.

6.2 STATE FUNCTIONAL PLANS

The Hawaii State Plan directs the appropriate State agencies to prepare functional plans for the program areas of agriculture, transportation, conservation lands, housing, tourism, water resources, historic preservation, energy, recreation, education, higher education and health. These Plans serve as the primary implementing vehicle for the goals, objectives and policies of the Hawaii State Plan.

The plans set forth "...the policies, programs, and projects designed to implement the objectives of a specified field of activity when such activity is proposed, administered, or funded by an agency of the State" (Section 226-2 (10) Hawaii Revised Statutes). Each Functional Plan contains objectives to be achieved and policies to be pursued within the specified areas. "...[S]uch policies shall address major programs and the location of major facilities" (Section 226-57 (b) HRS).

All twelve State Functional Plans have been adopted by the Hawaii State Legislature. These plans "...[S]hall be taken into consideration in amending the county general plans (Section 226-52(a)(por 3) HRS)." It is important to note that the policies, objectives and implementing actions within the Functional Plans are not mandates for County or private actions. Rather, they should be viewed as a guide, fully recognizing the inherent competing policy interests between the twelve plans. The applicable functional plans have been reviewed and considered in the formulation of this DP amendment. The following pages present a review of the agriculture, health, historic preservation, housing, recreation and tourism functional plans.

6.2.1 State Agriculture Functional Plan

The focus of the State Agriculture Functional Plan, prepared by the State Department of Agriculture, is towards the long-term preservation and utilization of lands "suitable and used, or potentially usable, for agricultural production." Such lands are found within the State Agriculture District in areas identified as important agricultural lands.

The proposed Kapolei Town Center would result in the urbanization of lands which are currently under sugarcane cultivation by the Oahu Sugar Company. A thorough discussion of the impact of the proposed development on State Agricultural policy (ALISH, LESA and the Agricultural Functional Plan) is presented in Section 3.4. As noted, the proposed development: (1) will not impact

the profitability of Oahu Sugar Company; and (2) is supported by the General and Development Plans of the City and County of Honolulu therefore indicating an overriding public interest in the establishment of the Kapolei Town Center at the proposed site.

6.2.2 State Health Functional Plan

The State Health Functional Plan is prepared and maintained by the State Department of Health (DOH). The Plan's objectives, policies, and implementing actions are intended to: (1) prevent disease and promote healthful lifestyles and environmental conditions; (2) ensure and promote appropriate provisions and access to health care for the total community; (3) protect society from potential dangers (e.g., epidemics, hazardous environmental conditions or violent persons); and finally, (4) prevent environmental degradation and enhance the quality of the air, land and water.

Implementing actions in the State Health Functional Plan describe the Health Department's permit/approval processes that directly impact the proposed Kapolei Town Center. These include: administering permit processes for discharges into the air, surface water and ground water; and the review of new drinking water systems. These subjects are discussed in the relevant sections of this report. Also addressed in the State Health Functional Plan are implementing actions concerning the reuse of treated sewage effluent for irrigation purposes, excessive noise, and the adequacy of health care facilities. These areas are also discussed in the relevant sections of the report.

6.2.3 State Housing Functional Plan

The State Housing Functional plan is prepared and maintained by the State Housing Finance and Development Corporation, an agency administratively attached to the State Department of Business and Economic Development. The implementing actions of the plan focus on two broad statewide areas: (1) Assisting the provision and maintenance of housing through government and private sector efforts; and, (2) Suggesting research needed to make well informed housing decisions. The two objectives in the functional plan deal with the orderly development of housing and expanded opportunities for Hawaii's people to secure adequate housing.

Official population projections for the Ewa Development Plan area indicate a more than doubling of current population levels within the next 20 years. This population growth will at least in part be accommodated by the residential areas in and around the Kapolei Town Center. Kapolei is planned not only as a center of commerce but a significant residential community in its own right. The "Kapolei Village" housing project, proposed by the HFDC on adjacent lands, will provide 4,871 dwelling units in both market and "affordable" price ranges. Areas to the north and south of the first increment will be largely residential in character with space for up to 1,708 additional residential units provided.

6.2.4 State Historic Preservation Functional Plan

The State Historic Preservation Functional Plan is prepared and maintained by the State Department of Land and Natural Resources (DLNR).

An archaeological survey of the proposed Kapolei Town Center site has been conducted (Appendix E). Survey results indicate that no significant archaeological or historical sites exist in the area.

6.2.5 State Recreation Functional Plan

The State Recreation Functional Plan is prepared and maintained by the Department of Land and Natural Resources. The purpose of the Plan is "to assess present and potential demand and supply of outdoor recreation resources and to guide State and County agencies in acquiring or preserving lands of recreational value, providing adequate recreational facilities and programs, and ensuring public access to recreational areas."

The State Recreation Functional Plan also states that, "In addition to their intrinsic and scientific value, Hawaii's physical resources contribute to the State's superb living environment, furnish links with Hawaii's natural and cultural heritage, and provide many of the attractions which buoy the visitor industry."

The Kapolei Town Center will provide both passive and active means of recreation. A system of greenbelts, with bicycle and pedestrian paths, is planned to meander throughout the project by connecting the schools, parks and neighborhood retail centers.

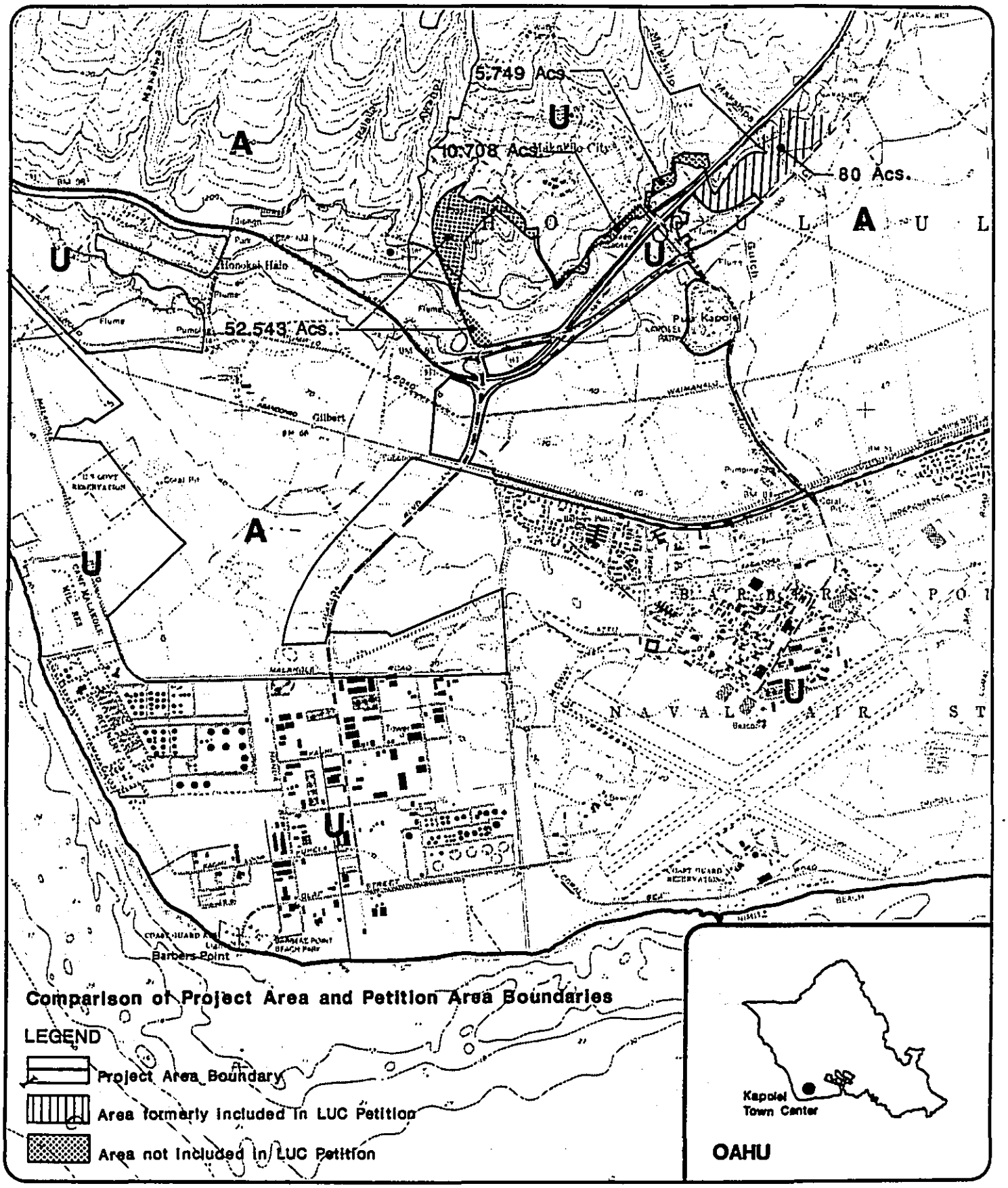
6.2.6 State Tourism Functional Plan

The State Tourism Functional Plan is prepared and maintained by the Tourism Office of the State Department of Planning and Economic Development (DPED). The overall theme of the Plan is, "the achievement of a visitor industry that constitutes a major component of steady growth for Hawaii's economy." The Plan identifies major issues and problem areas, and sets forth policies and actions "to insure against unplanned growth which could be damaging to the visitor industry and to the quality of life and well-being of the people of Hawaii." The Plan addresses the following functional areas of the visitor industry; tourism promotion, physical development, employment and career development and community relations.

The objectives, policies and implementing actions of the Tourism Functional Plan provide guidelines for a successful visitor industry development in Hawaii. To encourage implementation of this Plan, the proposed Kapolei Town Center will directly interact with the planned resort at Ko Olina. Due to existing and planned transportation links between the two, interaction is expected to occur. The Kapolei Town Center will provide the space needs of the necessary Ko Olina Resort support services.

6.3 STATE LAND USE LAW

All lands in the State have been classified in one of four land use districts, Urban, Rural, Agricultural, and Conservation, by the State Land Use Commission, pursuant to Chapter 205 HRS. The entire project area presently lies within the State Agriculture District (Figure 12). Reclassification to the Urban District is a prerequisite for development of the subject property. The applicant submitted a



State Land Use Districts

Kapolei Town Center E.I.S.

0 3000' Feet

Figure: **12**

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petition to the State Land Use Commission requesting the reclassification of the 890-acre "Petition Area" pursuant to the provisions of Section 15-15-78, Hawaii Land Use Commission Rules pertaining to Incremental Districting. Specifically, the Commission has been asked to approve the 890-acre Kapolei Town Center master plan, and to reclassify the first increment containing 135 acres to the Urban district (Carlsmith, et. al. June 1987). The Commission is presently considering the applicant's request for reclassification (page 11-43).

The project area identified for the purposes of the Development Plan amendment application is 879 acres in size. The "project area" generally corresponds with the 890-acre "petition area" now being reviewed for urban districting by the State Land Use Commission (Figure 12) with the following exceptions: 1) approximately 80-acres of TMK 9-1-16:4 were omitted from the project area as the developers of the parcel are now in the process of filing separate DP and Zoning amendments with DGP and DLU; and 2) where possible, tax parcel and master plan boundaries and/or existing DP Land Use boundaries were used to identify project boundaries, totaling approximately 69 acres.

6.4 GENERAL PLAN OF THE CITY AND COUNTY OF HONOLULU

The General Plan for the City and County of Honolulu (adopted 1977) was revised by the City Council in December 1982. The Plan is a statement of the long-range social, economic, environmental and design objectives for the general welfare and prosperity of the people of Oahu. A discussion concerning the genesis of the secondary center growth policy is presented in Section 7.2. A discussion of the relevant objectives and policies of the General Plan follows:

1. Population Objectives and Policies. The major thrust in this section is to manage the growth of the island's population in a manner that promotes the ideals of social, economic and environmental harmony. A major policy of the General Plan is to direct growth to the "secondary urban center in the West Beach-Makakilo area" (Policy C 2).

   Comment: The proposed Kapolei Town Center would directly implement these objectives and policies for population. Employment opportunities within Kapolei will also help the population to gravitate in that direction to live.

2. Economic Activity Objectives and Policies. Relevant objectives of the General Plan with respect to economic activities include Objective A: "To promote employment opportunities that will enable all the people of Oahu to attain a decent standard of living;" and Objective B: "To maintain the viability of Oahu's visitor industry."

   Comment: The proposed Kapolei Town Center will have a positive influence on employment in the Ewa area. Jobs will be created in the construction industry during the development phases, and long-term operational employment will occur as businesses and new industries begin to locate there.

   Kapolei will also help to support the visitor industry by providing space for necessary support services for the Ko Olina Resort.

3. Natural Environment. The objective "To preserve and enhance the natural monuments and scenic views of Oahu for the benefit of both residents and visitors," was a main design theme when planning the street pattern for the Kapolei Town Center. An emphasis has been placed on taking advantage of the views to the *puus* to the north and east of the project site.

4. Housing. A main emphasis at the county level is to provide housing for Oahu's residents in an affordable manner. The housing should not only be affordable, but located reasonably close to employment, recreation, commercial centers, and adequately served by public facilities and services.

   Comment: The Housing Finance and Development Corporation is proposing to develop a 4,871-unit residential community adjacent to the Kapolei Town Center. Called "Kapolei Village," this development would provide a range of housing types including market, gap-group, low-mod, elderly and rental housing. Within the southern area of the Kapolei Town Center (not included within the project area) additional residential areas have been identified which could provide an additional 1,100 residences. Both the Kapolei Village and the Town Center housing would allow prospective residents the opportunity to live and work in a master-planned community environment without having to commute long distances over congested roadways.

5. Transportation and Utilities. The major thrust of this section is to provide new and innovative means of transportation and utilities that are efficient and cost effective.

   Comment: Planning for the secondary urban center has long envisioned a multi-modal transportation system including transportation options such as a light rail system, a marine bus system providing service between the marinas at Ko Olina, Ewa Marina and Honolulu, and a possible limited-access "Parkway" facility which would connect the Ewa area with Honolulu via a 1.1 mile tunnel under the Pearl Harbor Channel. The proposed Town Center implements the Ewa Parkway and contemplates the eventual construction of a mass transit system along the adjacent OR&L right-of-way.

6. Physical Development and Urban Design. The Physical Development and Urban Design element of the General Plan is closely related to the Population element, with the major thrust being the coordination and sequencing of infrastructural systems to accommodate population objectives. Objective C, similar to Population Policy 2, is "To develop a secondary urban center in the Ko Olina-Makakilo area." Policy C(2) states, "Encourage the development of a major residential, commercial, and employment center within the secondary urban center."

   Comment: The development of the proposed Kapolei Town Center would directly implement this objective.

7. Culture and Recreation. The main emphasis of this section is to keep the Hawaiian heritage and culture alive, and to provide adequate recreational facilities for the citizens of Oahu.

Comment: The Kapolei Town Center Plan proposes to do both of these through the representative architecture of "old Honolulu", and by providing a park system connected by meandering greenbelts throughout the project area which will provide for the active and passive recreational needs of prospective residents.

6.5 EWA DEVELOPMENT PLAN

The City and County's Development Plan (DP) program provides a relatively detailed framework for implementing General Plan objectives and policies on an area-wide basis. A total of eight Development Plan regions have been established on Oahu. The Development Plan Ordinances consist of three elements: Common Provisions, Special Provisions (for each DP area), and Development Plan Maps (Land Use and Public Facilities).

The Ewa Development Plan text describes a desirable scenario for development in the Ewa area as follows:

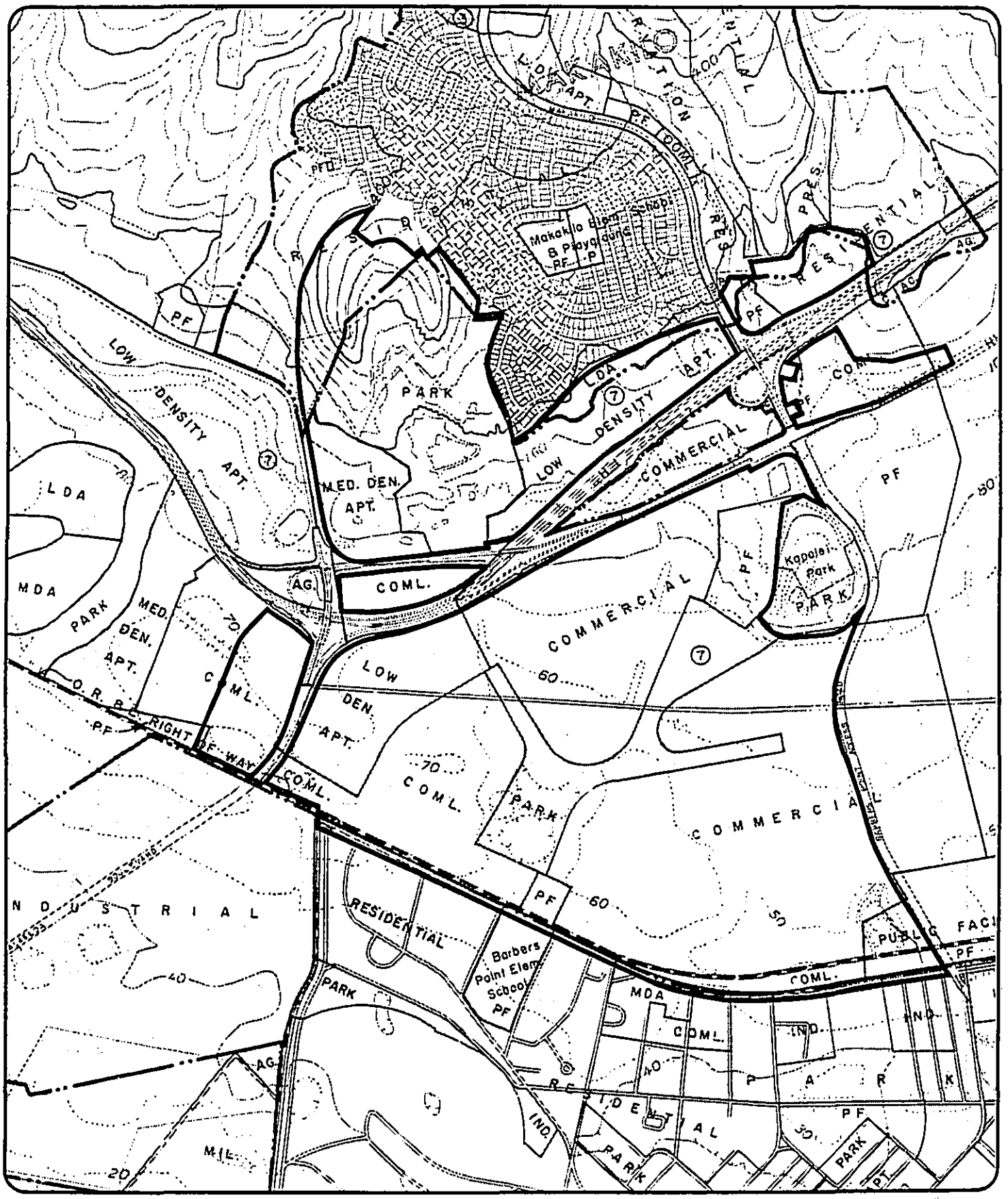
> "A new secondary urban center shall be gradually developed in the West Beach-Makakilo area in order to accommodate most of the influx of population into the area between 1980 and the year 2000."
>
> "...distinct identities of existing communities shall be protected and enhanced... additional development consistent with these identities shall be permitted in Makakilo as part of the gradual development of the secondary urban center."

- General Urban Design Principles and Controls. The Ewa Development Plan requires consideration of open space, public views, and other design elements, and it also establishes height and density controls. Because the land use plan of the proposed amendment area is at the conceptual level, architectural details are not available. However, all Development Plan requirements will be complied with in a manner that is mutually agreeable to the developers and relevant public agencies.

- Land Use Map. Major revisions were made in the FY 1985-86 annual review of the Ewa DP when the Kapolei Town Center was first proposed (Figure 13). The current DP Land Use Map designates much of the area makai of the H-1 Freeway as Commercial with a large park and various Public Facilities. Areas mauka of the H-1 Freeway are designated for medium and low density apartments, residential and park. Since its adoption two years ago, the Town Center concept has been further refined and changes have been made to the land use plan which will necessitate further amendments to the Ewa DP. These changes are the subject of the Development Plan Amendment application, the proposed action.

6.5.1 Amendments to the Ewa Development Plan Land Use Map

Proposed amendments to the DP Land Use map within the project area comprise a number of separate parcels. Figure 13 presents the existing Ewa DP Land Use map for the project area. Figure 14 identifies those areas of the DP map to be changed. Figure 15 presents a revised DP Land Use map with proposed revisions incorporated. Table 19 below presents summary information regarding the net



Existing Ewa DP Land Use Map

Kapolei Town Center E.I.S.

0 1450' Feet

Figure: 13

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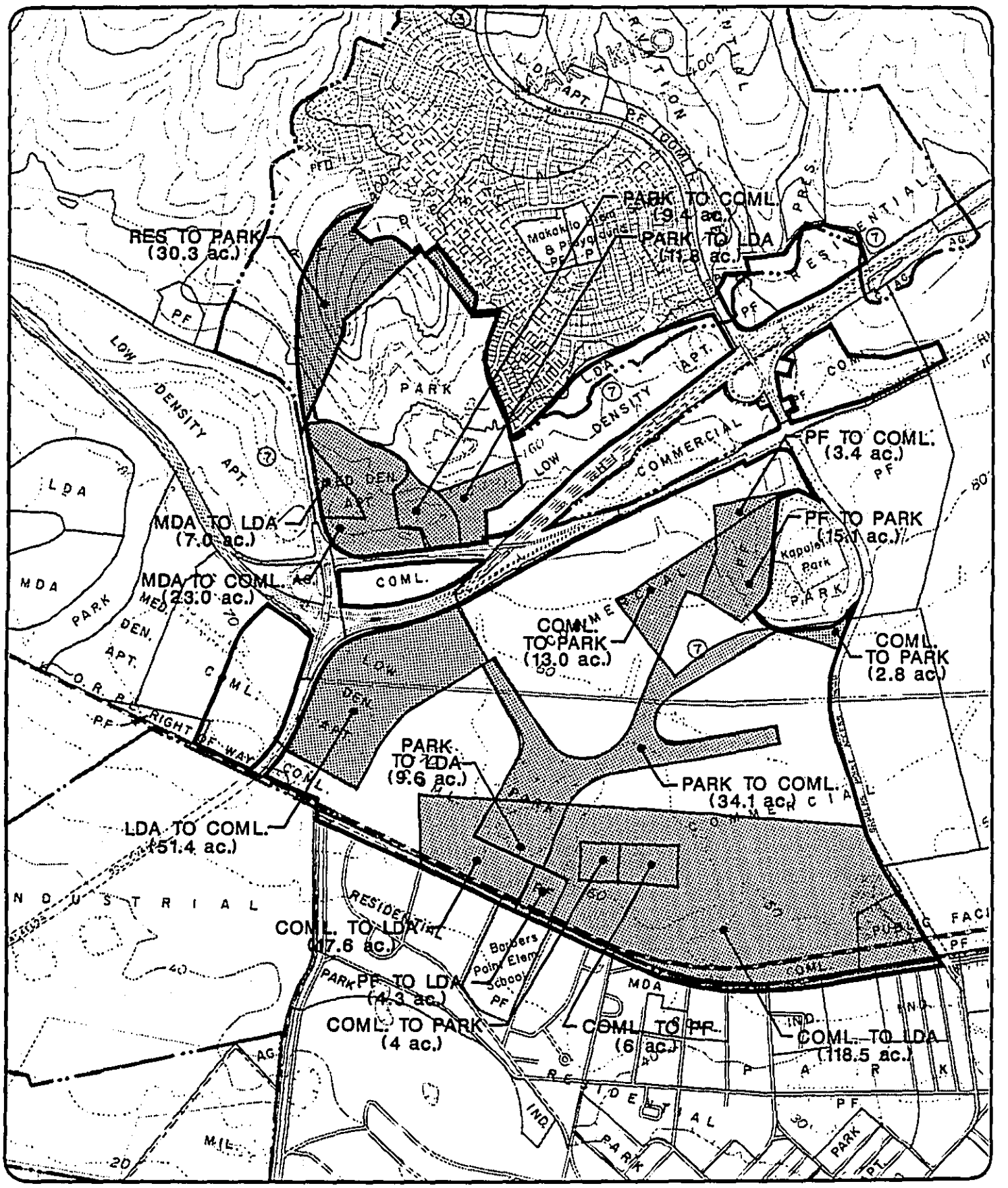

Proposed Changes to Ewa DP Land Use Map

Kapolei Town Center E.I.S.

0 1450' Feet

Figure: 14

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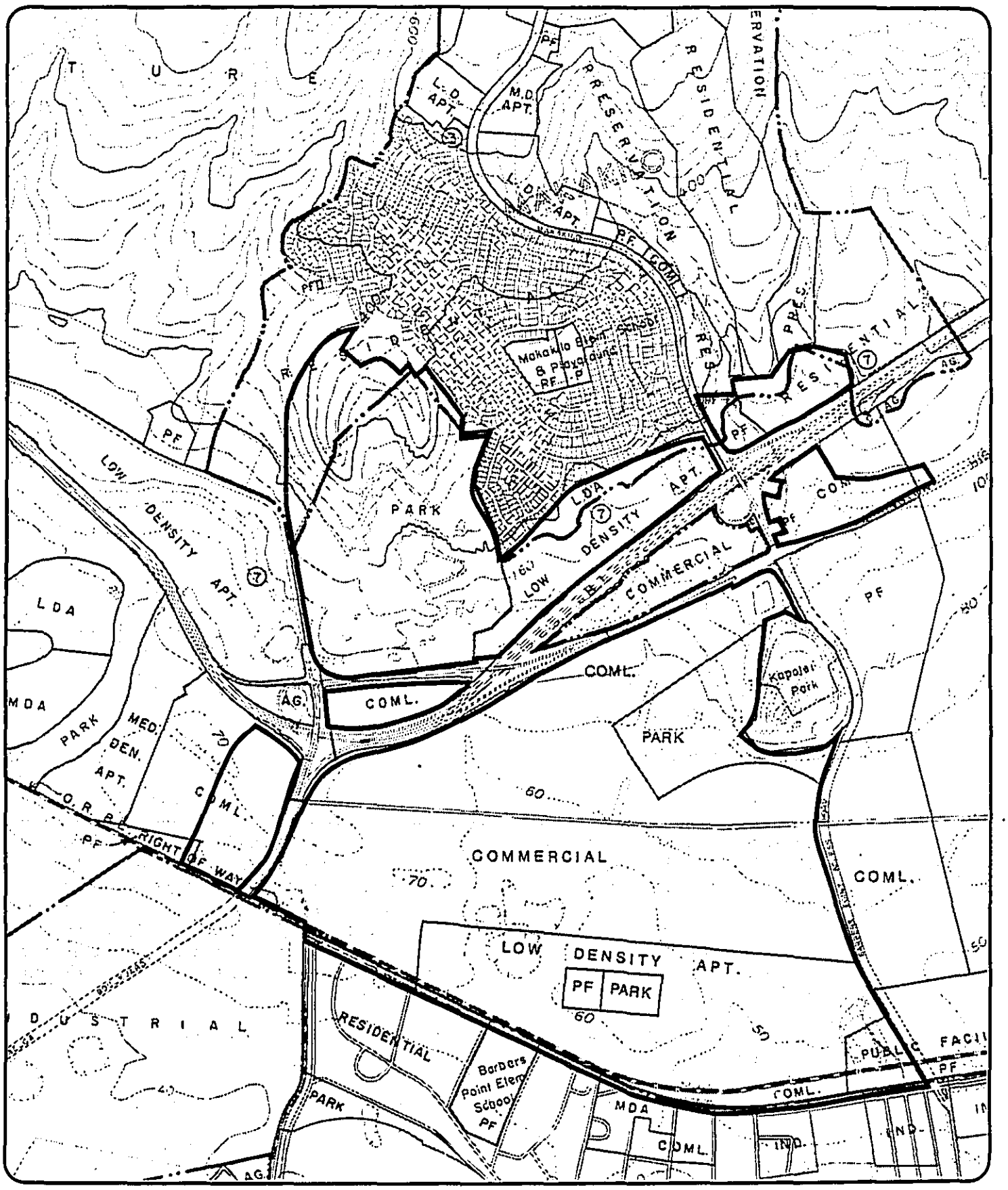

Revised Ewa DP Land Use Map

Kapolei Town Center E.I.S.

0 1450' Feet

Figure: **15**

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effect of the proposed changes on the present DP land use pattern represented in Figure 15.

Table 19: PROPOSED CHANGES TO PRESENT EWA DP LAND USE MAP
(acres)

DP Land Use Category	Existing	Proposed	Net Change
Residential	60	20	-40
Low-Density Apt.	103	219	+116
Medium-Density Apt.	30	0	-30
Commercial	493	452	-41
Park	159	170	+11
Public Facility	41	25	-16
TOTAL	886	886	0

As can be seen from the information provided above, net losses in residential, medium-density apartment, commercial and public facility uses are offset by net gains in low-density apartments, and park uses. The major net change is from residential (loss of 40 acres) and commercial (loss of 41 acres) to low-density apartment uses (net gain of 116 acres).

6.5.2 Probable Impact

The proposed amendments do not significantly alter the residential capacity of the Ewa DP area. To assess the impact of the proposed DP changes on existing residential capacity, maximum residential capacities allowable within the Ewa DP (Residential, 12 units/acre; Low-Density Apt., 30 units/acre; and, Medium-Density Apt, 90 units/acre) were assigned to existing and proposed acreages identified in Table 2. The analysis indicates a gain of 300 dwelling units (4.6 percent increase) over existing capacity. Average residential density decreased slightly from 33.7 dwelling units/acre to 28.5/acre. The decrease in density is attributable to the redesignation of the relatively high density (90/acre) 30-acre MDA parcel adjacent to Puu Palailai to LDA and Commercial uses.

Based on the analysis presented above, the proposed changes to the present Ewa DP land use pattern do not constitute a significant change.

6.5.3 Amendments to the Ewa Development Plan Public Facilities Map

Figure 16 presents the existing Ewa DP Public Facilities map for the project area. A number of changes to the map will be required to implement the proposed land use changes. Specifically, major project roads, water and sewer lines required to support the proposed land use changes will have to be incorporated into a revised

Existing Ewa DP
Public Facilities Map

Kapolei Town Center E.I.S.

0 1450'
Feet

Figure: **16**

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Public Facilities map. These and any other changes identified during the ongoing EIS process will be the subject of a comprehensive Public Facilities Map amendment to be submitted after the EIS process is completed in August 1988. As a relatively minor matter, based on a preliminary review, DGP has recommended that the combination 6 acre elementary school/4 acre park site, proposed in the low-density apartment area to the south of the Ewa Parkway, be represented on the DP Land Use map, notwithstanding the fact that the precise location of the two facilities is still subject to change.

6.6 COUNTY ZONING

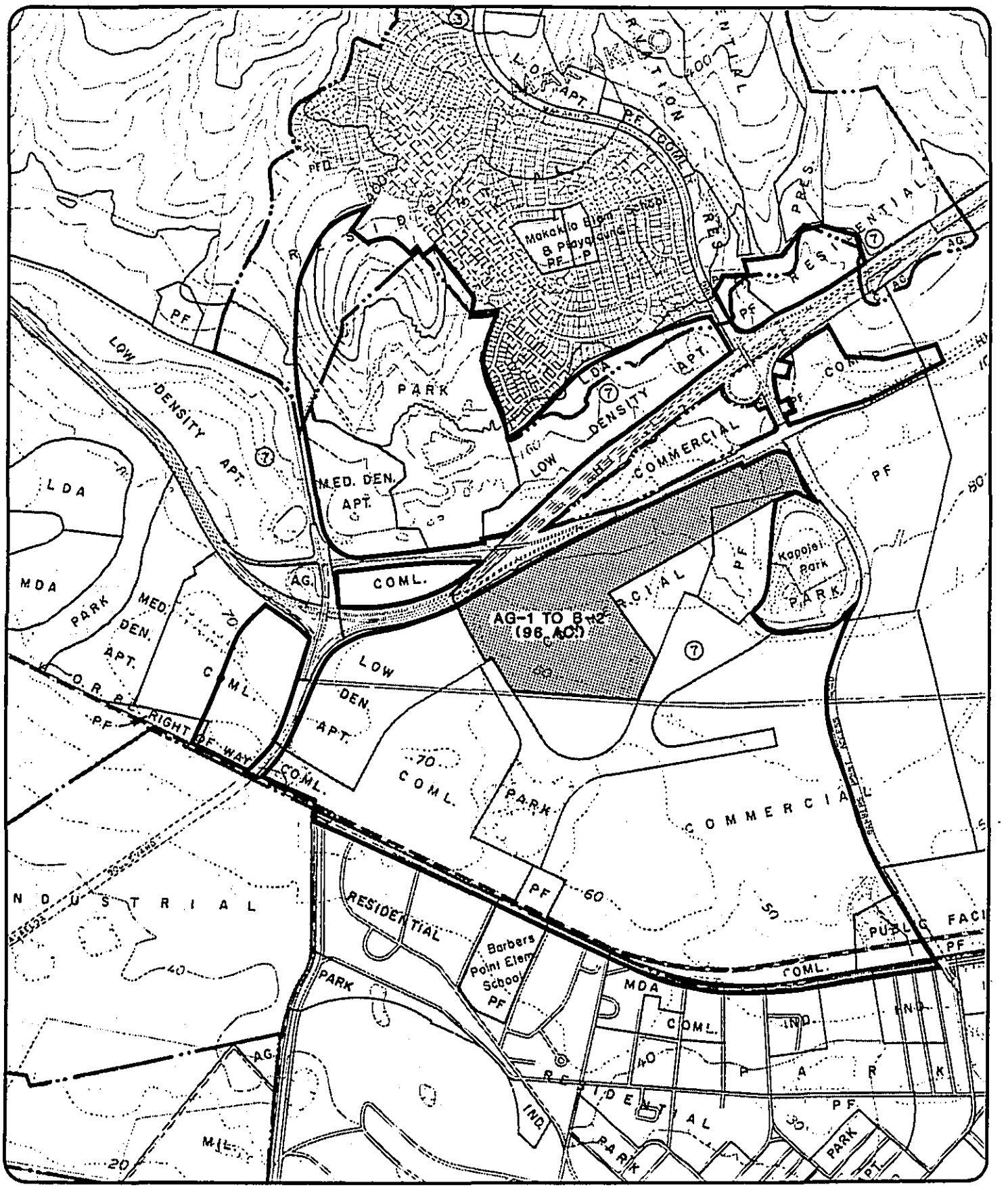
The majority of the Town Center area is zoned for agricultural purposes as AG-1 (Restricted Agricultural District). The Kapolei Shopping Center located between Farrington Highway and the H-1 Freeway is zoned B-2, Community Business District.

The applicant will shortly be submitting an application to the Department of Land Utilization (DLU) for the rezoning of a 96-acre parcel currently designated on the DP Land Use map as Commercial.[1] An application to rezone the remaining 39-acres of the first increment, probably to the B-2 zone, will be submitted pending favorable action on the proposed amendments to the Ewa DP land use map. The rezoning request is contingent upon the reclassification (Agriculture to Urban) of the 135-acre first increment of the Town Center by the State Land Use Commission. Specifically, the change of zone application will request the redesignation of the entire 96-acre site (Figure 17) from the current zoning, Restricted Agriculture District (AG-1), to the Community Business District (B-2). The parcel to be rezoned is bounded by Farrington Highway to the north, Barbers Point Access Road and Puu Kapolei to the east, and Waimanalo Road to the south. The western boundary is coterminus with the underlying DP Commercial boundary.

6.7 COASTAL ZONE MANAGEMENT/SPECIAL MANAGEMENT AREA RULES AND REGULATIONS

The objectives and policies of the Hawaii Coastal Zone Management (CZM) Program are included in the Shoreline Projection Act of 1975 (Chapter 205A-2, Hawaii Revised Statutes, Part I). The entire Kapolei Town Center lies approximately two-miles from the coastline at its nearest point (2.2-miles from the project area) and does not lie within the Special Management Area (SMA). A Special Management Area Permit from the City and County of Honolulu is not required.

1. A small (2.7 acre) portion of the 96-acre zoning parcel is presently designated as "Public Facility" on the DP Land Use map.



Proposed Zoning Amendment

Kapolei Town Center E.I.S.

0 1450' Feet

Figure: 17

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Compliance with the relevant objectives of the Hawaii CZM Program are discussed below (205A-2, HRS).

(b)(1) Recreational Resources;

Comment: The thrust of this objective is to provide "coastal recreational opportunities accessible to the public." Although the project area is over two-miles from the coast, the applicant is cognizant of the need to provide recreational opportunities to prospective Town Center residents and for the greater Ewa community.

(b)(2) Historic Resources;

Comment: No archaeological or historically significant resources are known to exist within the project area. Notwithstanding the technical findings of the consulting archaeologist (Appendix E), the applicant recognizes the cultural and mythological significance of the Ewa area and has designed the Town Center in such a manner as to be uniquely Hawaiian in character.

(b)(3) Scenic and Open Space Resources;

Comment: Traditional views of the mountains (Waianae Range), locally prominent *puus* (Palailai and Kapolei) and the sea have been maintained in the Town Center plan. Open space will be provided at the Kapolei park area and the future Palailai Regional Park to be built on the site of a reclaimed landfill.

(b)(4) Coastal Ecosystems;

Comment: Drainage from the site is to be retained in ponding basins located on-site, in areas overlying the coastal caprock formation thus preventing sediment-loaded urban run-off from damaging coastal ecosystems.

(b)(5) Economic Uses;

Comment: The proposed project is an excellent example of private party endeavors which will stimulate the region, county and state economies. Its location is also sensitive to the State's needs by not being proposed within the Special Management Area.

(b)(5) Coastal Hazards;

Comment: Due to its inland location, the Kapolei Town Center is not subject to inundation by coastal storm waves or tsunami. A regional drainage study has been completed promulgating recommendations which, when implemented, will improve current flooding problems in the project vicinity, and will minimize adverse impacts associated with stream flooding and erosion.

6.8 ENVIRONMENTAL IMPACT STATEMENT LAW (CHAPTER 343, HRS)

Because the proposed action involves a non-county initiated amendment to the City and County of Honolulu Development Plans and will result in designations other

than agriculture, conservation or preservation, the proposed action is also subject to the provisions of the Environmental Impact Statement Law (Chapter 343, HRS) (Section 343-5 (a)(6)). Based on the scale of the proposed development, including related impacts on population and the economy, the applicant has determined that the proposed action may have a significant effect on the environment. The DGP has concurred with this determination and accordingly, filed an environmental impact statement preparation notice with the Office of Environmental Quality Control on March 9, 1988, pursuant to Section 11-200-11 (a)(1), Administrative Rules of the Department of Health.

Alternatives to the Proposed Action

CHAPTER 7

KAPOLEI TOWN CENTER

THE ESTATE OF JAMES CAMPBELL

Ewa, Oahu, Hawaii

7.1 INTRODUCTION

Chapter 200 of Title 11, Environmental Impact Statement Rules (Subsection 17(f)), requires a discussion of "any known alternatives... which could feasibly attain the objectives of the action." The rules further specify that the alternatives be explored and evaluated in light of enhancement to the environmental quality or the avoidance or reduction of adverse environmental effects.

Three alternatives to the proposed action were evaluated:

1) Alternative Locations
2) Continued Agricultural Use of the Site
3) No Action

7.2 ALTERNATIVE LOCATIONS

The "Alternative Locations" alternative examines the public policy debate leading up to the selection of Ewa as the preferred location for the "secondary urban center."

The current General Plan Objectives and Policies relating to directing population growth to the Ewa Plain are largely based on the General Plan Revision Program conducted by DGP in 1973-4 and subsequent City Council action leading up to the adoption of the 1977 General Plan. "The prominence and attention given to population in the General Plan is a reflection of the overriding public concern with the issue of population growth that existed during the 1970s when the new General Plan was being formulated. This concern was focused on what were perceived as the negative impacts of nearly two decades of unprecedented population growth on Oahu..." (DGP March 1977:p. 3).

In March 1974, DGP released a series of technical reports addressing implications of alternative growth policies for the island of Oahu. Four land use alternatives including several variations were evaluated: Intensive Development, Moderate Expansion, Directed Growth and Private Sector Initiative. Essentially, the major policy issues being tested were: containment of growth (perhaps slowing population growth rates) within identified urban boundaries (intensive development); and, managed growth into either Central Oahu or Ewa (directed growth). Undesirable consequences of the intensive growth scenario involved accelerated growth in Koolaupoko and other urban fringe areas. After an analysis of alternatives, the "directed" growth alternative was recommended by DGP for adoption in the revised General Plan. A key conclusion of the evaluation was that the directed growth alternative offered "...the best potential for meeting the communities' residential requirements..." while it "...would also minimize the conversion of agricultural land to urban use as population grows... and provides the opportunity to minimize environmental problems within existing urban areas." It was also concluded that "the Ewa area is the best choice for the major thrust of urban development to occur within the concept of Directed Growth; however, "... the differences between Ewa

and Central Oahu are not great and the choice must be conditioned on the ability to formulate and effectively implement a housing program" (DGP March 1974). These recommendations were subsequently incorporated into a report entitled "Proposed Objectives and Policies for the Revised General Plan" which was then transmitted to the Honolulu City Council for further action. For a number of reasons, the City Council was "...unhappy with the study and refused to consider it a complete general plan document" (Creighton 1978:p. 263).

In 1976, based on input from the revision program, outside consultants and Council staff, the City Council prepared its own version of the General Plan which was subsequently adopted as the official General Plan the following year. A report prepared by the City Council's Planning and Zoning Committee (January 12, 1978) and subsequently approved by the full Council presents four reasons for the selection of Ewa over Central Oahu as the second urban center:

"The most important reason for selecting Ewa over Central Oahu is that the potential exists for accommodating urban development in Ewa with much less of a loss of good agricultural land than would have to occur in Central Oahu...The second reason for selecting Ewa over Central Oahu is that extensive growth in Central Oahu would create a problem of how to dispose of sewage effluent (due to costly pipeline improvements required to connect Central Oahu to the Honouliuli Wastewater Treatment Plant)...

"A third reason is that there is a greater erosion hazard in Central Oahu than in Ewa (due to steeper slopes and higher rainfall levels and potential for downstream siltation impacts on Pearl Harbor)..."The rainfall level is also a concern in the final reason for selection Ewa over Central Oahu. A relatively large portion of the land which would be developed in Central Oahu falls within... areas considered important for the recharge of our ground water supply." "Another factor affecting the choice between the two areas which was pointed out in the (DGP) technical evaluation '... is the fact that Ewa already contains a substantial employment center (Campbell Industrial Park) and might be expected to provide an important base for future industrial activity...'" (DGP March 1987:p. 4)

Reflections on the outcomes of the Revision Program are provided in a recent DGP review of growth management policies: "In broad terms the current General Plan population distribution policies generally conform to one of the variations of the 'directed growth' land use alternative. The 'directed growth' alternative represented what might be classified as a middle of the road growth management strategy between alternatives which would have restricted all future growth to existing urban zoned areas ('intensive development') or permitted an open ended acceptance of private sector development proposals 'private sector initiative'" (DGP March 1987: p. 3)

7.3 Continued Agricultural Use of the Site

The "continued agricultural use of the site" alternative assumes that present agricultural use of the site remains for an indefinite period of time.

The applicant currently leases c. 600 acres of the project area to the Oahu Sugar Company (OSCO) for sugarcane cultivation with leases due to expire in 1995. Over the past ten year period OSCO has been consolidating its plantation into a more

compact, efficient operation with no appreciable change in annual production (c. 100,000 tons per year). Continued advances in field productivity are expected which will further reduce plantation size. From a financial perspective, it is estimated that each acre of cultivated sugarcane generates approximately $3,000/year gross revenue, based on yields of 15 tons of sugar per acre and sales price of $400 per ton for sugar and molasses (P. B-9). Alternative crops have been evaluated by the applicant and OSCO and none have been found to effectively utilize the lands currently under sugar cultivation. The next-most-profitable agricultural use for the project area would therefore be cattle grazing. Estimates for annual gross revenues generated by cattle grazing range between $20 and $120 per acre, far less than what is currently generated by sugarcane cultivation. (By comparison, alternative urban uses can be expected to generate much higher per acre revenues than sugarcane, the highest value crop). However, these urban uses cover a very small area relative to the 14,000-acre plantation.

The applicant derives a significant portion of its income from its extensive (c. 8,900 acres) ground leases with OSCO. In light of the fact that no alternative crop replacements have been found, the long-term viability of plantation operations is clearly in the applicant's best interest. Simply put, no other uses have been identified which can generate positive lease rentals on the same scale as the present sugar plantation. However, notwithstanding this relationship, it is widely recognized that the long-term prospects for the sugar industry in Hawaii and nation-wide are poor. The industry is particularly susceptible to competition from artificial sweeteners and is heavily dependant on federal price supports to maintain farming operations. Because of the important financial relationship between OSCO and the applicant, because the proposed action will not adversely impact OSCO's financial viability, and in light of the poor long-term prospects for the sugar industry as a whole, the applicant has chosen a more pragmatic approach by selectively directing urban development activities into areas which will not adversely affect Osco's financial viability.

Advantages. Retention of the site in agricultural use will preserve open space and reserve important agricultural lands for future development options (including alternative agricultural uses).

Disadvantages. Long-term outlook for the sugar industry is poor, therefore continued reliance on lease revenues derived from sugar cultivation must be tempered with the need to diversify revenue sources away from high-risk, low reward sources. Retention of the site in agricultural use will require a re-evaluation of the General Plan "secondary urban center" concept of redirecting growth to the Ewa Plain (see Section 7.4). Continued urbanization associated with Ko Olina, Campbell Industrial Park, Makakilo and Kapolei Village are not compatible with continued farming operations within the project site. Alternative urban uses of the site will provide higher revenues to the applicant which may permit greater financial flexibility in renegotiating agricultural leases when they expire in 1995.

7.4 "No Action" Alternative

For the purposes of this analysis, the "no action" alternative involves a comparison between the "Central Business District" (CBD) plan approved for the project area by the City Council in 1986 and subsequently incorporated into the Ewa Development Plan Land Use Map and, the revised Kapolei Town Center plan initially prepared by

Pereira Associates and the subject of the present DP amendment application. To implement this alternative, the current DP Amendment Application would be withdrawn and the applicant would proceed to develop the site based on the 1984 CBD plan. A brief description of the 1984 "Central Business District" plan excerpted from the FY 85-86 DP Amendment Application (Helber, Hastert & Kimura, Planners June 1985:pp. 8-12) is presented below. It should be noted that the CBD plan was prepared without benefit of the comprehensive market studies prepared in conjunction with the formulation of the Kapolei Town Center plan.

The "Central Business District" (CBD) Plan

The CBD is proposed as an intensively developed mixture of office space, high density residential development, specialty retailing, and recreational facilities, all tied together through a series of pedestrian open spaces and multi-modal vehicular circulation network. The CBD Plan would ultimately provide approximately 6 million s.f. of office space, 0.5 million s.f. of retail commercial uses, and 6,400 residential units. These space allocations would ultimately provide jobs for approximately 30,000 workers and residences for 12,800 people.

Major urban design elements of the CBD plan include a grand internal boulevard shaped like a "C" open to the south enclosing a large curvilinear central park (c. 63 acres), mid-rise offices and a low-rise specialty shopping complex. These uses would be planned to open out onto the central park and pedestrian open space network. Open space/park corridors extend out from the park to the boulevard loop providing maximum physical and visual access to the park. A "people-mover" system would follow the boulevard loop and tie into the regional light rail transit system at the CBD station, thus allowing people to gain full access to the district without the use of an automobile. Much of the area outside of the loop road is planned for large scale, mixed-use projects with mid-rise residential towers in the back and lower office towers fronting the loop road. A vertical view of the city would discern a "bowl-like" effect with buildings stepping down in height from the perimeter towards the central park.

Major Differences with Proposed Kapolei Town Center

The Kapolei Town Center plan takes a more traditional approach in urban design, chosing the city block as the basic design unit and developing a familiar grid-like roadway network oriented to prominent physical features. The overall development program is more conservative with lower densities and, correspondingly, less building volume initially allowing for redevelopment to significantly higher densities in the years ahead when Kapolei is fully accepted as an urban center.

Advantages. The CBD plan is based on the modern "New Town" approach to urban design characterized by curvilinear roadway layouts, and relatively high-density mixed use development. The plan takes a forward (optimistic) look at modes of transportation (heavy reliance on pedestrian and mass transit).

Disadvantages. The mid-rise structures (12-15 stories) envisioned in the CBD may not be appropriate from both an aesthetic and safety perspective (potential conflicts with NAS Barbers Point and Honolulu International Airport air traffic). Market studies conducted by Kenneth Leventhal & Company as part of the Kapolei Town Center program indicate considerable market acceptance of the more traditional Town

Center design approach embodied in the Perreira plan. Market studies also determined that estimates of demand for office space and residential units within the CBD Plan were significantly overstated (factor of 6) while demands for commercial space were under estimated (factor of 2). The overall reduction in development intensity and changes in land use mix identified by the Leventhal Study

7.5 Conclusion

The alternatives described above explore a wide range of possible outcomes including alternative layouts, continued agricultural uses of the site and alternative locations for the overall secondary urban center. Clearly the range of possible alternatives in infinite, the intent here was to review plausible alternatives that have been discussed both publicly and privately over the past 10-20 years. The information and analysis presented above indicates that: 1) Ewa is the appropriate location for the secondary urban center; 2) The long-term retention of the site in agricultural use is not desirable because of the high opportunity costs and the fact that OSCO viability will not be adversely impacted by the gradual, phased development of the site; and, 3) the proposed Town Center master plan represents the best match between obtaining general planning objectives of new town development and market realities.

Irreversible and Irretrievable Commitments of Resources and Relationship Between Local Short-term Uses of the Environment and Maintenance and Enhancement of Long-term Productivity

CHAPTER 8

KAPOLEI TOWN CENTER

THE ESTATE OF JAMES CAMPBELL

Ewa, Oahu, Hawaii

This Chapter summarizes information presented elsewhere in this report in terms of two requirements of the Environmental Impact Statement Rules. Applicants are required to discuss: 1) the irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented; and, 2) the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity. These statements are discussed below.

8.1 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Chapter 200 of Title 11, Environmental Impact Statement Rules (11-200-17 (k)) requires the "identification of unavoidable impacts and the extent to which the action makes use of non-renewable resources during phases of the action, or irreversibly curtails the range of potential uses of the environment..."

The ultimate development of the project area will urbanize approximately 879 acres of the Ewa Plain, irreversibly committing the site to urban uses resulting in an irretrievable loss of prime agricultural land. As noted elsewhere in this report however, sufficient prime agricultural lands remain to accommodate all projected agricultural requirements, including those of the Oahu Sugar Company. Development of the site will require the expenditure of labor, materials, money and energy, most of which are non-renewable and therefore, irretrievable. Development of the proposed action in accordance with the master plan will foreclose alternative land use options to some extent; the master plan will have sufficient flexibility to respond to public need and changing market conditions.

8.2 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Chapter 200 of Title 11, Environmental Impact Statement Rules requires a brief discussion of the "extent to which the proposed action involves tradeoffs between short-term losses and long-term losses or vice-versa, and a discussion of the extent to which the proposed action forecloses future options, narrows the range of beneficial uses of the environment, or poses long-term risks to health or safety..." (11-200-17 (j)).

Short-term tradeoffs of the proposed action are generally associated with the urbanization process. The project area presently consists of active sugarcane fields, a recently closed Sanitary Landfill, and vacant lands. Much of the site provides an open space amenity to residents of Leeward Oahu. Phased development of the site will gradually alter the open space amenity from pastoral to urban. Major view corridors to the sea and mountains will be respected. Existing Oahu Sugar Company operations will be withdrawn in a programmed manner to minimize impact to operations. Short-term construction activities will cause temporary inconvenience to area residents, although the applicant will seek to minimize these impacts by complying with all applicable State and County rules and regulations.

Long-term impacts associated with the proposed development are estimated to be favorable to the extent that the Kapolei Town Center supports and enhances the General Plan growth policy of establishing a secondary urban center. In this perspective, short term construction impacts discussed above are mitigated by the "enhancement of long-term productivity" afforded by the development of the Town Center.

Organizations and Individuals Who Assisted in the Preparation of This EIS

CHAPTER 9

KAPOLEI TOWN CENTER

THE ESTATE OF JAMES CAMPBELL

Ewa, Oahu, Hawaii

This report was prepared for the Estate of James Campbell by Helber, Hastert & Kimura, Planners. The following list identifies individuals and organizations who were involved in the preparation of the EA and their respective contributions.

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CHAPTER 10

KAPOLEI TOWN CENTER

THE ESTATE OF JAMES CAMPBELL

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CHAPTER 11

KAPOLEI TOWN CENTER

THE ESTATE OF JAMES CAMPBELL

Ewa, Oahu, Hawaii

CONSULTED PARTIES AND COMMENTS RECEIVED DURING THE PREPARATION OF THE DRAFT EIS

The notice of availability of the EIS Preparation Notice (EISPN) for the Kapolei Town Center was published in the OEQC Bulletin by the Office of Environmental Quality Control on March 8, 1988. The 44 agencies and organizations listed below were sent copies of the OEQC notice together with a more detailed project description and a cover letter explaining the process and soliciting comments. Although not originally solicited, the Office of Hawaiian Affairs was included in this list after it specifically requested a copy of the EISPN. A total of 25 agencies/organizations responded to the request for comments and/or requested consulted party status and are identified below with an asterisk (*). Copies of these letters and the responses to them, as well as the EISPN, are reproduced in the following pages.

Federal Agencies

* Department of Agriculture, Soil and Conservation Service
* Department of the Army, U.S. Army Engineer District, Honolulu
* Department of the Navy, Naval Base Pearl Harbor
  Department of Navy, Naval Air Station Barbers Point
* Department of the Interior, Fish and Wildlife Service
* Department of Transportation,
  Federal Aviation Administration, Airports District Office

State Agencies

* Department of Accounting and General Services
* Department of Agriculture
* Department of Business and Economic Development
* Department of Education
* Department of Health
  Department of Land and Natural Resources
* Historic Preservation Office
* Department of Transportation
* Land Use Commission
  Office of Environmental Quality Control
* Office of Hawaiian Affairs
  Office of State Planning
  University of Hawaii,
  Water Resources Research Center
  Environmental Center
  Oahu Metropolitan Planning Organization

County Agencies and Boards

* Department of General Planning
  Department of Housing and Community Development
* Department of Land Utilization
* Department of Parks and Recreation
* Department of Public Works
* Department of Transportation Services
* Board of Water Supply
* Fire Department
* Police Department

Public Utilities

* Hawaiian Telephone Company
  Hawaiian Electric Company

Neighborhood Boards, Community Associations

Ewa Neighborhood Board No. 23
Ewa Beach Community Association
Ewa Housing Foundation
Ewa Coordinating Committee
Honokai Hale/Nanakai Gardens Community Association
Makakilo Community Association
Waianae Coast Neighborhood Board No. 24

Islandwide Organizations

Hawaii's Thousand Friends
Land Use Research Foundation
League of Women Voters
* Outdoor Circle

Other

Oahu Sugar Company, Ltd.

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

FRANK F. FASI
MAYOR

DONALD A. CLEGG
CHIEF PLANNING OFFICER

GENE CONNELL
DEPUTY CHIEF PLANNING OFFICER

KK/DGP 2/88-671

February 29, 1988

Mr. Tom Fee, Project Planner
Helber, Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Ewa Development Plan Amendment Application
from Commercial, Public Facility, Low and Medium Density
Apartment, Residential and Park to Commercial,
Low Density Apartment, Public Facility and Park for
Kapolei Town Center Development, Ewa
Tax Map Keys 9-1-15: Por. 4, Por. 5;
9-1-16: 1, Por. 4, 6, 9, 13, 16, 18, 24, 30;
9-2-03: Por. 2, 12; 9-2-19: 1
DGP File No. 89/E-1

This is to inform you that your request to amend the Ewa Development Plan will be processed in the 1989 Annual Amendment Review.

Your request for a development plan amendment was subject to an environmental assessment pursuant to Chapter 343, HRS, the State Environmental Impact Statement (EIS) law. We concur with your determination that an EIS will be required for the proposed development.

The State Office of Environmental Quality Control (OEQC) has been notified of our determination. They will be publishing a notice in their "OEQC Bulletin."

If there are any questions, please call Keith Kurahashi of my staff at 527-6051.

Sincerely,

DONALD A. CLEGG
Chief Planning Officer

Attach.

cc: OEQC
The Estate of James Campbell

data oahudata.doc
March 9, 1988

sal first last, title
address

Dear sal last:

Environmental Impact Statement Preparation Notice
Kapolei Town Center Development Plan Amendment
Ewa, Oahu, Hawaii

TMK 9-1-15: por. 4, por. 5; 9-1-16: 1, por. 4, 5, 6, 9, 12, 13, 16, 18, 24, & 30; 9-2-03: por. 2, 12; 9-2-19: 1

The Estate of James Campbell ("applicant") is proposing amendments to the Ewa Development Plan (DP), relating to its proposed Kapolei Town Center development ("proposed action"). The amendments propose to modify the DP land uses for the Town Center adopted in 1986.

Because the proposed action involves a non-county initiated amendment to the City & County of Honolulu's Ewa Development Plan and will result in designations other than agriculture, conservation or preservation, the proposed action is subject to the provisions of the Environmental Impact Statement Law, Chapter 343, Hawaii Revised Statutes (HRS). The Department of General Planning ("accepting agency") has determined that an Environmental Impact Statement will be required for the proposed development. Our firm has been retained to prepare the EIS and to assist the applicant in this process.

The official EIS preparation notice for the Kapolei Town Center Development Plan Amendment was published in the March 8, 1988 issue of the Office of Environmental Quality Control (OEQC) Bulletin. A copy of that notice is enclosed. The publication in the OEQC Bulletin begins a 30-day public review period which is scheduled to end on April 7, 1988. We look forward to receiving any comments you may have concerning the proposed action within this time period.

To aid in your evaluation of potential project-related issues, we have also enclosed a more detailed preparation notice. We would appreciate your assistance in this process by reviewing the enclosed materials and: 1) Sending us your written comments or concerns relative to the proposed action; and/or, 2) Identifying an individual within your organization whom we may contact to discuss the project further. Thank you for your cooperation.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/el
Enclosures

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Kevin M. YOUNG AIA

11-4

HH&K

ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE

PROPOSED AMENDMENTS TO THE EWA DEVELOPMENT PLAN FOR THE

KAPOLEI TOWN CENTER

Ewa, Oahu, Hawaii

March 9, 1988

Prepared for:
The Estate of James Campbell

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION AND SUMMARY	1
	1.1 Introduction	1
	1.2 Development Summary	1
2.0	DESCRIPTION OF THE PROPERTY	2
	2.1 Location	2
	2.2 Project Area	2
	2.3 Physiography	5
	2.4 Soils	5
	2.5 Land Use	5
	2.6 Surrounding Developments and Development Proposals	5
3.0	DEVELOPMENT PROPOSAL	6
	3.1 Concept	6
	3.2 Master Plan Land Uses	6
	3.3 Development Timetable	9
	3.4 Approximate Cost	9
	3.5 Amendments to the Ewa DP Land Use Map	9
	3.6 Amendments to the Ewa DP Public Facilities Map	13
	3.7 Zoning Amendment	13
4.0	NEED FOR PROPOSED DEVELOPMENT	13
	4.1 Public Problem or Need	13
	4.2 Intended Market	13
	4.3 Designated Use vs. Proposed Use	16
5.0	FEDERAL, STATE AND COUNTY PLANS AND PROGRAMS INVOLVED	16
	5.1 Federal	16
	5.2 State	16
	5.3 County	17
6.0	SUMMARY OF POTENTIAL IMPACTS	17
	6.1 Demographic Impacts	17
	6.2 Economic Impacts	18
	6.3 Housing Impacts	18
	6.4 Public Services	18
	6.5 Environmental Impacts	19
7.0	DETERMINATION OF SIGNIFICANCE	19
8.0	IDENTIFICATION OF AGENCIES TO BE CONSULTED DURING PREPARATION OF EIS	20

TABLE OF CONTENTS (continued)

List of Figures

Figure No.		Page
1.	Location Map	3
2.	Tax Map	4
3.	Master Plan Land Uses	7
4.	Existing Ewa DP Land Use Map	10
5.	Proposed Changes to Ewa DP Land Use Map	11
6.	Revised Ewa DP Land Use Map	12
7.	Existing Ewa DP Public Facilities Map	14
8.	Proposed Zoning Amendments	15

List of Tables

Table No.		Page
1.	Project Area Land Use Summary	8
2.	Change to Existing DP Land Use Map	9

1.0 INTRODUCTION AND SUMMARY

1.1 Introduction

This environmental impact statement preparation notice (EISPN) was prepared pursuant to the Department of General Planning (DGP) outline entitled "Application for Development Plan Amendment and Environmental Assessment" in support of certain amendments to the Ewa Development Plan relating to the proposed Kapolei Town Center. An application to amend the Ewa Development Plan in the 1989 Annual Review was submitted to DGP by the Estate of James Campbell ("applicant") on February 23, 1988. Because the proposal described herein involves a non-county initiated amendment to the City and County of Honolulu Development Plans and will result in designations other than agriculture, conservation or preservation, the proposed action is also subject to the provisions of the Environmental Impact Statement Law, Chapter 343, Hawaii Revised Statutes (HRS) (Section 343-5 (a)(6)). Much of the information presented in this report is excerpted from an environmental assessment of the proposed Kapolei Town Center prepared for inclusion in a petition filed with the State Land Use Commission to reclassify portions of the Town Center into the State Urban District (Helber, Hastert & Kimura, Planners 1987).

Based on the scale of the proposed development, and related impacts on population and the economy, the applicant has determined that the proposed action may have a significant effect on the environment. The Department of General Planning ('accepting agency') has concurred with this determination and has filed an EISPN with the Office of Environmental Quality Control (OEQC) pursuant to Section 11-200-11 (a)(1), Administrative Rules of the Department of Health.

1.2 Development Summary

Applicant/Landowner:	The Estate of James Campbell 828 Fort Street Mall, Suite 500 Honolulu, Hawaii 96813
Consultant for EIS:	Helber, Hastert & Kimura, Planners 733 Bishop Street, Suite 2590 Honolulu, Hawaii 96816
Project Location:	Ewa, Oahu, Hawaii
Proposed Action:	Applicant Action: Applicant requests the Department of General Planning to approve proposed changes to the Ewa Development Plan Land Use Map.
Accepting Agency:	Department of General Planning
Project Area:	879 acres
Tax Map Keys:	9-1-15: por. 4, por. 5 9-1-16: 1, por. 4, 5, 6, 9, 12, 13 16, 18, 24, and 30 9-2-03: por. 2, 12 9-2-19: 1

Existing Use:	Agricultural and vacant uses
Proposed Uses:	Commercial/retail facilities, business parks, public facilities, parks, residential and mixed use developments.
State Land Use District:	Agriculture and Urban
Development Plan Designations:	Commercial, Public Facility, Medium and Low Density Apartment, Residential and Park.
Zoning:	AG-1 and AG-2

2.0 DESCRIPTION OF THE PROPERTY

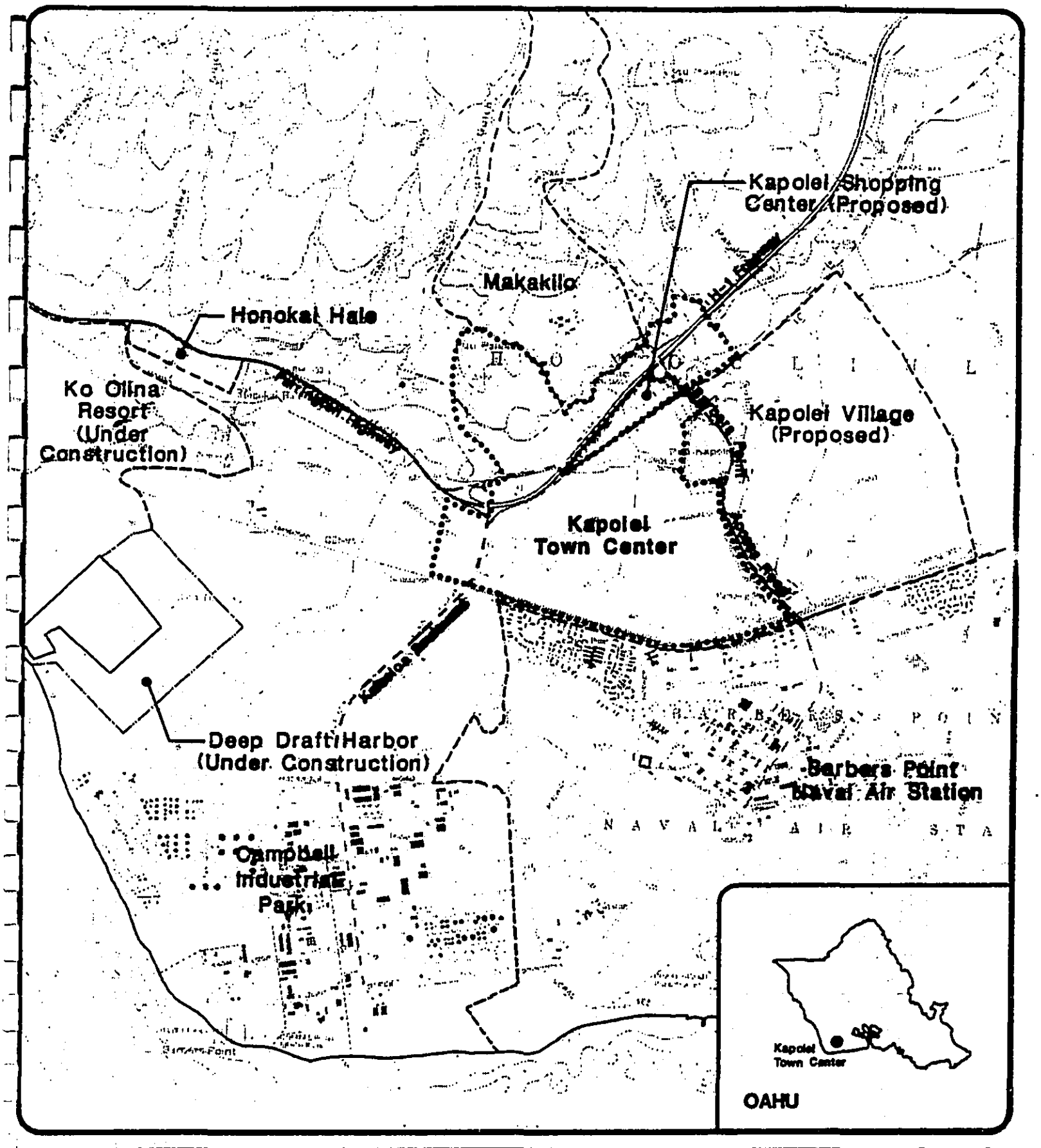
2.1 Location

The project is located within the Ewa Development Plan (DP) area of the City and County of Honolulu in an area roughly between Makakilo, Ko Olina (West Beach), Campbell Industrial Park and the Naval Air Station Barbers Point (NASBP). The area is generally bounded by the NASBP to the south, Barbers Point Access Road (also referred to as Fort Barette Road) to the east, Kalaeloa Boulevard to the west and the lower slopes of Makakilo to the north (Figure 1).

2.2 Project Area

The project area encompasses the proposed Development Plan amendment parcels and consists of approximately 879 acres. The project area generally corresponds with the 890-acre area recently submitted to the State Land Use Commission (hereinafter referred to as the "petition area") with the following exceptions: 1) approximately 80-acres of TMK 9-1-16: 4 were omitted from the project area as the developers of this parcel are now in the process of filing separate Development Plan and Zoning amendments with DGP and DLU; and, 2) where possible, tax parcel and master plan boundaries and/or existing Development Plan Land Use boundaries were used to identify project boundaries, adding approximately 69 acres.

The project area consists of six separate parcels (Figure 2). The largest parcel comprises an area of approximately 569 acres and is generally referred to as the Kapolei Town Center. This parcel is bounded by Kalaeloa Boulevard to the west, NASBP to the south, Barbers Point Access Road and Puu Kapolei to the east and the Farrington Highway/H-1 Freeway corridor to the north. The second largest parcel located north of the H-1 Freeway is approximately 210 acres in size and includes the cinder cone known as Puu Palailai. A third parcel within the project area is approximately 35 acres in size and is located west of and adjacent to Kalaeloa Boulevard. The western boundary of this parcel is coterminous with the eastern boundary of the Ko Olina option area. The fourth parcel is 13 acres in size and is located adjacent to and east of the Palailai Interchange, between Farrington Highway and the H-1 Freeway. The fifth parcel is 25 acres in size and is located in the northeastern quadrant of the Makakilo Drive/H-1 Freeway Interchange. The sixth parcel of 26 acres, is located in the southeastern quadrant of the same interchange with the southern boundary lying along Farrington Highway and the eastern boundary coterminous with the proposed Kapolei Knolls residential community being proposed by the Lusk Company.



LOCATION MAP

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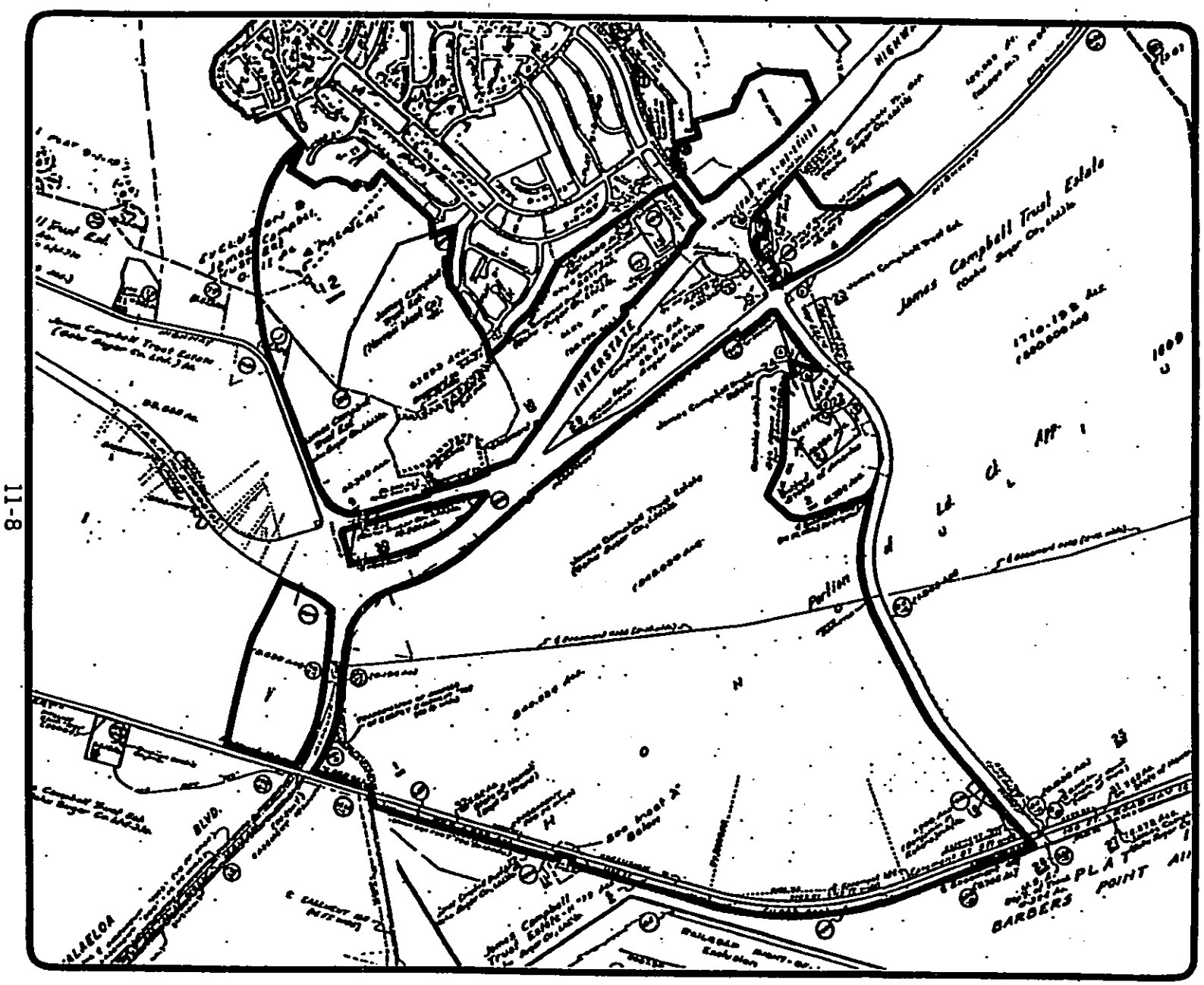
Figure: 1

THE ESTATE OF JAMES CAMPBELL

HELBER, HASTERT & KIMURA PLANNERS



THE ESTATE OF JAMES CAMPBELL

Figure: 2
TAX MAP

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Feet

HELBER, HASTERT & KIMURA

2.3 Physiography

The 879-acre project area is gently sloping with average slopes ranging between zero and three percent. Some local slope conditions exceed twenty percent. Ground elevations within the project area range from 50 feet above mean sea level (MSL) near the OR&L right-of-way passing through the site adjacent to the southern or makai boundary, to 492 feet MSL at Puu Palailai. Puu Kapolei (166 feet MSL) anchors the eastern edge of the project area.

2.4 Soils

Much of the project area is located on a relatively level coralline/alluvial plain with a variety of soil types including coral deposits in the flat lands, silty clays, and stoney steep lands. The predominant soils are in the Honouliuli and Mamala series. The Honouliuli series (principally Honouliuli clay, 0 to 2 percent slopes) consists of well drained soils on the coastal plains which are developed from alluvium from basic igneous rock. The Mamala soil series (principally Mamala stony silty clay loam, 0 to 12 percent slopes) consists of shallow, well drained soils along coastal plains formed in alluvium deposited over coral limestone and consolidated calcareous sand.

2.5 Land Use

Agriculture. Approximately two-thirds of the project area is presently under sugarcane cultivation and farmed by the Oahu Sugar Company (OSCO). The cultivated area is roughly contained south of Farrington Highway. In approximately two year cycles, OSCO harvests fields in the area and hauls the raw cane to its mill in Waipahu for processing. OSCO maintains an agricultural irrigation and roadway system within the project area to facilitate its farming operations. Waimanalo Road, a major agricultural road maintained by OSCO, bisects the triangular shaped Town Center parcel in an east to west direction.

Landfill. The Palailai Sanitary Landfill operated by Grace Pacific Corporation is located within Puu Palailai. Landfill operations are expected to cease in the near future as the landfill reaches capacity in the next few years.

Satellite Earth Station. The American Satellite Company maintains a single satellite dish antenna and small masonry block equipment building at the base of Puu Palailai facing the Palailai Interchange. The site is leased from the applicant.

2.6 Surrounding Developments and Development Proposals

The 30-acre site of the proposed Kapolei Shopping Center is located directly north of the proposed Town Center, separated from the Town Center by Farrington Highway. The 22 year old residential community of Makakilo is located upslope from this area. The 3,700-acre Naval Air Station Barbers Point is located immediately south of the project area. The 2,400 acre Campbell Industrial Park is located to the southwest of the project site. The master-planned 970-acre Ko Olina resort/residential community is located immediately to the west of the project area. Between Ko Olina and Campbell Industrial Park, to the west of the project area, lies the 330-acre (ultimate size) Barbers Point Harbor.

Immediately to the northeast of the site, sandwiched between Farrington Highway and the H-1 Freeway lies the 80-acre site of the proposed Kapolei Knolls residential community now being proposed by the Lusk Company. The development proposal

includes the construction of 500 single-family residential homes. To the east of the site, south of Kapolei Knolls lies the proposed 830-acre Kapolei Village Residential Community being developed by the State Housing Finance and Development Corporation (HFDC). Development plans for the area call for the construction of 4,871 homes (most of which will be sold in the "affordable" range, two elementary schools, one intermediate and one high school, and a municipal golf course.

3.0 DEVELOPMENT PROPOSAL

3.1 Concept

The overall concept for the development proposal is rooted in the Honolulu General Plan objectives and policies concerning the development "...of a secondary urban center in the West Beach-Makakilo area..." (General Plan 1982:19). Specifically, the applicant proposes to develop or assist in the development of the project area to provide the major nucleus for economic activities within the Ewa Plain.

3.2 Master Plan Land Uses

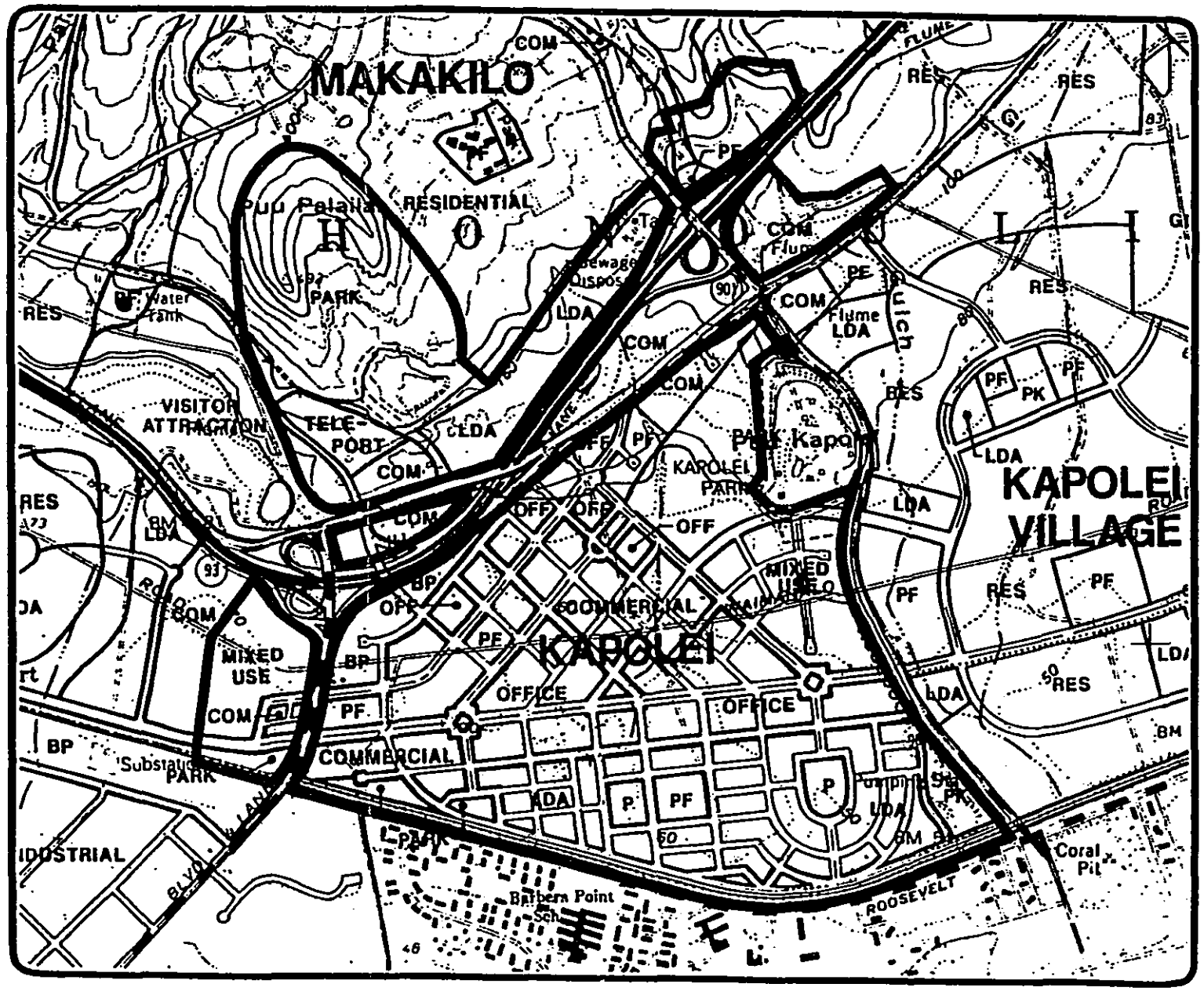
The master plan land use map presented on the following page (Figure 3) is based on the master plan for the area prepared by Pereira Associates in 1986 (see Section 4.3). A review of the major proposed land uses within the project area is presented below.

Kapolei Town Center. The 569-acre Town Center is bounded by Barbers Point Access Road to the east, NASBP to the south, Kalaeloa Boulevard to the west, and the H-1 Freeway/Farrington Highway corridor to the north. The Town Center is conceived as being the nucleus of the Ewa secondary urban center. It is designed as an urban place, organized by a city grid directed towards views of locally prominent puus. The predominant land uses within the Town Center are for commercial, office and public facilities located in the northern two-thirds of the triangle-shaped area.[1] A 50-acre regional park is proposed to the west of and adjacent to the existing Puu Kapolei Park. Low-density apartment uses are sited in the southern third of the Town Center, south of the proposed Ewa Parkway and north of the adjacent Naval Air Station Barbers Point. An 6-acre elementary school and 4-acre neighborhood park are also proposed for this area.

West of Town Center. A 35-acre mixed-use area is located adjacent to and west of Kalaeloa Boulevard. This site could accommodate a post-secondary West Oahu educational facility. The site offers excellent accessibility to major thoroughfares and would be in walking distance of the Town Center.

North of Town Center. A 10-acre teleport facility reserved for earth stations and associated telecommunication-related uses is located at the base of the Puu Palailai. Adjacent to the teleport is the Palailai Regional Park, proposed for development on reclaimed land when the existing Palailai landfilling operations cease. Other commercial uses are sited along both sides of Farrington Highway near the Palailai Interchange. Between these commercial uses and the Makakilo Interchange, mauka of Farrington Highway and the H-1 Freeway, is an area reserved for low-density apartment uses. Directly east of the Makakilo Interchange lies a 5-acre area

1. Public Facilities refer to regional government offices and typical municipal services such as police and fire stations and libraries.



THE ESTATE OF JAMES CAMPBELL

Figure: 3

MASTER PLAN LAND USES

0 1000 Feet

HELBER, HASTERT & KIMURA

designated as public facility which will be used as the site for a community church. To the east of the church site lies a 20-acre area designated for residential uses.

East of the Town Center. East of and adjacent to Makakilo Drive, between the H-1 Freeway and Farrington Highway lies a 26-acre parcel identified for commercial uses.

A total of 1,708 dwelling units are identified within the project area in three separate residential areas. The master plan prepared by Pereira Associates identified a 110-acre area below the Ewa Parkway for residential uses. Based on an average density of 10 units per net acre, a total of 1,108 homes were identified for this area. An additional 470 homes are identified on a 50-acre site located in the lower Makakilo area, adjacent to the H-1 Freeway, between Palailai and Makakilo Interchanges. The 20-acre area east of Makakilo Interchange is basically an expansion of the existing Makakilo community and was not included in the Pereira analysis. Assuming slightly reduced residential densities, this area would accommodate 130 additional homes.

Table 1 presents a summary of the project area land uses.

Table 1: PROJECT AREA LAND USE SUMMARY

Land Use	Acres	Percent of Site	Dwelling Units
Residential	20	2%	130
Low Density Apt.	172	20%	1,578
Commercial	117	13%	
Office	101	11%	
Mixed Use	73	8%	
Light Industrial	23	3%	
Park	191	22%	
Public Facility	51	6%	
Circulation/Open Space	131	15%	
TOTAL	879	100%	1,708

Park and residential uses account for almost half of the project area (22 percent each). The next-most extensive land use is circulation and open space (15 percent). Commercial uses follow accounting for approximately 13 percent, consistent with the development concept of providing a major employment center and nucleus of the secondary urban center. Office uses account for approximately 11 percent of the project area. Mixed Uses, reserved for a mix of possible post-secondary educational facilities and commercial activities, comprise approximately 8 percent of the site. Public facilities consisting of various government/civic uses including administrative offices, police and fire stations, elementary school and other municipal services occupy approximately 6 percent of the project area. Finally, Business Park/Light Industrial Uses account for 3 percent of the project area.

3.3 Development Timetable

The applicant intends to develop the entire project area over the next 20 to 40 year period, subject to market demands and economic conditions. The applicant intends to proceed with zoning and subdivision approvals of a 95-acre parcel within the Town Center Area upon acceptance of the Final EIS. Subsequent rezoning requests will be forthcoming pending final approvals of the State Land Use Commission.

3.4 Approximate Cost

Estimates of major off- and on-site infrastructure improvements have been made for the project area. Major off-site improvements analyzed included pro-rata shares of increasing the size of the Ko Olina interceptor sewer and the installation of a new water line along Farrington Highway. Total offsite infrastructure costs are estimated at $3.1 million. Onsite costs include site clearing, drainage, landscaping, roadways, sewer, water, electrical, telephone, street lighting, and Cable TV. Estimated onsite infrastructure costs are $35.9 million.

3.5 Amendments to the Ewa Development Plan Land Use Map

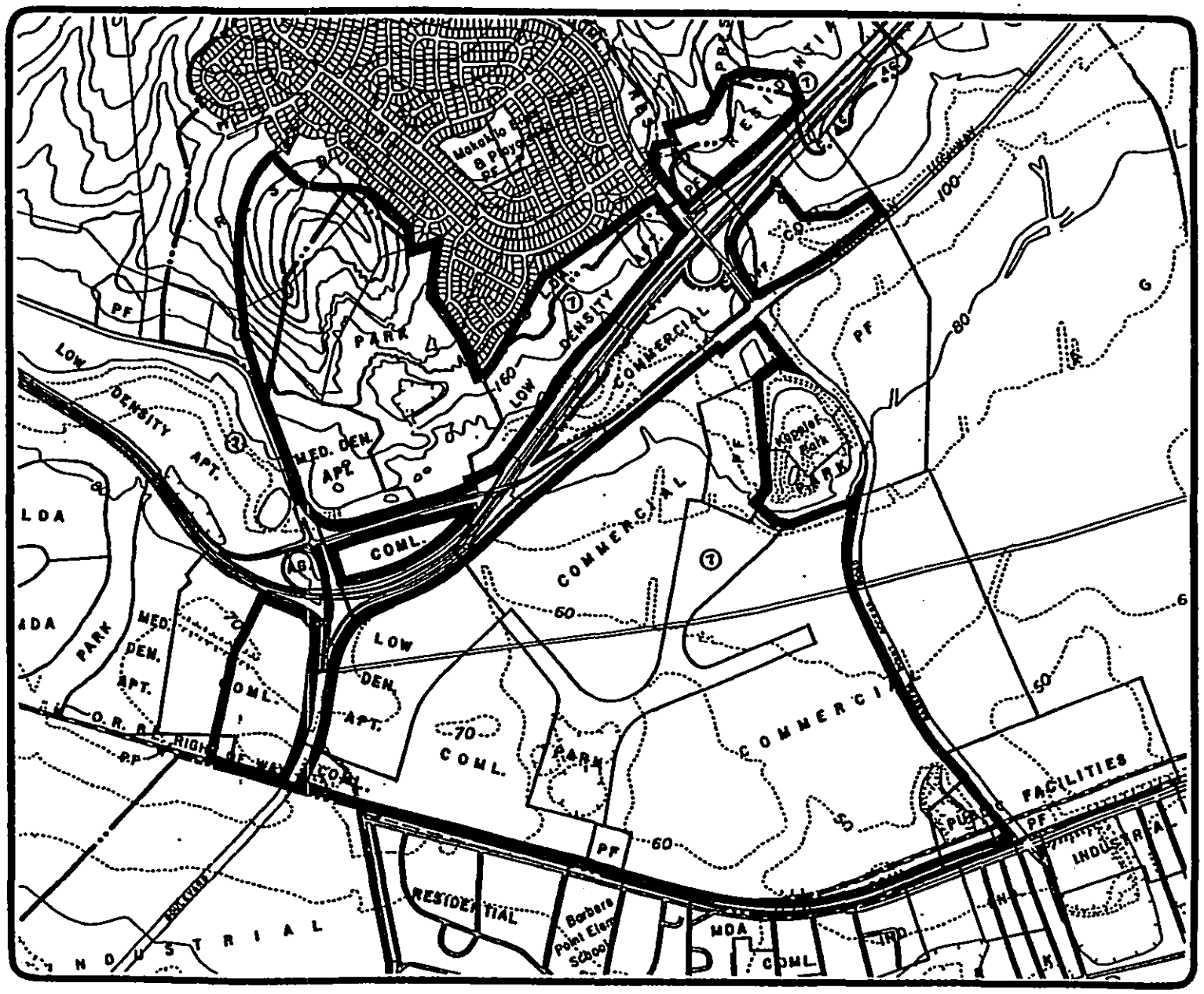
Proposed amendments to the DP Land Use map within the project area comprise a number of separate parcels. Figure 4 presents the existing Ewa DP Land Use map for the project area. Figure 5 identifies those areas of the DP map to be changed. Figure 6 presents a revised DP Land Use map with proposed revisions incorporated. Table 2 below presents summary information regarding the net effect of the proposed changes on the present DP land use pattern represented in Figure 4.

Table 2: CHANGES TO PRESENT DP LAND USE
(acres)

DP Land Use Category	Existing	Proposed	Net Change
Residential	53	20	-33
Low-Density Apt.	103	219	+116
Medium-Density Apt.	30	0	-30
Commercial	493	452	-41
Park	159	163	+4
Public Facility	41	25	-16
TOTAL	879	879	0

As can be seen from the information provided above, net losses in residential, medium-density apartment, commercial and public facility uses are offset by net gains in low-density apartments, and park uses. The major net change is from residential (loss of 33 acres) and commercial (loss of 41 acres) to low-density apartment uses (net gain of 116 acres).

The proposed amendments do not significantly alter the residential capacity of the Ewa DP area. To assess the impact of the proposed DP changes on existing residential capacity, maximum residential capacities allowable within the Ewa DP (Residential, 12 units/acre; Low-Density Apt., 30 units/acre; and, Medium-Density Apt, 90 units/acre) were assigned to existing and proposed acreages identified in

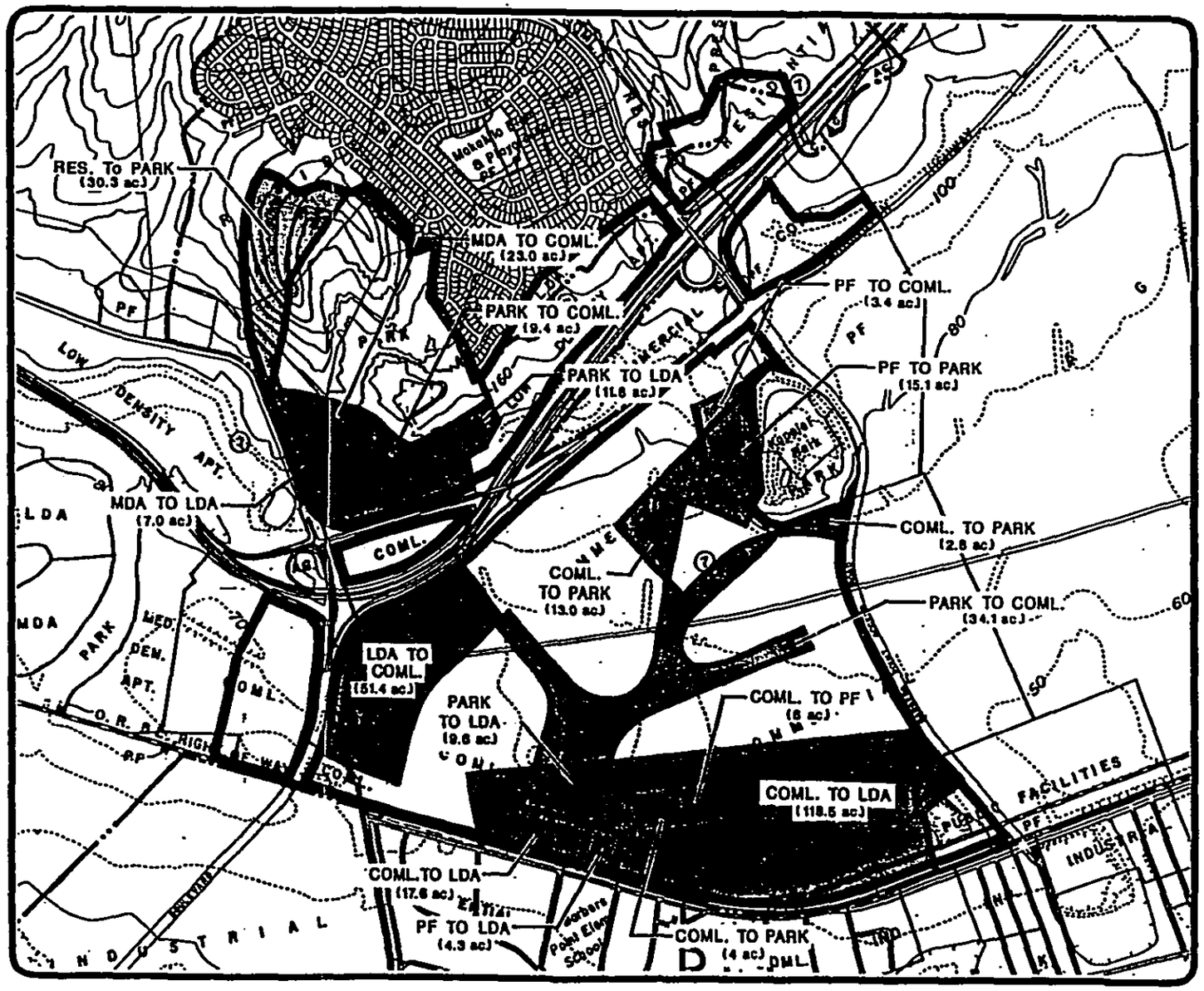


THE ESTATE OF
JAMES CAMPBELL

Figure: 4

EXISTING EWA DP LAND USE MAP

HELBER, HASTERT & KIMURA

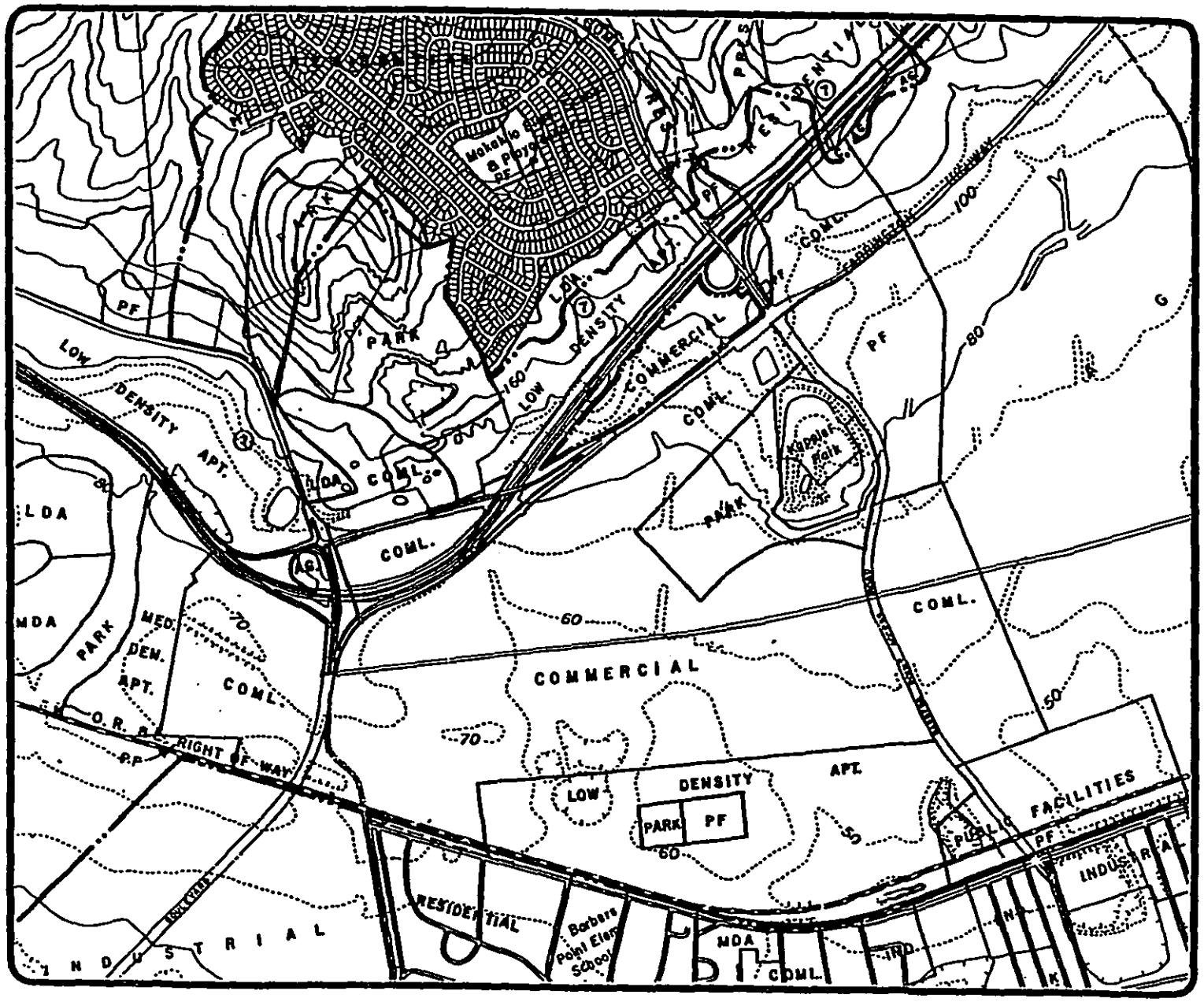


THE ESTATE OF
JAMES CAMPBELL

Figure: 5

PROPOSED CHANGES TO THE EWA DP LAND USE MAP

HELBER, HASTERT & KIMURA



THE ESTATE OF
JAMES CAMPBELL

Figure: 6

REVISED EWA DP LAND USE MAP

0 1000
Feet

HELBER, HASTERT & KIMURA PLANNERS

Table 2. The analysis indicates a gain of 640 dwelling units (10 percent increase) over existing capacity. Average residential density decreased slightly from 34.55 dwelling units/acre to 29.15/acre. The decrease in density is attributable to the redesignation of the relatively high density (90/acre) 30-acre MDA parcel adjacent to Puu Palailai to LDA and Commercial uses.

Based on the analysis presented above, the proposed changes to the present Ewa DP land use pattern do not constitute a significant change.

3.6 Amendments to the Ewa Development Plan Public Facilities Map

Figure 7 presents the existing Ewa DP Public Facilities map for the project area. A number of changes to the map will be required to implement the proposed land use changes. Specifically, major project roads, water and sewer lines required to support the proposed land use changes will have to be incorporated into a revised Public Facilities map. These and any other changes identified during the forthcoming EIS process will be the subject of a comprehensive Public Facilities Map amendment to be submitted after the EIS process is completed. As a relatively minor matter, based on a preliminary review, DGP has recommended that the combination 6 acre elementary school/4 acre park site, proposed in the low-density apartment area to the south of the Ewa Parkway, be represented on the DP Land Use map, notwithstanding the fact that the precise location of the two facilities is still subject to change.

3.7 Zoning Amendment

Upon acceptance of the Final EIS, the applicant will be submitting an application to the Department of Land Utilization (DLU) for the rezoning of a 95-acre parcel currently designated on the DP Land Use map as Commercial.[2] The rezoning request is also contingent upon the reclassification (Agriculture to Urban) of the 135-acre first increment of the Town Center by the State Land Use Commission. Specifically, the change of zone application will request the redesignation of the entire 95-acre site (Figure 8) from the current zoning, Restricted Agriculture District (AG-1), to the Community Business District (B-2). The parcel to be rezoned is bounded by Farrington Highway to the north, Barbers Point Access Road and Puu Kapolei to the east, and Waimanalo Road to the south. The western boundary is coterminus with the underlying DP Commercial boundary.

4.0 NEED FOR PROPOSED DEVELOPMENT

4.1 Public Problem or Need

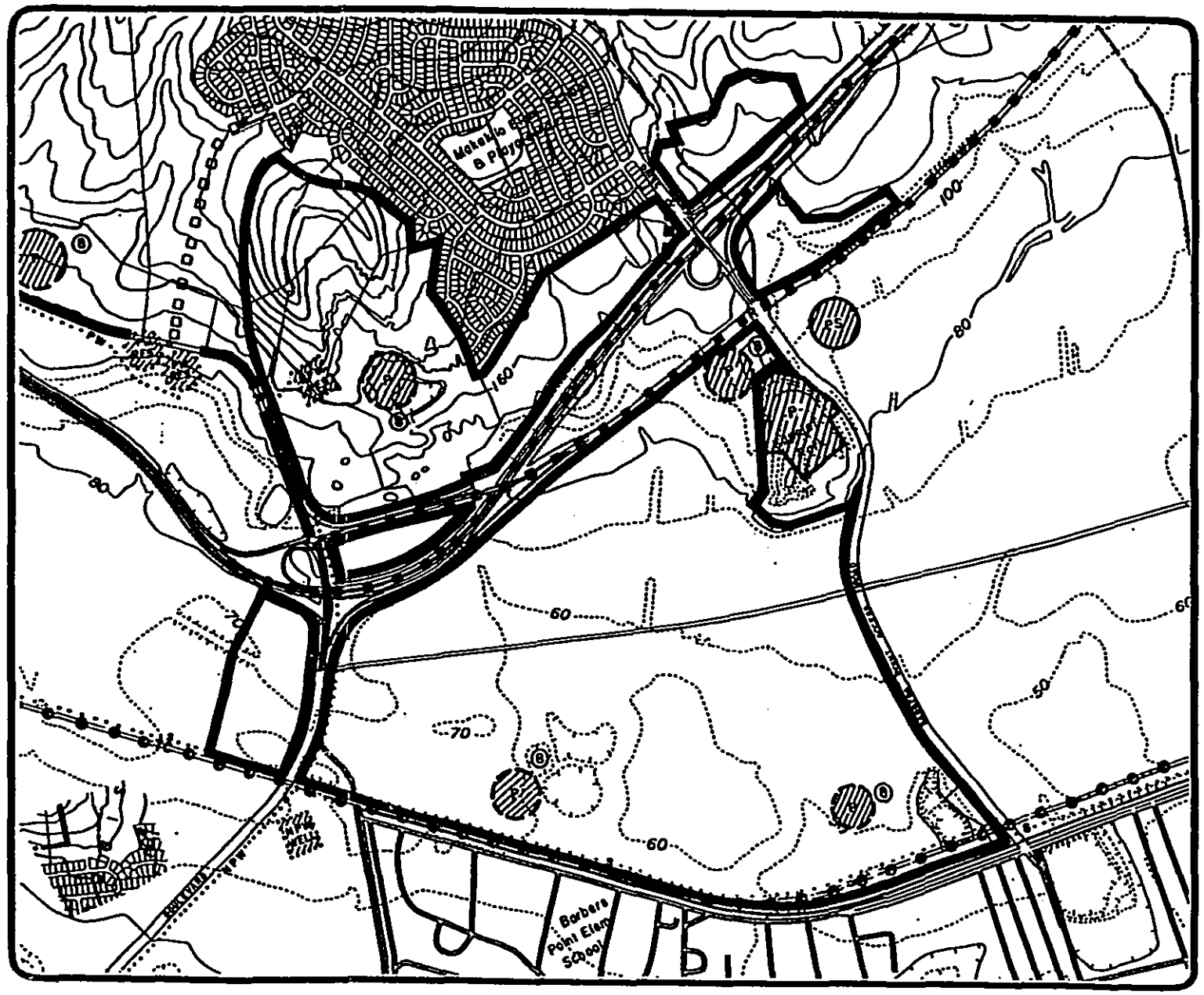
A review of State and County growth policies indicates a significant public need for the development of a secondary urban center in Ewa. The development of the Kapolei Town Center as proposed herein represents the urban nucleus of the secondary urban center.

4.2 Intended Market

Market studies completed for the Town Center support the indicated land use changes proposed within the project area. The Town Center is a complex urban area

2. A small (2.7 acre) portion of the 95-acre zoning parcel is presently designated as "Public Facility" on the DP Land Use map.

11-15

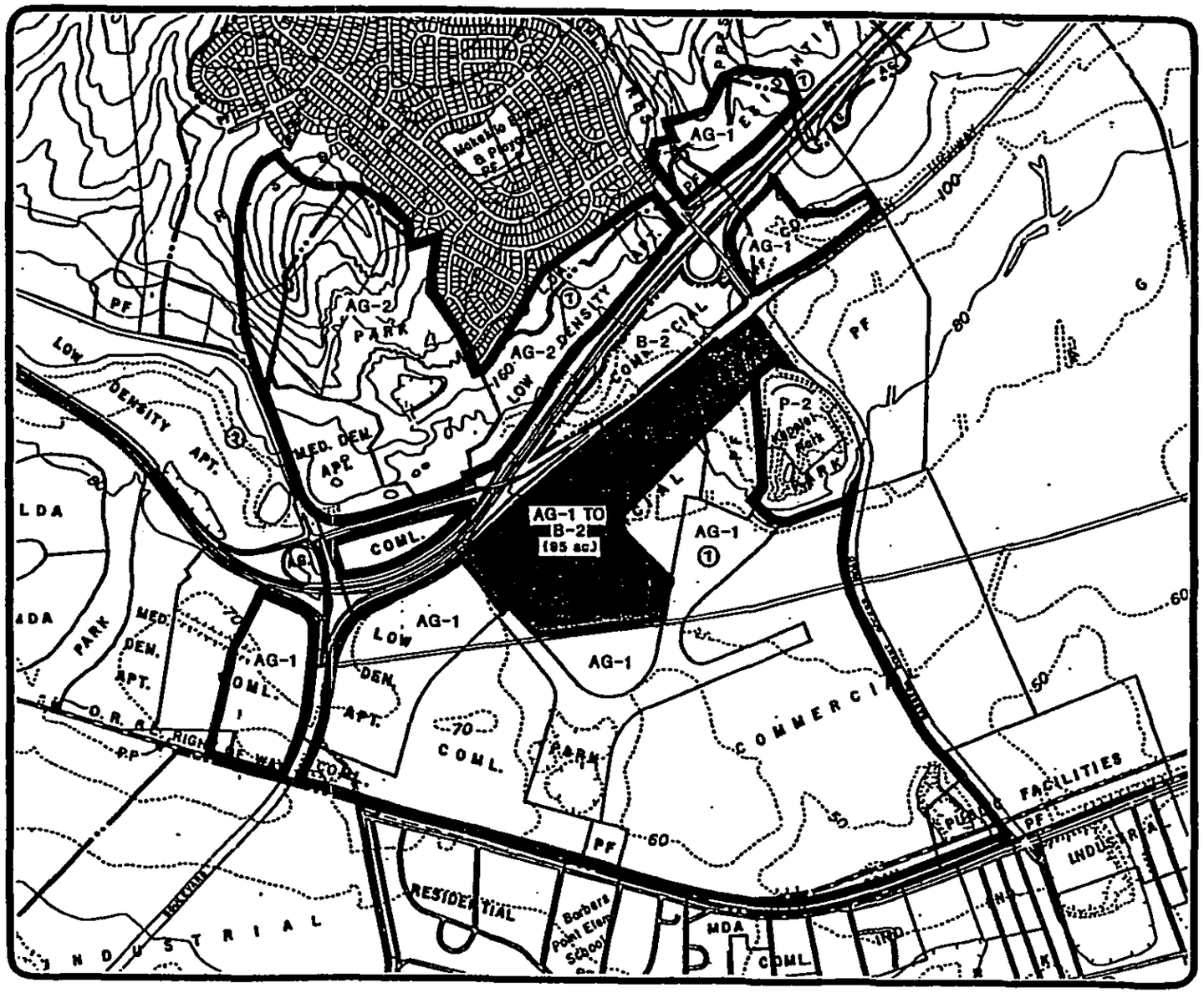


THE ESTATE OF
JAMES CAMPBELL

Figure: 7

EXISTING EWA DP PUBLIC FACILITIES MAP

HELBER, HASTERT & KIMURA



THE ESTATE OF JAMES CAMPBELL

Figure: 8

PROPOSED ZONING AMENDMENT

0 1000 Feet

HELBER, HASTERT & KIMURA

with multiple land uses which will provide areas for living, relaxing and working for present and prospective residents of Oahu. The "intended market" of the Town Center is thus islandwide and transcends conventional market boundaries. Public and private employers will find new locations for their respective operations. Employees will be attracted to new job opportunities in a compact, master-planned urban environment. Recreation-seekers will find parks and pleasant urban settings to fulfill recreation needs. Prospective residents will find attractive, affordable residential accommodations in close proximity to work and recreational opportunities.

4.3 Designated Use vs. Proposed Use

The present Development Plan land use pattern (Figure 4) within the project area was first proposed in two applications submitted to DGP by the applicant during the 1985/86 Annual Development Plan Review cycle (Helber, Hastert & Kimura, Planners February and June 1985). The proposed land use changes were later adopted by the Honolulu City Council in March 1986 as reflected in the present Development Plan Land Use map (Figure 4). The 1985 applications were based on a Master Plan for the area prepared by Helber, Hastert & Kimura, Planners (HH&K) in 1984. A major element of the 1984 Master Plan was a "Central Business District" with "... an intensively developed mixture of office space, high density residential development, specialty retailing, and recreational facilities, all tied together with a series of pedestrian open spaces and a multi-modal vehicular circulation network" (HH&K June 1985).

In 1986, the applicant commissioned the planning firm of Pereira Associates and the market research firm of Kenneth Leventhal & Company to reevaluate and update the 1984 Master Plan. What emerged later in 1986 was a revised urban design for the Central Business District (renamed "Kapolei" in deference to the major physiographic feature, Puu Kapolei) and a detailed implementation plan. Basic design elements included the introduction of a rectilinear street system oriented towards major physiographic features, a major development axis located along a proposed east/west regional parkway ("Ewa Parkway") bisecting the town center, and the introduction of a regional park adjacent to Puu Kapolei. The Leventhal market studies conducted in conjunction with the Pereira planning effort essentially supported the overall development program.

5.0 FEDERAL, STATE AND COUNTY PLANS AND PROGRAMS INVOLVED

5.1 Federal Plans and Programs

No federal plans or programs are known to be affected by the proposed action.

5.2 State Plans and Programs

Hawaii State Plan and State Functional Plans. The environmental assessment prepared by the applicant accompanying the petition to reclassify the Town Center site into the State Urban district reviewed the Hawaii State Plan and related State Functional Plan and found that the proposed action is fundamentally supported by these plans.

State Land Use Law. The majority of the project area (c. 830-acres or 94 percent) is currently within the State Agriculture district. The balance of approximately 49-acres is currently within the Urban district (Palailai and lower Makakilo area). In

June 1987, the applicant submitted a revised Master Plan for the area to the State Land Use Commission as part of an environmental assessment (HH&K June 1987) prepared to accompany its petition to reclassify 890-acres from the State Agriculture district to the Urban district. The petition requested the Commission to approve the entire 890-acre petition area in concept and reclassify the 135-acre first increment to the Urban district, consistent with the provisions of incremental districting. The land Use Commission is presently considering the petition request.

5.3 County Plans and Programs

Honolulu General Plan. The General Plan supports the development of the project area as proposed. A fundamental growth policy of the General Plan is to "...develop a secondary urban center in the West Beach-Makakilo area" (Policy 2, Population Objectives and Policies). Other objectives and policies in the General Plan "promote employment opportunities... " (Objective A, Economic Activity) and the "...development of a major residential, commercial and employment center within the secondary urban center" (Objective C, Physical Development and Urban Design).

Development Plans. The Development Plans generally support the development of the project area as proposed. The area description found in the Special Provisions for Ewa notes in part: "A new secondary urban center shall be gradually developed in the West Beach-Makakilo area in order to accommodate most of the expected influx of population into the area between 1980 and 2000." The Ewa DP Land Use map currently indicates a city-center-like land use pattern within the project area. The proposed changes are viewed as a refinement of the existing land use pattern, rather than as a fundamental or significant change. Amendments to the Ewa DP Public Facilities map will be forthcoming based on information generated during the EIS process.

Zoning. Current zoning for the project area is limited to Restricted Agriculture (AG-1) and General Agriculture (AG-2). Upon acceptance of the Final EIS and final action of the State Land Use Commission on reclassifying a portion of the project area to the Urban district, the applicant will submit a change of zone application to DLU to rezone a 95-acre site near the center of Kapolei Town Center from AG-1 to Community Business District (B-2) (See Figure 8). Subsequent change of zone applications will be submitted for other areas within the project area as market demands and economic conditions warrant.

6.0 SUMMARY OF POTENTIAL IMPACTS

The summary of potential impacts presented below is excerpted from the Kapolei Town Center Environmental Assessment (HH&K June 1987).

6.1 Demographic Impacts

The population within the Ewa DP area is projected to grow rapidly from 36,845 residents in 1985 to 83,906 residents in 2005 (DGP 1987). Many of these residents will be attracted to the Ewa area because of job opportunities offered within the project area. Thus, the proposed action represents a significant contribution to the residential growth of the Ewa DP region over the next twenty years.

6.2 Economic Impacts

As noted, the Ewa area is planned to undergo a relatively rapid growth-cycle over the next twenty-year period as it becomes Oahu's secondary urban center. The Kapolei Town Center within the project area will become region's major employment center.

A major impact associated with the proposed action is the significant increase of job opportunities related to the development of the Town Center. Market study projection conducted for the Kapolei Town Center indicate that job opportunities within the Ewa area are expected to increase by 600 percent over the next twenty year period. The Town Center will become the major employment center within the region by 2005 providing an estimated 12,500 jobs, representing almost 50 percent of the Ewa-area employment base. The applicant is cognizant of the potential dislocative effects of rapid employment growth and is participating in a program to mitigate potentially adverse social impacts that could occur as a result of rapid employment growth.

6.3 Housing Impacts

Official projection estimate a trebling of the Ewa area housing stock over the next twenty years (DGP 1987). As discussed in Section 3.2, a total of 1,708 low-density apartments and residential homes are proposed for the project area. As noted in Section 3.5, the proposed amendments discussed herein will not significantly alter the residential capacity of the Ewa DP or significantly alter established residential densities.

6.4 Public Services

The General Plan policies of developing a true urban center in Ewa is a long-range goal and one that will require a public/private partnership of unprecedented proportions. The proposed action will create additional demands on public infrastructure, facilities and services. A thorough review of all public services and facilities affected by the proposed development will be presented in the EIS. A brief revue of major facility systems is presented below.

Water. The entire project area is part of a regional water master plan (Ewa Water Master Plan, August 1987) approved by the Honolulu Board of Water Supply (BWS) in October 1987. A more detailed water master plan for the Town Center will be submitted for BWS approval in the near future.

The project area will utilize a dual water system with potable water utilized inside residential areas, and commercial and business structures. Non-potable water pumped from the underlying limestone aquifer will be used for irrigation purposes wherever possible. Average potable daily demand for the project area is estimated at 3.865 mgd with average daily non-potable water demands estimated at 0.8188 mgd.[3]

Sewer. A sewerage master plan is now being prepared for the project area and will be submitted to the Department of Public Works in the near future. Total average wastewater flows for the project area are estimated at 3.46 mgd with total peak flows estimated at 15.28 mgd.

Drainage. A drainage master plan for the area has been submitted to the Department of Public Works for approval.

Traffic. Proposed development within the Ewa area, including the proposed action, will increase traffic congestion. Mitigation measures including the use of transportation system management strategies, development of park & ride facilities and contra-flow lanes, and the construction of the Ewa Parkway between the Kapolei Town Center and Ewa Marina will be sufficient to mitigate adverse impacts.

6.5 Environmental Impacts

Air Quality. The growth of vehicular activity resulting from the development of the project area will not result in the impairment of existing ambient air quality levels, provided programmed roadway improvements are developed in a timely manner.

Agriculture. Approximately two-thirds of the project area is under sugarcane cultivation and farmed by the Oahu Sugar Company (OSCO). Studies prepared for the applicant and other public and private developers in the Ewa area indicate that a phased withdrawal of cultivated lands will not adversely affect the economic viability of OSCO. Study results also show that the cumulative development of the Ewa Plain will not adversely impact the growth of the diversified agricultural industry. The development of the project area will reduce the amount of "important agricultural lands" as identified by the Land Evaluation and Site Assessment Commission.

Aircraft Noise. The applicant has studied the probable impacts of aircraft noise on proposed land uses within the project area. Findings from these and other independent investigations indicate that the proposed land uses within the project area are compatible with the existing noise environment.

Flora and Fauna. No protected or endangered biota are known to exist within the project area.

Historic and Archaeological Resources. No significant historic or archaeological resources have been identified within the project site.

Hydrology. Most of the project area is located over relatively impermeable caprock, therefore development of the site will not have a significant impact on groundwater recharge.

Land Use. The proposed action will commit the project area to urban uses.

7.0 DETERMINATION OF SIGNIFICANCE

Based on the scale of the proposed development, and related impacts on population and the economy, the applicant has determined that the proposed action may have a significant effect on the environment. The Department of General Planning has concurred with this determination and has filed an environmental impact statement preparation notice (EISPN) with the Office of Environmental Quality Control

3. Figures quoted for water and wastewater demands are from the "Kapolei Town Center Environmental Assessment" (HH&K 1987) submitted to State Land Use Commission in June 1987. Changes to area boundaries and resultant modifications to overall land use may alter estimated demand figures. A further discussion will be presented in the EIS.

11-19

(OEQC) pursuant to Section 11-200-11 (a)(1), Administrative Rules of the Department of Health.

8.0 IDENTIFICATION OF AGENCIES TO BE CONSULTED IN PREPARATION OF ENVIRONMENTAL IMPACT STATEMENT

The following agencies and organizations will be consulted in the preparation of the EIS.

Federal Agencies

Department of Agriculture, Soil and Conservation Service
Department of the Army, U.S. Army Engineer District, Honolulu
Department of the Navy, Naval Base Pearl Harbor
Department of Navy, Naval Air Station Barbers Point
Department of the Interior, Fish and Wildlife Service
Department of Transportation,
  Federal Aviation Administration, Airports District Office

State Agencies

Department of Accounting and General Services
Department of Agriculture
Department of Education
Department of Health
Department of Land and Natural Resources
Department of Business and Economic Development
Department of Transportation
Office of State Planning
Office of Environmental Quality Control
Land Use Commission
Historic Preservation Office
University of Hawaii,
  Water Resources Research Center
  Environmental Center
Oahu Metropolitan Planning Organization

County Agencies and Boards

Department of General Planning
Department of Housing and Community Development
Department of Land Utilization
Department of Parks and Recreation
Department of Public Works
Department of Transportation Services
Board of Water Supply
Fire Department
Police Department

Public Utilities

Hawaiian Telephone Company
Hawaiian Electric Company

Neighborhood Boards, Community Associations

Ewa Neighborhood Board No. 23
Ewa Beach Community Association
Ewa Housing Foundation
Ewa Coordinating Committee
Honokai Hale/Nanakai Gardens Community Association
Makakilo Community Association
Waianae Coast Neighborhood Board No. 24

Islandwide Organizations

Hawaii's Thousand Friends
Land Use Research Foundation
League of Women Voters
Outdoor Circle

Other

Oahu Sugar Company, Ltd.

465 SOUTH KING STREET · KEKUANAOA BUILDING, #104 · HONOLULU, HAWAII 96813 · TELEPHONE (808) 548-6915

OEQC BULLETIN

OFFICE OF ENVIRONMENTAL QUALITY CONTROL

JOHN WAIHEE
GOVERNOR

MARVIN T. MIURA, Ph.D.
DIRECTOR

Volume V | March 8, 1988 | No. 5

REGISTER OF CHAPTER 343, HRS DOCUMENTS

****

All Chapter 343, HRS documents submitted for publication in the OEQC Bulletin must be addressed to the Office of Environmental Quality Control, 465 South King Street, Room 104, Honolulu, Hawaii 96813. Documents addressed otherwise will not be considered for publication.

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EIS PREPARATION NOTICE

The following proposed action has been determined to require an environmental impact statement. Anyone can be consulted in the preparation of the EIS by writing to the listed contact. 30 days are allowed for requests to be a consulted party.

EWA DEVELOPMENT PLAN AMENDMENT FOR KAPOLEI TOWN CENTER DEVELOPMENT, EWA, OAHU, The Estate of James Campbell/City and County of Honolulu Dept. of General Planning

The applicant is requesting that the Dept. of General Planning approve changes to the Ewa Development Plan Land Use Map from Commercial, Public Facility, Low and Medium Density Apartment, Residential and Park use to Commercial, Low Density Apartment, Public Facility and Park use for the proposed Kapolei Town Center Development. A total of 1,708 dwelling units are planned in 3 separate residential areas. The project is located within the Ewa Development Plan area of the City and County of Honolulu in an area roughly between Makakilo, Ko Olina (West Beach), Campbell Industrial Park and the Naval Air Station Barbers Point (NASBP). The area is generally bounded by the NASBP to the south, Barbers Point Access Rd. (also referred to as Fort Barette Rd.) to the east, Kalaeloa Blvd. to the west and the lower slopes of Makakilo to the north. The project consists of six separate parcels (TMK: 9-1-15:por. 4, por. 5; 9-1-16:1, por. 4, 5, 6, 9, 12, 13, 16, 18, 24 and 30; 9-2-03:por. 2, 12 and 9-2-19:1) totaling 886 acres. The largest parcel comprises an area of approx. 569 acres and is generally referred to as the Kapolei Town Center. This parcel is bounded by Kalaeloa Blvd. to the west, NASBP to the south, Barbers Point Access Rd. and Puu Kapolei to the east and the Farrington Hwy./H-1 Freeway corridor to the north. The second largest parcel located north of the H-1 Freeway is approx. 217 acres in size and includes the cinder cone known as Puu Palailai. A third parcel within the project area is approx. 35 acres in size and is located west of and adjacent to Kalaeloa Blvd. The western boundary of this parcel is coterminous with the eastern boundary of the Ko Olina option area. The fourth parcel is 13 acres in size and is located

adjacent to and east of the Palailai Interchange, between Farrington Hwy. and the H-1 Freeway. The fifth parcel is 25 acres in size and is located in the northeastern quadrant of the Makakilo Dr./H-1 Freeway interchange. The sixth parcel of 26 acres, is located in the southeastern quadrant of the same interchange with the southern boundary lying along Farrington Hwy. and the eastern boundary coterminous with the proposed Kapolei Knolls residential community being proposed by the Lusk Co.

Contact: Mr. Tom Fee, Project Planner
Helber, Hastert & Kimura, Planners
733 Bishop St., Suite 2590
Honolulu, HI 96813

Deadline: April 7, 1988.

NEGATIVE DECLARATIONS

The following are Negative Declarations or determinations made by proposing or approving agencies that certain proposed actions will not have significant effects on the environment and therefore do not require EISs (EIS Rules 11-200-11). Publication in the Bulletin of a Negative Declaration initiates a 60-day period during which litigation measures may be instituted. Copies are available at 25 cents per page upon request to the Office. Parties wishing to comment may submit written comments to the agency responsible for the determination (indicated in project title). The Office would appreciate a copy of your comments.

KAUAI

HOUSEHOLD TOXIC WASTE PICKUP AND DISPOSAL, PUHI, KAUAI, Office of Environmental Quality Control

The Office of Environmental Quality Control (OEQC) proposes to conduct a public education campaign on Household Hazardous Waste that will culminate in a one-day collection. The household hazardous waste collection will be held on March 26, 1988 at the C. Brewer Chemical Co. facility in Puhi, Kauai. The goals of the project are to increase general public awareness of the hazardous materials found in most homes; provide guidance related to the safe use, storage, and disposal of these materials; identify and encourage the use of less hazardous substitutes; and assist the homeowner in safe disposal of highly toxic waste via a one-day collection program. A telephone hot-line will be established that will allow Kauai residents a toll-free call to OEQC for information on household hazardous waste and the collection program.

REPAIR OF EXISTING SEAWALL AT WAIPOULI, KAUAI, James F. Bolster/County of Kauai Planning Department

The applicant proposes to repair an existing seawall within the shoreline setback area. Wave action has damaged the footing of the existing seawall and if remedial action is not taken, further damage may occur. A section of approx. 120 ft. will be repaired and the area behind the wall backfilled with soil. Concrete will be used to strengthen and weigh down the footing of the existing seawall. The seawall is located mauka of Kuhio Hwy. approx. 700 ft. northeast of the intersection of Kamoa Rd. and Kuhio Hwy. on land identified as TMK: 4-3-7:11.

CONSERVATION DISTRICT USE APPLICATION TO ESTABLISH A PRIVATE RECREATIONAL AREA AND PUBLIC PARK, KEONILOA BAY, KAUAI, Ainako Resort Associates/Dept. of Land and Natural Resources

The applicant is requesting an amendment to Conservation District Use Application (CDUA) Approvals, Nos. KA-1180 and KA-1562, to allow revisions to its proposed development of a private landscaped/recreational area and public park facility. The project site is located at Keoniloa Bay in Poipu, Kauai and is identified by TMK: 2-9-01:por. 2. The project site is situated in the State designated Conservation District, Limited Subzone. It extends from the shoreline to approx. 250 ft. inland and from approx. the western boundary of Keoniloa Bay to approx. 300 ft. from the Bay's

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P. O. BOX 50004
HONOLULU, HAWAII
96850

April 18, 1988

Mr. Tom Fee, Project Planner
Helber, Hastert & Kimura, Planners
733 Bishop St., Suite 2590
Honolulu, HI 96813

RECEIVED
APR 29 1988
HELBER, HASTERT & KIMURA PLANNERS

Dear Mr. Fee:

Subject: Environmental Impact Statement Preparation Notice (EISPN)- Ewa Devleopment Plan Amendment for Kapolei Town Center Development, Ewa, Oahu

We have no comment at this time but would appreciate the opportunity to review the draft Environmental Impact Statement.

Sincerely,

RICHARD N. DUNCAN
State Conservationist

HELBER HASTERT & KIMURA Planners
HH&K
Grosvenor Center
PFII Tower
733 Bishop Street
Suite 2590
Honolulu Hawaii 96813
Telephone (808) 545-2055
Telex 634468 HHMKUW
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Principals
Larry E. HELBER ASLA
Mark H. HASTERT AICP
Glenn T. KIMURA
Associates
Nancy L. NISHIKAWA AICP
Thomas A. FEE AICP
Kevin M. YOUNG ASLA

May 25, 1988

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

Dear Mr. Duncan:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of April 18, 1988 regarding the EISPN for the referenced project. Although you have no comments at this time concerning the project, we appreciate the time you and your staff spent reviewing the EISPN.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/el

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

REPLY TO
ATTENTION OF:

April 4, 1988

Planning Branch

RECEIVED
APR - 6 1988
HELBER, HASTERT & KIMURA PLANNERS

Mr. Thomas A. Fee
Project Planner
Helber, Hastert &
Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Thank you for the opportunity to review the Environmental Impact Statement Preparation Notice (EISPN) for the Kapolei Town Center Development Plan Amendment, Ewa, Oahu, Hawaii. The following comments are offered.

a. Based on the EISPN, no work is to be done in waters of the U.S. or adjacent wetlands. A Department of the Army permit is therefore not required.

b. According to the Flood Insurance Study for the City and County of Honolulu, the project parcels are located in unstudied areas (Zone D).

Sincerely,

Kisuk Cheung
Chief, Engineering Division

11-22

HELBER
HASTERT
& KIMURA
Planners
HHK

Grosvenor
Center
PRI
Tower
733
Bishop
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May 25, 1988

Mr. Kisuk Cheung, Chief
Engineering Division
Department of the Army
U.S. Army Engineer District, Honolulu
Building 230
Honolulu, Hawaii 96858-5440

Dear Mr. Cheung:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of April 4, 1988 regarding the EISPN for the referenced project. The information you provided is appreciated and will be included in the Draft EIS.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

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

IN REPLY REFER TO
11010
Ser N5B(2021GA)/836

12 APR 1988

RECEIVED
APR 14 1988
HELBER, HASTERT & KIMURA PLANNERS

Helber Hastert & Kimura Planners
733 Bishop Street
Suite 2590
Honolulu, HI 96813

Gentlemen:

ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
KAPOLEI TOWN CENTER DEVELOPMENT PLAN AMENDMENT
EWA, OAHU, HAWAII

The EIS Preparation Notice (EISPN) for the Kapolei Town Center Development provided by your letter of March 9, 1988 has been reviewed. Brief discussions of the subjects which are of concern to the Navy and which should be addressed in the EIS are provided below:

ENVIRONMENTAL IMPACTS

Aircraft Noise. - The EISPN makes brief mention of the issue of aircraft noise. The EIS should provide an analysis of the total noise environment at the project site, including an analysis of the effects from Honolulu International Airport and NAS Barbers Point. The EIS must also address the impact of the proposed development in terms of this total noise environment. The analysis should consider environmental noise levels requisite for the protection of public health and welfare, Hawaii's "open air" living style, and the type of construction associated with the project.

Several Government agencies have noise level requisites for the protection of public health and welfare. The Navy's AICUZ for NAS Barbers Point includes the 65 Ldn noise contour. The State of Hawaii, Department of Transportation recommends that housing and noise-sensitive buildings be built in areas with noise impacts below 60 Ldn. While the State of Hawaii, Department of Health is concerned to the 55 Ldn noise level. These noise levels should be discussed in the EIS.

As well, the EIS should disclose that military aircraft will continue to overfly the project site, make noise, and raise certain safety issues. Some of the land uses proposed, such as the church site at the H-1 Makakilo interchange, the "public facility" sites, and the residential sites may not be fully compatible with these aircraft operations. The EIS should identify these incompatibilities.

Of particular concern is the EISPN's failure to disclose the intended heights of proposed structures. High-rise construction would raise serious safety concerns relative to aircraft operations and should be thoroughly evaluated.

Although the proposed action is located outside the AICUZ, the Navy remains concerned with developments of this magnitude near a Naval air station. The Navy, in initially siting NAS Barbers Point, prudently selected a basically uninhabited rural area. It should also be noted that the Navy is currently updating the AICUZ Study for NAS Barbers Point.

Agriculture. - The development of the Kapolei Town Center would result in the urbanization of approximately 879 acres many of which are currently under cultivation by Oahu Sugar Company, Ltd. (OSCo). The EISPN references previous studies which indicated that a phased withdrawal of cultivated lands will not adversely affect the economic viability of OSCo. The EIS should assess the Kapolei Town Center Project to determine if, when combined with other planned or proposed projects, its construction would severely degrade OSCo operations, either by reducing sugar cane acreage sufficiently to reduce economics of scale, and or by contributing to a scattered and therefore inefficient plantation rather than a more compact and efficient one. This analysis should also include the State of Hawaii's 4,000 acre "land banking" proposal.

Hydrology. - The subject project is located near the U.S. Navy well site. The Navy is very concerned that the proposed Kapolei Town Center Development will have an adverse effect on the quality of the groundwater being drawn from the nearby Navy well. Development near the Navy's Barbers Point Water Shaft may result in the contamination of the shaft by insecticides, herbicides and other chemicals commonly used in Hawaii. The Barbers Point Water Shaft is the sole source of potable water for NAS Barbers Point. The Navy considers the shaft to be an irreplaceable asset and is considered to be the best and most efficient means for obtaining potable groundwater. The EIS should address the impact of urbanization on ground water quality.

ALTERNATIVES

One of the major elements of any EIS is the thorough evaluation of alternatives to the proposed action. Therefore alternate sites on the island for this project should be considered, identified, and examined prior to the taking of this proposed action. Also alternate land uses for each site should be evaluated.

MASTER PLAN LAND USES. - In paragraph 3.2 reference is made to a proposed "teleport" reserved for earth stations and telecommunication related uses. The draft EIS should describe in detail this proposed use and address all its impacts. The Navy is very concerned that this facility could include satellite dishes, microwave towers or other electronic structures. These installations could raise serious concerns relative to aircraft operations at NAS Barbers Point and should be thoroughly evaluated.

United States Department of the Interior

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

ES
Room 6307

5 APR 1988

RECEIVED
APR - 7 1988
HELBER, HASTERT & KIMURA PLANNERS

Mr. Thomas A. Fee
Project Planner
Helber Hastert and Kimura
Grosvenor Center
733 Bishop Street
Honolulu, Hawaii 96813

Re: Environmental Impact Statement Preparation Notice, Kapolei Town Center Development Plan Amendment, Oahu

Dear Mr. Fee:

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

We appreciate this opportunity to comment.

Sincerely,

Ernest Kosaka, Field Supervisor
Environmental Services
Pacific Islands Office

11-25

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May 25, 1988

Mr. Ernest Kosaka, Field Supervisor
Environmental Services, Pacific Islands Office
U.S. Department of the Interior
Fish and Wildlife Service
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kosaka:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of April 5, 1988 regarding the EISPN for the referenced project. Although you have no comments at this time concerning the project, we appreciate the time you and your staff spent reviewing the EISPN.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

DEMOGRAPHIC IMPACTS

Drainage. - The EISPN indicates that the drainage master plan for the area has been submitted to the Department of Public Works for approval. The EIS should describe the proposed drainage improvements and address all anticipated environmental impacts. The proposed drainage infrastructure system should prevent foreseeable damage to adjacent property due to storms.

Traffic. - The EISPN states that the developments within the Ewa area, including the proposed action, will increase traffic congestion. The draft EIS should describe in more detail the mitigating measures proposed and address any environmental impacts. The document should assess the cumulative traffic effects of this action in addition to other development proposals for the Ewa area.

In general, the EIS, in order to meet its definition as established by Section 343-2(9) of the Hawaii Revised Statutes, must disclose the environmental effects of the proposed action, the effects of the action on the economic and social welfare of the community, the measure proposed to minimize adverse effects, and alternatives to the action. As well, the document, in accordance with Section 11-200-16 of the Administrative Rules of the Department of Health, should identify and assess the interrelationships and cumulative environmental impacts of the proposed action when added to related actions in the Ewa region. Failure to disclose these cumulative impacts yields a misleading picture.

Thank you for the opportunity of reviewing the EISPN. The Navy's point of contact is Mr. Bill Liu, phone 471-3324.

Sincerely,

R. M. GALLEN
Captain, CEC U.S. Navy
Base Civil Engineer
By Direction of
the Commander

Copy to:
F.J. Rodriguez
P.O. Box 536
Honolulu, Hawaii 96809

11-24

May 25, 1988

Captain R.M. Gallen, CEC
U.S. Navy Base Civil Engineer
Naval Base Pearl Harbor
Naval Base Box 110
Pearl Harbor, Hawaii 96860-5020

Dear Captain Gallen:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of April 12, 1988 regarding the EISPN for the referenced project. We appreciate the time you and your staff spent on reviewing the EISPN. A full discussion of the concerns raised in your letter will be presented in the Draft EIS.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

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FEDERAL AVIATION ADMINISTRATION

DAVID J. WELHOUSE
Airport Engineer/Planner

Honolulu Airports District Office
Prince Jonah Kuhio Kalanianaole Building
P.O. Box 50244
Honolulu, Hawaii 96850

Tel. (808) 541-1243

ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE

RECEIVED
MAR 17 1988
HELBER, HASTERT & KIMURA PLANNERS

PROPOSED AMENDMENTS TO THE EWA DEVELOPMENT PLAN FOR THE

KAPOLEI TOWN CENTER

Ewa, Oahu, Hawaii

Tom,

Have no comments on prep. notice, but Navy is updating AICUZ study for Barbers Point. May want to include noise contours from it in this EIS. I'll be the FAA contact.

David Welhouse

March 9, 1988

Prepared for:
The Estate of James Campbell

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Thomas A. FEE AICP
Kevin M. YOUNG ASLA

May 25, 1988

Mr. David J. Welhouse, Airport Engineer/Planner
Federal Aviation Administration
Honolulu Airports District Office
P.O. Box 50244
Honolulu, Hawaii 96850

Dear Mr. Welhouse:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of March 17, 1988 regarding the EISPN for the referenced project. We will contact the Navy regarding their AICUZ update and include any new information in the Draft EIS.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
DIVISION OF PUBLIC WORKS
P. O. BOX 119, HONOLULU, HAWAII 96810

RUSSEL S. NAGATA
COMPTROLLER

KEN EITABU
DEPUTY COMPTROLLER

LETTER NO. (P)1222.8

APR 4 1988

RECEIVED
APR - 5 1988
HELBER, HASTERT & KIMURA PLANNERS

Mr. Thomas A. Fee
Project Planner
Helber, Hastert and Kimura,
Planners
Grosvenor Center
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Subject: EIS Preparation Notice
Kapolei Town Center
Development Plan Amendment
Ewa, Oahu, Hawaii

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

Very truly yours,

TEUANE TOMINAGA
State Public Works Engineer

MY:jk

1-27

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AICP
Kevin M.
YOUNG
ASLA

May 25, 1988

Mr. Teuane Tominaga, State Public Works Engineer
Department of Accounting
and General Services
State of Hawaii
P.O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Tominaga:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of April 4, 1988 regarding the EISPN for the referenced project. Although you have no comments at this time concerning the project, we appreciate the time you and your staff spent reviewing the EISPN.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

JOHN WAIHEE
GOVERNOR

SUZANNE D. PETERSON
CHAIRPERSON, BOARD OF AGRICULTURE

ROBERT Y. TSUYEMURA
ACTING DEPUTY
TO THE CHAIRPERSON

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

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

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APR 11 1988
HELBER, HASTERT & KIMURA
PLANNERS

April 7, 1988

Mr. Thomas A. Fee
Project Planner
Helber, Hastert and Kimura, Planners
733 Bishop Street
Suite 2590
Honolulu, Hawaii 96813

Subject: Environmental Impact Statement Preparation Notice (EISPN) for Kapolei Town Center Development Plan Amendment
TMK: 9-1-15: por. 4, por. 5
9-1-16: por. 4, 5, 6, 9, 12, 13, 16, 18, 24 and 30
9-2-03: por. 2, 12
9-2-19: 1
Ewa, Oahu
Area: approximately 879 acres

Dear Mr. Fee:

The Department of Agriculture has reviewed the subject EISPN and offers the following comments.

Our concerns regarding the proposed development have been expressed in our memorandum to Mr. Roger A. Ulveling (dated August 24, 1987) on the related State Land Use District Boundary amendment petition (Land Use Commission Docket No. A87-613). A copy is enclosed. Briefly, our concerns about the proposed development included (1) the impacts on Oahu Sugar Company, (2) alternative uses for the land, (3) water requirements, and (4) impact on important agricultural lands.

The Draft EIS should include discussion on the following issues:

- A complete soils description with references to the Agricultural Lands of Importance to the State of

Hawaii (ALISH) system, Land Study Bureau Overall Productivity Rating system, and the Soil Conservation Service Soil Survey which indicate the suitability of agricultural use on the site;

- The full impact on the economic viability of Oahu Sugar Company resulting from the cessation of sugarcane production on affected fields. This would include the loss in tons of sugar per acre, lost revenues, location and cost of replacement field preparation (if any), and any other indicators of adverse impact;

- The impact of this development on future agricultural production requirements and expansion of diversified agriculture, as identified in the Final Report of the Land Evaluation and Site Assessment (LESA) Commission (February 1986);

- The potential of establishing viable alternative agricultural uses on the project site;

- The broader economic and resource impact on the State from the irrevocable loss of prime agricultural lands;

- Conformity to the State Agriculture Functional Plan and its objectives and policies, particularly, Implementing Action B(5)(c); and

- The relationship to the following Hawaii State Plan objectives, policies and priority guidelines:

226-7(b)(6) "Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs."

226-103(c)(1) "Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries."

226-103(d)(1) "Identify, conserve and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands."

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."

Thank you for the opportunity to comment. We will provide further comment upon our receipt and review of the Draft Environmental Impact Statement.

Sincerely,

Suzanne D. Peterson

SUZANNE D. PETERSON
Chairperson, Board of Agriculture

Attachment

cc: Mr. William Balfour, President and Manager
Oahu Sugar Company
OSP (Attn: LUD)
LUC
OEQC

2 Pies

August 24, 1987

MEMORANDUM

To: Mr. Roger A. Ulveling, Director
Department of Business and Economic Development

Subject: Petition for Amendment to the State Land Use District Boundaries
A87-613 (The Trustees Under the Will and of the Estate of James Campbell, Deceased)
Agriculture to Urban
Implementation of City and County of Honolulu's General Plan Policy for Secondary Urban Center
TMK: 9-1-15: por. 4
9-1-16: 1, por. 4, 6, por. 9, 16, 18, 24 and 30
9-2-03: por. 2
9-2-19: por. 1 Honouliuli, Ewa, Oahu
Acres: approximately 890

The Department of Agriculture has reviewed the subject petition and has the following comments to offer.

According to the petition, the applicant seeks to reclassify approximately 890 acres of land from the Agricultural District to the Urban District for the development of the proposed Kapolei Town Center. The petitioners seek to develop the property in three phases. Our comments refer to the entire 890-acre petitioned area.

The proposed development, if approved and constructed, would result in the irreversible conversion of 890 acres, most of which is in agricultural use. Most of the subject property is classified as very productive agricultural land by the Soil Conservation Service's (SCS) Soil Survey classification system, the Land Study Bureau's (LSB) Detailed Land Classification system, the Agricultural Lands of Importance to the State of Hawaii (ALISH) system and the Land Evaluation ratings according to the Land Evaluation and Site Assessment (LESA) Commission final report (February 1986).

POTENTIAL IMPACTS ON OAHU SUGAR COMPANY

According to Petitioner's Exhibit A, the Environmental Assessment (EA) (Chapter III, Assessment of Existing Conditions and Probable Impacts -- Physical Environment), the economic impact on Oahu Sugar Company (OSC) of the removal of cultivable lands could be mitigated, somewhat, by increased yields per acre (from about 15 to 16-17 tons/sugar/acre) which would compensate for the loss of approximately 700 acres of cultivated fields. (This loss would be in addition to the recently approved phase-out of 600 acres of sugarcane fields above the Village Park residential subdivision in Kunia (Waitec Development, Inc.; docket A86-600). These drip-irrigated fields once held the world record for sugar production.) It should be pointed out that these increased yields could only occur with additional inputs and additional production costs.

Appendix B of the EA ("An Evaluation of the Profitability Impact on Oahu Sugar Company Resulting from Secondary Urban Center Land Withdrawals," by Jack Larsen, Agro-Industrial Consultant, March 1986) states that "... the easiest yield improvements have already been made." If the land removed is of higher potential productivity than the remaining lands, then the additional costs incurred in achieving greater yields may reduce net returns previously earned by the plantation.

Appendix B also states that the establishment of a single mill operation at OSC, and attainment of 16 to 17 tons/sugar/acre production, could feasibly allow the removal of 3,000 acres from current OSC use, with a remaining 9,000 acres under cultivation (EA, page B-6). This scenario assumes that everything else remains constant.

However, the petition does not identify the conditions under which the factors of labor, management, land, capital replacement, energy and other production input costs would remain constant. We question whether OSC can realistically maintain future profitability if available acreage is reduced to the point where there is little or no leeway in altering the total acreage available for sugarcane cultivation, and high-yield lands are removed from production.

Another related issue that should be addressed at the time of the hearing is whether the development of the Waikele project (Land Use Commission Docket No. A85-594) has been calculated as a factor in determining the future profitability of OSC. In Amfac's petition for boundary reclassification, it is clearly indicated that the Waikele development is essential to Oahu Sugar Company's continued economic viability.

ALTERNATIVE USES FOR THE LAND

The Appendix B report states that "... there are presently no economic crop options for sugar replacement at OSCo or the areas under consideration." (EA, page B-11). The study looked at various crop and livestock options individually. We note that no evaluation was made of a combination of agricultural commodities that might profitably utilize the 890 acres under petition.

One option that could be investigated is to lease the land to individual farmers. For example, the Department of Agriculture is aware of considerable demand for land for the production of diversified commodities. More than 275 individuals have submitted interest forms for lots within State Agricultural Parks on Oahu. This does not include the phone calls and walk-ins that seek information on the availability of suitable agricultural lands.

WATER REQUIREMENTS

Section 2.3.1 of the EA states that total water demand of the subject project will be about 4.7 million gallons per day (mgd). The domestic water system will be separate from the irrigation system. The update to the Ewa Water Master Plan will address this dual water system and is being prepared by the petitioner.

A concern we have is whether the domestic/irrigation water demand of the total Kapolei project requires a reallocation of water that is presently used for agricultural irrigation in the Pearl Harbor Groundwater Control Area. If this is so, the ramifications of the diversion upon affected agricultural activities should be discussed at the time of hearing.

IMPACT ON IMPORTANT AGRICULTURAL LANDS

The Department of Agriculture has supported and continues to conceptually support the City and County of Honolulu's designation of West Beach - Makakilo as the Secondary Urban Center (SUC). As the following selected chronology of DOA comments on the matter indicates, this support is by no means open-ended.

In our letter to the City and County Department of General Planning (DGP) (dated November 27, 1981) regarding proposals to amend the County General Plan, we found the proposed designation of a smaller area (West Beach - Makakilo) for the SUC to be more desirable than the designation of the entire Ewa plain. Our

support was based on the belief that the West Beach - Makakilo SUC "...appears to conserve and protect the relatively greatest amount of important agricultural land...as well as preserve sufficient agricultural land to ensure the continuation of a viable sugar industry in the area...". At the same time, we felt that the "...vacant Urban District lands around Ewa Village (should be reclassified) back to the Agricultural District."

On November 16, 1984, the DOA responded to more proposed amendments to the County General Plan. We wrote that "The current trend indicates that lands in lower elevations, with plentiful sunshine, low rainfall, and readily available and inexpensive irrigation water, are now considered more desirable by the (sugar and pineapple) industries. This represents a shift from some previous practices which indicated a preference for high elevations and wetter conditions that reduced irrigation demands or required high pumpage costs.

"Therefore, based on the present needs of the sugar and pineapple industries, it appears that the higher elevation lands such as around the Mililani and Waiawa areas would be relatively less economically viable. Conversely, the lower elevation lands below Waiahole Ditch, such as Ewa and Waikele, that are more arid but have lower cost irrigation water along with productive soils currently appear to yield higher economic raturns. Abundant sunshine and the ability to control moisture are among the most important environmental characteristics in determining optimum productivity of agricultural land for most agricultural crops. (emphasis added)

"The implications now appear to be the major development(s) on agricultural land in the higher Central Oahu areas may have generally less adverse impact on the agricultural economy than those located in the Ewa area. Amfac has stated that the Waikele development is essential to Oahu Sugar Company's continued economic viability. However, a possible alternative might be for Castle and Cooke/Dole to cultivate pineapple for the fresh market in the Waikele area, while Oahu Sugar could continue to cultivate sugarcane in some of the Ewa area lands conceptually designated as "City Center" in the Ewa Master Plan of the Estate of James Campbell. Perhaps a form of development rights transfer could allow the affected landowners to shift their proposed development projects to the alternative Central Oahu sites under consideration in your review." (emphasis added)

On February 5, 1986 we submitted comments to the City Planning Commission regarding the City Administration's proposal to "liberalize" the location of urban growth in Central Oahu and Ewa. We iterated our 1984 philosophy of retaining in

agriculture the "...lower elevation lands with plentiful sunshine, low rainfall, and readily available and inexpensive irrigation water are the more desirable lands (i.e., the lands below Waiahole Ditch) and the higher elevation lands would be relatively less economically viable for agricultural production." We also made note of the possibility of redirecting growth from portions of Ewa to portions of Central Oahu (or vice-versa).

On April 23, 1987 we submitted comments to DGP on the "General Plan Growth Management Policies Review and Assessment of the Agricultural Industry". Again, we reiterated our earlier stand that urban development should be discouraged from the low elevation, high insolation and water-available areas of Central Oahu and Ewa (i.e., below Waiahole Ditch and on the Waianae side of Waikele Stream). We also added that:

"The Department of Agriculture is compelled by the State Constitution...to conserve and protect important agricultural lands throughout the State. On Oahu, its happens that the lands most suitable for agricultural use are situated in the areas (Ewa and Central Oahu) that are perceived to be under the greatest pressure for housing expansion. The Hawaii State Plan and the State Agriculture Functional Plan seek to preserve such lands for agricultural use, while the present General Plan and Ewa and Central Oahu Development Plans direct significant urban development to the West Beach - Makakilo Secondary Urban Center.

"Although there may be more agricultural land in total on Oahu than can be fully utilized over the next decade, it should be the policy of the State and County to allocate the best agricultural lands to agricultural use to the fullest extent possible. Alternative uses should be directed to lands of lesser value for agriculture wherever possible."

In our comments on the recent Mililani-Mauka boundary amendment (State Land Use Commission Docket No. A87-609, dated May 8, 1987), we stated that "...a decision on this project should be based on an adopted regional land use plan... From an agricultural perspective, we feel strongly that the (Land Use) Commission, the State and the City and County of Honolulu...make a concerted effort to develop and implement a coherent land use plan...for the Central Oahu/Ewa area...direct(ing) future urban growth away from important agricultural lands of low elevation, high insolation, low rainfall, with available and inexpensive irrigation water."

Finally, in a letter to City Council Chairman Arnold Morgado (dated June 8, 1987), the DOA, via the use of illustrative maps, identified the land area below Waiahole Ditch and on the Waianae side of Waikele Gulch as having "...our

highest priority for preservation because it has large, uninterrupted, contiguous fields and inexpensive irrigation water available from the ditch."

SUMMARY

We continue to believe that development in the West Beach - Makakilo area must be done within the context of a coherent land use plan that would identify the acceptable location and magnitude of urban growth of the SUC as well as the rest of the Ewa plain, Central Oahu and the rest of the island. It is neither desirable nor prudent to plan for Ewa and Central Oahu (and any other area on Oahu) as separate and distinguishable areas. Nor should major proposed developments that have complex impacts that go far beyond administrative boundaries be considered in piecemeal and isolated fashion.

The Department of Agriculture continues to support the West Beach - Makakilo Secondary Urban Center concept as found in the County General Plan. Our provisional support of the SUC has been and will continue to be tempered by the State Constitutional mandate to conserve and protect important agricultural lands throughout the State (Article XI, Section 3). Until the State determines the means by which these important agricultural lands would be identified, conserved and protected, we believe the existing arable land base, especially those lands with a known capacity for productive agricultural use, should be retained in the Agricultural District to the greatest extent practicable, except where there is overriding public interest to reclassify such lands.

Thank you for the opportunity to comment.

Suzanne D. Peterson

SUZANNE D. PETERSON
Chairperson, Board of Agriculture

cc: LUC
DGP

bcc: PS
EY

May 25, 1988

Ms. Suzanne D. Peterson, Chairperson
Board of Agriculture
State of Hawaii
1428 South King Street
Honolulu, Hawaii 96814-2512

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Glenn T. KIMURA
Associates
Nancy L. NISHIKAWA A.I.C.P.
Thomas A. FEE A.I.C.P.
Kevin M. YOUNG A.S.L.A.

Dear Ms. Peterson:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of April 7, 1988 regarding the EISPN for the referenced project. Your comments concerning the potential agricultural impacts of the project are noted. A full discussion of your comments will be presented in the Draft EIS.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

JOHN WAIHEE
GOVERNOR
ROGER A. ULVELING
DIRECTOR
MURRAY E. TOWILL
DEPUTY DIRECTOR
BARBARA KIM STANTON
DEPUTY DIRECTOR

DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

KAMAMALU BUILDING, 250 SOUTH KING ST., HONOLULU, HAWAII
MAILING ADDRESS: P.O. BOX 2359, HONOLULU, HAWAII 96804 TELEX: 7430(28 HIDPED

April 4, 1988

RECEIVED
APR - 6 1988
HELBER, HASTERT & KIMURA PLANNERS

Mr. Thomas A. Fee, AICP
Helber, Hastert and Kimura, Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Subject: Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center Development Plan Amendment,
Ewa, Oahu, Hawaii

Thank you for your letter of March 9, 1988 requesting our comments on the EISPN for the proposed amendments to modify the Ewa Development Plan land uses for the Kapolei Town Center which were adopted in 1986.

The information presented in the EISPN is mostly excerpted from an environmental assessment of the proposed Kapolei Town Center which was filed with a petition to the State Land Use Commission (LUC) to reclassify approximately 890 acres from the Agricultural to the Urban District (LUC Docket No. A87-613).

The draft Environmental Impact Statement (DEIS) should clearly delineate the LUC petition area in relation to the 879-acre project area as described in the subject EISPN. An additional map with corresponding tax map keys should be included in the DEIS. The existing State land use classification of the area should also be shown.

The six separate parcels described on page 2 as the project area and referred to in Figure 2 of the EISPN should be labeled for easier reference with their corresponding acreages and street boundaries.

The proposed changes to the present Development Plan (DP) land use pattern are the result of recommendations provided to the Campbell Estate by the planning firm of Pereira Associates and the market research firm of Kenneth Leventhal & Company. The proposed amendments to the Ewa Development Plan Land Use Map are shown in Figure 5 of the EISPN and listed in Table 2:

CHANGES TO PRESENT DEVELOPMENT PLAN LAND USE
(acres)

DP Land Use Category	Existing	Proposed	Net Change
Residential	53	20	-33
Low-Density Apt.	103	219	+116
Medium-Density Apt.	30	0	-30
Commercial	493	452	-41
Park	159	163	+4
Public Facility	41	25	-16
TOTAL	879	879	0

The EISPN states that net losses in residential medium-density apartment, commercial and public facility uses are offset by net gains in low-density apartments, and park uses. The DEIS should document why these changes are necessary.

A total of 1,708 dwelling units are identified within the project area and account for approximately 22% of the site. The DEIS should discuss the need and provision for affordable housing within the project area.

The EISPN states that job opportunities within the Ewa area are expected to increase by 600 percent over the next twenty years. It states that the Kapolei Town Center will become the major employment center within the region by 2005, providing an estimated 12,500 jobs, representing almost 50 percent of the Ewa-area employment base. The DEIS should elaborate on a program mentioned in the EISPN to "mitigate potentially adverse social impacts that could occur as a result of rapid employment growth".

According to the EISPN, approximately two-thirds of the project area is under sugarcane cultivation by the Oahu Sugar Company (OSCO). It states that studies prepared for the Campbell Estate and other public and private developers in the Ewa area indicate that a phased withdrawal of cultivated lands will not adversely affect the economic viability of OSCO. The DEIS should include or reference these studies. The DEIS should also assess the impact of the project area on the cane haul roads which traverse the area, especially Waimanalo Road which is maintained by OSCO and bisects the Town Center in an east to west direction.

Major off-site improvements mentioned in the EISPN included pro-rata shares of increasing the size of the Ko Olina interceptor sewer and the installation of a new water line along Farrington Highway. Total off-site infrastructure costs are estimated at $3.1 million. The DEIS should also discuss off-site costs associated with drainage, water development/transmission and transportation system improvements and should further elaborate on the term "pro-rata share".

According to an agreement in principle between the Campbell Estate and the State Administration, at least 40 acres of land will be made available to the State in the proposed Town Center with more to be made available if a need can be shown. The availability of the land will give the State the option of locating facilities and employees at Kapolei.

The proposed amendments to the existing DP described in the EISPN propose a reduction of "Public Facility" uses from 41 acres to 25 acres. The EISPN refers to "Public Facilities" as regional government offices and typical municipal services such as police and fire stations and libraries. The reasons for the reduction in acreage should be discussed in the DEIS and its impact on the job center concept should be assessed.

The DEIS should thoroughly discuss the impacts of aircraft activity from the Barbers Point Naval Air Station on the Kapolei Town Center.

The section on drainage should be elaborated to discuss the potential impacts of storm water runoff from the project site upon surrounding areas and any receiving waters. The drainage patterns of the project site and any receiving waters or watercourses should be identified. Appropriate mitigation measures should also be included.

The discussion of potential impacts in the sections on Flora and Fauna, Historic and Archaeological Resources, and Hydrology are inadequate and need to be elaborated with supportive evidence or data. Appropriate mitigation measures, if necessary, should also be proposed.

The current State position before the Land Use Commission is to approve the first phase of the Kapolei Town Center consisting of approximately 135 acres. Upon acceptance of the Final EIS and action by the LUC, a change of zone application to the City Department of Land Utilization will be submitted to rezone a 95-acre site near the center of the project area. The zoning of the remainder of the 135-acre first phase should also be discussed.

Sincerely,

Roger A. Ulveling

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& KIMURA
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HHK

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Kevin M. YOUNG ASLA

May 25, 1988

Mr. Roger Ulveling, Director
Department of Business and Economic Development
State of Hawaii
250 S. King Street
P.O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Ulveling:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of April 4, 1988 regarding the EISPN for the referenced project. Your comments and concerns are noted and where appropriate, will be addressed in the Draft EIS.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

JOHN WAIHEE
GOVERNOR

CHARLES T. TOGUCHI
SUPERINTENDENT

STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

March 21, 1988

RECEIVED
MAR 31 1988
HELBER, HASTERT & KIMURA PLANNERS

Mr. Thomas A. Fee, AICP
Project Planner
HH&K
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

SUBJECT: EIS Preparation Notice
Kapolei Town Center

Our review of your proposed 1,708-unit development indicates that it will have the following impact on our area schools:

SCHOOL	GRADE	APPROXIMATE ENROLLMENT
Barbers Pt./Makakilo El	K-6	200 - 300
Ilima Intermediate	7-8	40 - 60
Campbell High	9-12	80 - 120

The above schools will be able to accommodate the initial enrollment generated by 1,708 housing units of the Kapolei Town Center.

Pending future development schedules of the Ewa plain area, attendance from the subject area will most likely shift to new schools identified in the Ko Olina and Kapolei Village subdivisions.

Please keep us informed of any changes to your project plan.

Sincerely,

Charles T. Toguchi
Superintendent

CTT:jl

cc E. Imai
E. Nakano, Leeward Dist.

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

11-35

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& KIMURA
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Kevin M. YOUNG ASLA

May 25, 1988

Mr. Charles T. Toguchi, Superintendent
Department of Education
State of Hawaii
P.O. Box 2360
Honolulu, Hawaii 96804

Dear Mr. Toguchi:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of March 21, 1988 regarding the EISPN for the referenced project. The information you provided is appreciated and will be included in the Draft EIS.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/el

JOHN WAIHEE
GOVERNOR OF HAWAII

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

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

RECEIVED
MAY - 4 1988
HELBER, HASTERT & KIMURA PLANNERS

April 25, 1988

In reply, please refer to:
EPHSO

Mr. Thomas A. Fee, AICP
Project Manager
Helber, Hastert & Kimura, Planners
733 Bishop St., Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Subject: Kapolei Town Center, Ewa, Oahu EIS Preparation Notice (EISPN)

Thank you for allowing us to review and comment on the subject EISPN. We provide the following comments:

Air Pollution

As with the environmental assessment for the Kapolei Town Center, the environmental impact statement (EIS) should include the potential impact on the ambient air quality resulting from the increase in vehicular activity from the proposed project and all other projects which were previously approved, but not yet constructed. Projections on the increased traffic volume and the impact on the ambient air quality should be for the associated corridors, roadways, and highways. The results should be compared to the State and federal ambient air quality standards. Should a potential violation be determined, the EIS should address the mitigating actions which shall be implemented.

The preparation notice states that the growth of vehicular activity resulting from the development of the project area will not result in the impairment of the existing ambient air quality levels, provided programmed roadway improvements are developed in a timely manner. If this is true, the impacts to the State and federal ambient air quality standards should be presented for the various scenarios of roadway improvements starting with no improvements.

Water Pollution

The EIS should address the implication of additional sewage treatment requirements on the Honouliuli Wastewater Treatment Facility. Additional sewage flows may have severe ramifications on the City and County of Honolulu's 301(h) application (request for less than secondary treatment).

Noise

There are reservations toward the proposed Petition for Amendment to State Land Use District Boundaries and Reclassification from agricultural to urban due to noncompatible use of land. We concur with the Noise Impact Study by Design

Engineering, Inc. that noise from traffic on Farrington Highway and the H-1 Freeway, aircraft fly-bys at Barbers Point Naval Air Station and Honolulu International Airport, industrial activities at Campbell Industrial Park and nearby agricultural activities would result in adverse noise impacts on residents of the proposed project.

Drinking Water

The use of a dual water system must be carefully controlled to assure that no possibility of cross-connections can exist between the potable and nonpotable water systems. Water taps and hose bibs accessible to the public should be clearly labeled if tap is nonpotable.

Development of new sources of potable water will require compliance with the State's Potable Water Systems rules, Chapter 20, Title 11, Administrative Rules.

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.

Protection of ground water sources should be considered in planning the Kapolei Town Center. Activities with the potential to contaminate ground water should be located in areas such that the contamination of existing and future drinking water sources is minimized.

Wastewater Disposal

The project must comply to all provisions of Act 282, SLH 1985. The project should proceed only on the basis that there be a centralized wastewater collection system and that all wastewater is to be treated and disposed of by means of a municipal treatment plant and disposal system.

Sincerely yours,

Bruce S. Anderson

BRUCE S. ANDERSON, Ph.D.
Deputy Director for
Environmental Health

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AICP
Kevin M.
YOUNG
ASLA

May 25, 1988

Dr. Bruce S. Anderson, Ph.D
Deputy Director for Environmental Health
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Anderson:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of April 25, 1988 regarding the EISPN for the referenced project. Your comments are noted and, where appropriate, will be addressed in the Draft EIS.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

JOHN WAIHEE
GOVERNOR OF HAWAII

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

APR 11 1988

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

LIBERT G. LANDGRAF
DEPUTY

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

DOC. NO.: 3080E
FILE NO.: 88-428

RECEIVED
APR 12 1988
HELBER, HASTERT & KIMURA PLANNERS

Mr. Thomas A. Fee, Project Planner
Herbert, Hastert, and Kimura
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

SUBJECT: EIS Preparation Notice, Kapolei Town Center Development Plan Amendment

In response to your request, we have reviewed the document cited above and have the following comments to offer.

This project will be located in the Pearl Harbor Ground Water Control Area. The Draft EIS should fully and explicitly cite the project's water source.

The archaeological reconnaissance survey that your firm commissioned in 1986 did not locate any significant historic sites. Therefore, we believe that the project will have "no effect" on significant historic sites. The Draft EIS should contain a "no effect" statement and a copy of the archaeological report.

If you would like further discussions on the project, please contact Don Horiuchi of our Office of Conservation and Environmental Affairs at 548-7837.

Very truly yours,

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

11-38

HELBER
HASTERT
& KIMURA
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Grosvenor Center
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Kevin M. YOUNG ASLA

May 25, 1988

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

Dear Mr. Paty:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of April 11, 1988 regarding the EISPN for the referenced project. Your concerns regarding the project's water source will be addressed in the Draft EIS. Regarding archaeology/historic sites, the DEIS will contain a "no effect" statement and a copy of the archaeological report.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

JOHN WAIHEE
GOVERNOR OF HAWAII

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

LIBERT K. LANOGRAP
DEPUTY

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

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

March 18, 1988

RECEIVED
MAR 22 1988
HELBER, HASTERT & KIMURA PLANNERS

Thomas A. Fee, AICP
Helber, Hastert and Kimerua, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

SUBJECT: Environmental Impact Statement Preparation Notice
Kapolei Town Center Development Plan Amendment
Ewa, Oahu

Thank you for your letter of March 9, 1988, and the attached documentation relative to the Kapolei Development Plan Amendment.

An archaeological survey was completed for this project area by Dr. Alan Haun of PHRI. We have a copy of Dr. Haun's report on file, and the report indicates that no archaeological sites or significant historic sites were found on the subject parcels. Our concerns have therefore been met, and we believe that the project will have "no effect" on significant historic sites.

Should you need to contact our office for further information, Dr. Joyce Bath of our Historic Sites Section (548-7460) will be glad to assist you.

Sincerely,

RALSTON H. NAGATA
State Parks Administrator
and Deputy State Historic Preservation Officer

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HASTERT
& KIMURA
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Kevin M. YOUNG ASLA

May 25, 1988

Mr. Ralston H. Nagata, State Parks Administrator
and Deputy State Historic Preservation Officer
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Nagata:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of March 18, 1988 regarding the EISPN for the referenced project. The information you provided is appreciated and will be included in the Draft EIS.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/ci

JOHN WAIHEE
GOVERNOR

EDWARD Y. HIRATA
DIRECTOR

DEPUTY DIRECTORS
JOHN K. UCHIMA
RONALD N. HIRANO
DAN T. KOCHI
JEANNE K. SCHULTZ

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

IN REPLY REFER TO:
STP 8.2822

April 27, 1988

RECEIVED
MAY - 3 1988
HELBER, HASTERT & KIMURA
HAWAII

Mr. Thomas A. Fee, AICP
Project Planner
Helber, Hastert & Kimura
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center Development Plan Amendment
Ewa, Oahu

We previously responded on the petition to amend the State land use boundaries for the subject Kapolei Town Center development and have attached the response for your consideration. Our comments on the traffic impact analysis report (TIAR) found in the environmental assessment should be addressed and resolved. The TIAR should also be amended to include impacts at specific sites such as the Makakilo Drive/ Farrington Highway intersection, Palailai Interchange, etc.

In contrast with statements on page 19 of the EISPN under Traffic, a major redesign of the Makakilo and Palailai Interchanges may be required to accommodate the growth of this region. The developer should investigate this proposal, coordinate his efforts with our Highways Division, and dedicate the necessary right-of-way. The developer may be required to fund all or a portion of the cost for these improvements.

The developer should be informed that we are concerned about the effects of developments such as Kapolei Town Center on downstream sections of our highway system. Consequently, we will be considering methods to obtain developer assistance to fund needed improvements.

The developer should also implement traffic management programs such as ridesharing, subscription bus service, vanpools, carpool computer matching service, provision of park-and-ride and daycare facilities, etc., as appropriate.

Thank you for this opportunity to provide comments.

Very truly yours,

Edward Y. Hirata
Director of Transportation

Attachment

gLSTP

3.1.3(4)
8802
STP 8.2329

September 10, 1987

MEMORANDUM

TO: The Honorable Roger A. Ulveling, Director
Department of Business and Economic Development

FROM: Director of Transportation

SUBJECT: PETITION FOR AMENDMENT TO THE STATE LAND USE COMMISSION - SECONDARY URBAN CENTER, EWA, OAHU

The Ewa Town Center traffic impact study indicates that a North-South Connector Road will not be required prior to 2005 based on the westbound movement from Ewa Beach to the Town Center. Our evaluation on the need for a connector road is based on the congestion at the on-ramp of the Kunia Interchange for eastbound traffic. The implication that the traffic generated by the Ewa Town Center will not impact the Kunia Interchange seems unreasonable considering the increased traffic on the existing Farrington Highway and the traffic expected on the Ewa Parkway which is expected to be constructed in 2005.

The study also states that improvements to Makakilo Drive is not necessary. We disagree as our analysis indicates that the development of a secondary urban center will require improvements at the Makakilo Drive/Farrington Highway intersection and very likely along Makakilo Drive from the interchange off-ramp to Farrington Highway.

The study implies further that additional lanes for ramps of the Makakilo Interchange would have the same effect on traffic circulation as another interchange easterly of the Ewa Town Center. This observation appears self-serving to limit the type and number of highway improvements needed.

We would like to express our support of several proposals of the Secondary Urban Center, including:

1. Installation of park-and-ride facilities;

2. Construction of the Ewa Parkway and second access to the industrial park; and

3. Realignment of Farrington Highway.

The developer/landowner should commit to fund these improvements. In this regard, all plans for work within the State highway right-of-way must be submitted for review and approval by our Highways Division.

Comments from our Airports Division will be submitted under separate cover.

Thank you for this opportunity to provide comments.

Edward Y. Hirata

DT:ko

cc: HWY, STP(dt)
Mr. Julian Ng, Parsons Brinkerhoff...

May 25, 1988

Mr. Edward Y. Hirata, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

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AICP
Kevin M.
YOUNG
ASLA

Dear Mr. Hirata:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of April 27, 1988 regarding the EISPN for the referenced project. Our traffic engineering consultants (Engineering Concepts, Inc. and Pacific Planning and Engineering, Inc.) have recently met with your staff to brief them on completed and ongoing traffic studies addressing potential impacts associated with project development and proposed mitigating measures. The Draft EIS will fully discuss the transportation issues and findings presented in these studies.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

STATE OF HAWAII
DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

LAND USE COMMISSION

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

JOHN WAIHEE
Governor

TEOFILO PHIL TACBIAN
Chairman

FREDERICK P. WHITTEMORE
Vice Chairman

COMMISSION MEMBERS:
Richard B.F. Chun
Lawrence F. Chun
Everett L. Ewhadon
Sharon R. Himeno
Toru Suzuki
Robert S. Tamaya
Benton L.K. Nip

ESTHER UEDA
Executive Officer

March 24, 1988

Mr. Thomas A. Fee, AICP
Project Planner
Helber Hastert & Kimura
Grosvenor Center
733 Bishop Street
Suite 2590
Honolulu, Hawaii 96813

RECEIVED
MAR 25 1988
HELBER, HASTERT & KIMURA PLANNERS

Dear Mr. Fee:

Subject: EIS Preparation Notice for Kapolei Town Center Development Plan Amendment Ewa, Oahu, Hawaii

We have no comments to offer on the subject EIS Preparation Notice except to confirm that the petition, referenced on page 17 of the EISPN, for an amendment of approximately 890 acres from the Agricultural District to the Urban District for the Kapolei Town Center is pending before the Land Use Commission at this time.

Sincerely,

ESTHER UEDA
Executive Officer

EU:to

11-43

HELBER HASTERT & KIMURA Planners
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Thomas A. FEE AICP
Kevin M. YOUNG ASLA

May 25, 1988

Ms. Esther Ueda, Executive Officer
Land Use Commission
State of Hawaii
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Ms. Ueda:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of March 24, 1988 regarding the EISPN for the referenced project. Although you have no comments at this time concerning the project, we appreciate the time you and your staff spent reviewing the EISPN.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
1600 KAPIOLANI BLVD., SUITE 1500
HONOLULU, HAWAII 96814
(808) 548-6000
(808) 548-2642

April 28, 1988

Mr. Tom Fee, Project Planner
Helber, Hastert & Kimura, Planners
733 Bishop St. Suite 2590
Honolulu, HI. 96813

Dear Mr. Fee:

SUBJECT: EIS Preparation Notice: Ewa Development Plan Amendment for Kapolei Town Center Development, Honouliuli, Oahu.
TMK: 9-1-15: por. 4, por. 5
9-1-16: 1, por.4, 5,6,9,12,13,16,18,24,30
9-2-03: por. 2, 12
9-2-19: 1

Thank you for the opportunity to comment on the proposed undertaking.

Our office is concerned about the loss of agricultural lands with potential for small farmers and diversified agriculture, the displacement of small farmers, the lack of rural planning and development, and the loss of archaeological sites. Please send our office copies of any archaeological reports related to this project.

Sincerely,

Kamaki A. Kanahele III
Administrator

cc: OEQC
DGP/C&C Honolulu

RECEIVED
MAY - 9 1988
HELBER, HASTERT & KIMURA PLANNERS

HELBER
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& KIMURA
Planners
HH&K

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Glenn T. KIMURA
Associates
Nancy L. NISHIKAWA AICP
Thomas A. FEE AICP
Kevin M. YOUNG ASLA

May 25, 1988

Mr. Kamaki A. Kanahele III, Administrator
Office of Hawaiian Affairs
State of Hawaii
1600 Kapiolani Boulevard, Suite 1500
Honolulu, Hawaii 96814

Dear Mr. Kanahele III:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of April 28, 1988 regarding the EISPN for the referenced project. Your concerns are noted and, where appropriate, will be addressed in the Draft EIS. At your request, we are transmitting a copy of the Archaeological Reconnaissance Survey for the project area for your review. The survey will also be included as an Appendix to the Draft EIS. Please note that the State Historic Preservation Officer has reviewed the Reconnaissance Survey and has determined that the proposed project will have "no effect" on significant historic sites.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

Enclosure

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

KK/DGP 89/E-1

March 29, 1988

RECEIVED
MAR 31 1988
BELT, COLLINS & ASSOCIATES
PLANNERS

Mr. Thomas A. Fee, AICP
Project Planner
HH&K
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Environmental Impact Statement Preparation Notice
for the Proposed Kapolei Town Center
Development Project Situated in Ewa, Oahu

This is in response to your request for comments on the Environmental Impact Statement Preparation Notice for the proposed Kapolei Town Center development in Ewa.

The following points should be addressed in the preparation of the Draft Environmental Impact Statement:

1. Vehicular Access and Traffic

   The applicant should prepare a traffic study which discusses the proposed development's impact on Farrington Highway, Waimanalo Road, Barbers Point Access Road, Kalaeloa Boulevard, H-1 Interchanges at Palaikai and Makakilo, and its impact on downstream traffic on the H-1 Freeway.

2. Sewage Treatment and Disposal

   The availability of capacity at the Honouliuli Wastewater Treatment Plant to service the proposed development should be addressed.

3. Water System

   The water needs of the proposed development and its impact on the water resources in Ewa should be discussed.

4. Drainage System

   The Draft EIS should examine the project's drainage impact and proposed mitigation measures.

5. Environmental Characteristics

   A. Agriculture: The Draft EIS should address the loss of agricultural land and its impact on the agricultural industry on Oahu.

   B. Environmental Quality: The project's impact on air quality and noise levels should be evaluated.

   C. The impact of the Air Installations Compatible Use Zone Plan for the Naval Air Station Barbers Point (1984) should be considered in the land use plan for the project.

Thank you for giving us an opportunity to comment and if you have any questions regarding this matter, please contact Keith Kurahashi at 527-6051.

Sincerely,

DONALD A. CLEGG
Chief Planning Officer

May 25, 1988

Mr. Donald A. Clegg, Chief Planning Officer
Department of General Planning
City & County of Honolulu
650 South King Street, 8th Floor
Honolulu, Hawaii 96813

Dear Mr. Clegg:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of March 29, 1988 regarding the EISPN for the referenced project. Your concerns are noted and will be addressed in the Draft EIS.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

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& KIMURA
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AICP
Kevin M.
YOUNG
ASLA

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

FRANK F. FASI
MAYOR

JOHN P. WHALEN
DIRECTOR

BENJAMIN B. LEE
DEPUTY DIRECTOR

LU3/88-1565 (BWM)

March 29, 1988

RECEIVED
MAR 31 1988
HELBER, HASTERT & KIMURA
HONOLULU

Mr. Thomas A. Fee, AICP
Helber Hastert & Kimura
Grosvenor Center
PRI Tower
733 Bishop Street
Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Environmental Impact Statement
Preparation Notice (EISPN)
Kapolei Town Center
Development Plan Amendment
Ewa, Oahu, Hawaii
Tax Map Keys 9-1-15: por. 4, por. 5;
9-1-16: 1, por. 4, 5, 6, 9, 12, 13
16, 18, 24, and 30;
9-2-03: por. 2, 12; 9-1-19: 1

This is in response to your March 9, 1988 request for consultation comments. We have the following comments and questions:

1. Soils

The EIS should note both the Agricultural Lands of Importance in the State of Hawaii (ALISH) ratings as well as the Land Study Bureau's (LSB) detailed land classifications.

2. Sewers

The EIS should note the current and proposed capacity of the Honouliuli Wastewater Treatment Plant (WWTP) in relationship to the flow from this project, and the estimated total flows of all of the existing areas and proposed projects to be

sewered in the Ewa region. It is important to note the time schedule for increasing the capacity of the Honouliuli WWTP to handle the projected future flow from the Ewa region which will be greater than its current capacity.

3. Water

The EIS should relate this project's water demand with the regional water master plan.

We note that a dual water system (potable and non-potable) will be utilized.

Will the use of brackish water for irrigation require a mixture with potable water to be usable?

Will the drawdown of brackish water cause any problems with the underlying aquifer? Will there be a build-up of salts in the soils? Will the pumping from the brackish wells reduce the depth of the fresh water lens?

What is the status of the wells that showed evidence of pesticide contamination? Will any of these wells (Kunia Wells I and II, and Waipahu Well) be used as sources for potable water?

Thank you for the opportunity to comment. If there are any questions regarding these comments, please call Bennett Mark of our staff at 527-5038.

Very truly yours,

John P. Whalen

JOHN P. WHALEN
Director of Land Utilization

JPW:sl
1722B

May 25, 1988

Mr. John P. Whalen, Director
Department of Land Utilization
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

HELBER
HASTERT
& KIMURA
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HH&K

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AICP
Thomas A.
FEE
AICP
Kevin M.
YOUNG
ASLA

Dear Mr. Whalen:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of March 29, 1988 regarding the EISPN for the referenced project. Your concerns are noted and, where appropriate will be addressed in the Draft EIS.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

DEPARTMENT OF PARKS AND RECREATION

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

HIRAM K. KAMAKA
DIRECTOR

WALTER H. OZAWA
DEPUTY DIRECTOR

April 11, 1988

RECEIVED
APR 15 1988
HELBER, HASTERT & KIMURA PLANNERS

Mr. Thomas A. Fee, AICP
Helber, Hastert & Kimura Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Subject: Environmental Impact Statement Preparation Notice
Kapolei Town Center Development Plan Amendment
Ewa, Oahu, Hawaii

Thank you for providing the Department of Parks and Recreation the opportunity to review the above-referenced Preparation Notice. We offer the following comments on the proposed park areas:

1. Palailai Regional Park: As stated in the Preparation Notice, this regional park would be located on reclaimed land when the existing landfill operations cease. The EIS should describe the process of development transition from landfill to a regional park and identify any potential environmental problems which may occur as a result of such development and subsequent use by park visitors.

2. Kapolei Town Center Park: The Department concurs with the proposals for a 50-acre regional park and a 4-acre neighborhood park within the town center. The EIS, however, should evaluate the proposed amendments which indicate a gain of 640 dwelling units in relation to the City's Park Dedication Ordinance.

Sincerely,

HIRAM K. KAMAKA, Director

HKK:ei

11-49

HELBER
HASTERT
& KIMURA
Planners
HH&K

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733 Bishop Street
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Associates
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Thomas A. FEE AICP
Kevin M. YOUNG ASLA

May 25, 1988

Mr. Hiram K. Kamaka, Director
Department of Parks and Recreation
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Kamaka:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of April 11, 1988 regarding the EISPN for the referenced project. The information and comments you provided are appreciated and will be discussed in the Draft EIS.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

DEPARTMENT OF PUBLIC WORKS

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU HAWAII 96813

FRANK F. FASI
MAYOR

ALFRED J. THIEDE
DIRECTOR AND CHIEF ENGINEER

ENV 88-73

March 29, 1988

RECEIVED
MAR 31 1988
HELBER, HASTERT & KIMURA PLANNERS

Mr. Thomas A. Fee
Project Planner
Helber, Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Subject: EISPN for Kapolei Town Center Development Plan Amendment, Ewa, Oahu, Hawaii (Tax Map Key: 9-1-15; 9-1-16; 9-2-03; 9-2-19; Various Parcels)

In response to your memorandum dated March 9, 1988 concerning the subject proposed amendment, we have the following comments:

1. The drainage master plan is still being reviewed.

2. Any changes in the projected wastewater flows should be reflected in the design of the proposed West Beach interceptor sewer.

Very truly yours,

ALFRED J. THIEDE
Director and Chief Engineer

HELBER
HASTERT
& KIMURA
Planners
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Kevin M. YOUNG ASLA

May 25, 1988

Mr. Alfred J. Thiede, Director and Chief Engineer
Department of Public Works
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Thiede:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of March 29, 1988 regarding the EISPN for the referenced project. Your comments are noted. Regarding projected wastewater flows, no changes to the sewer master plan are expected at this time. The wastewater consultant (R.M. Towill Corp.) will coordinate any future changes with your office to assure maintenance of adequate service levels in the area.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

PL 1.1057
TE-1765

April 11, 1988

RECEIVED
APR 14 1988
HELBER, HASTERT & KIMURA PLANNERS

Helber, Hastert & Kimura, Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Attention: Mr. Thomas A. Fee, AICP

Gentlemen:

Subject: Kapolei Town Center
EIS Preparation Notice

This is in response to your letter of March 9, 1988 requesting our comments regarding the subject matter.

A detailed traffic impact report should be prepared for this project to address anticipated impacts to all major interior streets and measures should be proposed to mitigate these impacts. Required roadway widths and interconnections to other surrounding projects should also be addressed.

Questions should be directed to Mr. Kenneth Hirata of my staff at 527-5009.

Yours truly,

JOHN E. HIRTEN

HELBER HASTERT & KIMURA Planners
HH&K

Grosvenor Center
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Kevin M. YOUNG ASLA

May 25, 1988

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

Dear Mr. Hirten:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of April 11, 1988 regarding the EISPN for the referenced project. Our traffic engineers (Engineering Concepts, Inc. and Pacific Planning and Engineering, Inc.) have recently met with your staff to brief them on completed and ongoing traffic studies addressing potential impacts associated with project development and offsetting mitigating measures. The Draft EIS will fully discuss the transportation issues and findings presented in these studies.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843

FRANK F. FASI, Mayor
DONNA B. GOTH, Chairman
ERNEST A. WATARI, Vice Chairman
MILTON J. AGADER
SISTER M. DAVILYN AH CHICK, O.S.F.
EDWARD Y. HIRATA
ALFRED J. THIEDE
JOHN K. TSUI
KAZU HAYASHIDA
Manager and Chief Engineer

March 29, 1988

Mr. Thomas A. Fee, AICP
Helbert, Hastert and Kimura
Planners
Grosvenor Center
PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

RECEIVED
APR - 1 1988
HELBER, HASTERT & KIMURA PLANNERS

Dear Mr. Fee:

Subject: Your Letter of March 19, 1988 Transmitting the EIS Preparation Notice for Kapolei Town Center

We have the following comments on the EIS preparation notice:

1. The approved Campbell Estate Ewa Water Master Plan includes the off-site water system required to serve the proposed development. However, use of the existing Makakilo "440" water system facilities will require the approval of Finance Realty, the developer of Makakilo.

2. The on-site water master plan should be submitted for our review and approval.

3. Water for the development should be obtained from sources developed by the developer. However, before water can be made available to the proposed development, the necessary off-site transmission mains and reservoir should be installed.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

Pure Water . . . man's greatest need – use it wisely

HELBER
HASTERT
& KIMURA
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HHK

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Kevin M. YOUNG ASLA

May 25, 1988

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

Dear Mr. Hayashida:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of March 29, 1988 regarding the EISPN for the referenced project. Your comments are noted and will be discussed in the Draft EIS.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

1455 S. BERETANIA STREET, ROOM 306
HONOLULU, HAWAII 96814

FRANK F. FASI
MAYOR

FRANK K. KAHOOHANOHANO
FIRE CHIEF

LIONEL E. CAMARA
DEPUTY FIRE CHIEF

March 23, 1988

RECEIVED
MAR 24 1988
HELBER, HASTERT & KIMURA PLANNERS

Mr. Thomas A. Fee, AICP
Project Planner
Helber, Hastert & Kimura, Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

Environmental Impact Statement Preparation Notice
Kapolei Town Center Development Plan Amendment
Ewa, Oahu, Hawaii
TMK 9-1-15: por. 4, por. 5; 9-1-16: 1, por. 4, 5, 6, 9, 12, 13, 16, 18, 24, & 30; 9-2-03: por. 2, 12; 9-2-19: 1

We have reviewed the subject material provided and offer the following comments:

1. Existing fire protection for the proposed project is provided by Makakilo Fire Station, an engine company with 5 on-duty personnel, and Waipahu Fire Station with both an engine and a ladder company and 11 on-duty personnel. Response time is 3-5 minutes for Makakilo and 10-12 minutes for Waipahu. Secondary service is available from engine companies at Nanakuli and Pearl City. Mutual aid is available from the Barbers Point Naval Air Station.

2. Because of recent developments at West Beach and the deep draft harbor adjacent to Campbell Industrial Park, fire protection and medical co-response capability is considered marginal.

3. We propose an additional fire station be built within the Kapolei Town Development to meet the fire protection needs of the immediate area. We are preparing the necessary documentation to add a fire station on the public facilities map, site to be determined.

Thank you for the opportunity to comment on this proposed development. Should you have any questions, please contact Battalion Chief Kenneth Word of our Administrative Services Bureau at local 3838.

Very truly yours,

FRANK K. KAHOOHANOHANO
Fire Chief

FKK/KAW:lm

May 25, 1988

Mr. Frank K. Kahoohanohano, Fire Chief
Fire Department
City & County of Honolulu
1455 South Beretania Street
Honolulu, Hawaii 96814

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Thomas A.
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AICP
Kevin M.
YOUNG
ASLA

Dear Mr. Kahoohanohano:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of March 23, 1988 regarding the EISPN for the referenced project. Your concerns regarding fire protection and medical co-response capability are noted and will be discussed in the Draft EIS. The applicant is working with your staff to identify an appropriate site for an additional fire station.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/el

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

1455 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96814 - AREA CODE (808) 943-3111

FRANK F. FASI
MAYOR

DOUGLAS G. GIBB
CHIEF

WARREN FERREIRA
DEPUTY CHIEF

OUR REFERENCE KN-LC

March 31, 1988

RECEIVED
APR - 6 1988
HELBER, HASTERT & KIMURA PLANNERS

Mr. Thomas A. Fee
Project Planner
Helber Hastert & Kimura
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Fee:

We have reviewed the environmental impact statement preparation notice for the Kapolei Town Center Development Plan Amendments and have no objections to the modification of designated land uses at this time.

We would appreciate being kept informed of the Kapolei Town Center Development Plan as further details are established.

Thank you for the opportunity to comment.

Sincerely,

DOUGLAS G. GIBB
Chief of Police

11-55

HELBER HASTERT & KIMURA Planners
HH&K

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Associates
Nancy I. NISHIKAWA AICP
Thomas A. FEE AICP
Kevin M. YOUNG AIA

May 25, 1988

Mr. Douglas G. Gibb, Chief of Police
Police Department
City & County of Honolulu
1455 South Beretania Street
Honolulu, Hawaii 96813

Dear Mr. Gibb:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of March 31, 1988 regarding the EISPN for the referenced project. We have advised the applicant of your request for periodic status update of the proposed development. Please do not hesitate to contact either Mark Hastert or me if we can be of any assistance.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/el

HAWAIIAN TEL GTE

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

Telephone (808) 546-4511

March 24, 1988

RECEIVED
MAR 31 1988
HELBER, HASTERT & KIMURA PLANNERS

Helber, Hastert & Kimura, Planners
733 Bishop Street Suite 2590
Honolulu, Hawaii 96813

ATTENTION: Mr. Thomas A. Fee

Dear Sir:

Environmental Impact Statement Preparation Notice
Kapolei Town Center Development Plan Amendment
Ewa, Oahu, Hawaii

As requested, we have reviewed the Environmental Impact Statement Preparation Notice (EISPN) for the Kapolei Town Center Development Plan at Ewa, Oahu, Hawaii. Our preliminary findings show that we will be requiring approximately 5,000 square feet of land along the Barber's Point Access Road to establish a remote switching unit which will serve both the Kapolei Town Center and the adjacent Kapolei Village development projects.

We do not foresee any problems in providing the telecommunication services to these two developments with the establishment of the remote switching unit.

We appreciate the opportunity to comment on this well planned development and if you have any questions, please call me at 834-6221.

Sincerely,

Walter M. Matsumoto
Oahu Engineering and
Construction Manager

WMY/dv (may2102.ltr)

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& KIMURA
Planners
HH&K

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PFI Tower
733 Bishop Street
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Larry E. HELBER ASLA
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Associates
Nancy L. NISHIKAWA AICP
Thomas A. FEE AICP
Kevin M. YOUNG ASLA

May 25, 1988

Mr. Walter Matsumoto, Oahu Engineering
and Construction Manager
Hawaiian Telephone Company
P.O. Box 2200
Honolulu, Hawaii 96841

Dear Mr. Matsumoto:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of March 24, 1988 regarding the EISPN for the referenced project. Your comments are noted and will be included in the EIS.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

THE OUTDOOR CIRCLE

Established 1912
A Non-profit Organization
200 No. Vineyard Blvd., Suite 506, Honolulu, HI 96817
(808) 521-0074

March 28, 1988

RECEIVED
MAR 30 1988
HELBER, HASTERT & KIMURA PLANNERS

Mr. Tom Fu, Project Planner
Helber, Hastert & Kimura Planners
733 Bishop St., Ste. 2590
Honolulu, Hawaii 69813

SUBJECT: Environmental Impact Statement - Preparation Notice
Kapolei Town Center Development Plan Amendment Ewa,
Oahu, Hawaii

Dear Mr. Fu:

The Outdoor Circle endorses in concept the proposed Kapolei Town Center.

Certainly Oahu is in need of the kind of development proposed to alleviate our severe housing shortage. We do not object to the proposed changes to the Ewa development Plan Land Use map to accommodate the construction of 1,708 dwelling units in three separate residential areas.

The Outdoor Circle just asks that the final plans for the development establish as its primary goal that the Kapolei Center be a pleasant place for children to be reared and families to reside.

We ask you attention to the following Outdoor Circle concerns:

1. The streets and medials be tree lived.
2. The parks be landscaped with ample trees to provide shade for the users and picnickers.
3. That sufficient open spaces be provided for passive enjoyment.

4. That provisions be made for the maintenance of these common areas to assure
   a. care of the grounds free from litter and graffiti.
   b. regular feeding of the plants and lawns and
   c. adequate provisions for dumping, to prevent the blighting of adjacent vacant areas as dumping refuse grounds.

Thank you for the opportunity to voice our concerns. If we can work with you please do not hesitate to call upon us.

Sincerely,

Carolie Simone

Carolie Simone (Mrs. Albert J.)
President

May 25, 1988

Ms. Carolie Simone, President
The Outdoor Circle
200 N. Vineyard Boulevard, Suite 506
Honolulu, Hawaii 96817

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AICP
Kevin M.
YOUNG
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Dear Ms. Simone:

Environmental Impact Statement Preparation Notice (EISPN)
Kapolei Town Center
Ewa, Oahu, Hawaii

Thank you for your letter of March 28, 1988 regarding the EISPN for the referenced project. We appreciate your qualified endorsement of the proposed Kapolei Town Center. The Estate of James Campbell is cognizant of the need to plan for a city of human scale which will provide pleasant residential areas and equally pleasant employment centers within Kapolei. Your suggestions regarding street trees, landscaped set-backs, open space and rigorous maintenance/enforcement are noted and will be discussed within the Draft EIS.

For your information your letter, together with this response, will be published as part of the forthcoming Draft EIS.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Thomas A. Fee, AICP
Project Planner

TAF/cl

APPENDICES

APPENDIX A

Projections of Future Employment, Population and Land Use for the Ewa Town Center. (Executive Summary)

Kenneth Leventhal & Company. January 1986

PROJECTIONS OF FUTURE EMPLOYMENT, POPULATION AND LAND USE FOR THE EWA TOWN CENTER

Prepared for
the Estate of James Campbell

March, 1986

Kenneth Leventhal & Company
660 Newport Center Drive, Suite 800
Newport Beach, California 92660

(714) 640-5000

RECEIVED
MAR 17 '86
The Estate of James Campbell

Kenneth Leventhal & Company
Certified Public Accountants

660 Newport Center Drive
Newport Beach, California 92660
(714) 640-5000

The Estate of James Campbell
Honolulu, Hawaii

The accompanying report summarizes the results of our analyses and absorption projections for the planned Ewa Town Center project located in the Ewa area of the Island of Oahu, Hawaii. In this connection, we have compiled absorption projections in the form of low, mid and high-range projections for the twenty-year period 1986-2005. The projections are based on assumptions, market data and information gathered and formulated by us, and on information, assumptions and conditions provided by others.

Although our analysis is based on currently available information, such an analysis is based on assumptions about future developments in the economy and local real estate markets, and on assumptions about future actions by the Estate of James Campbell and others including government agencies, the occurrence of which cannot be assured. Achievability of the stated assumptions depends on the timing and probability of a complex series of future events, both internal and external to an enterprise. Accordingly, we do not express an opinion either as to the achievability of the assumptions and conditions or as to the probability that the actual results of the planned Ewa Town Center project may or may not approximate the estimated results. However, we believe the analysis summarized in this report has been compiled in all material respects to give numerical effect to the information, assumptions and conditions provided by others, and to the other assumptions underlying the analysis.

The terms of our engagement did not provide for reporting on events subsequent to the date of this report. Therefore, we accept no responsibility to update or revise this report subsequent to the date of its issuance.

Kenneth Leventhal & Company

March 15, 1986

REPORT CONTENTS

		Page Number
Transmittal Letter		
Table of Contents		
Executive Summary		1
1.0	Background	1-1
2.0	Purpose and Overview	2-1
3.0	General Approach and Methodology	3-1
4.0	Summary of the Projections	4-1
5.0	Existing Developments in Ewa	5-1
6.0	Approved Developments in Ewa	6-1
7.0	Ewa Town Center	7-1
8.0	Ewa Town Center Housing Analysis	8-1
9.0	Ewa Population	9-1
10.0	The Ewa Business Parks	10-1
11.0	Ewa Town Center Civic Center	11-1
12.0	Ewa Town Center Other Public Uses	12-1
13.0	Ewa Town Center Commercial	13-1
14.0	James Campbell Industrial Park	14-1
15.0	Ewa Employment	15-1

EXECUTIVE SUMMARY

Background

The landholdings of the Estate of James Campbell ("EJC") in Ewa consist of approximately 35,000 acres located in the southwest corner of the island of Oahu. In response to both the limits to growth and congestion within urban Honolulu, and to the suitability of the Ewa area, the City and County of Honolulu ("County") designated the Ewa area as the Secondary Urban Center ("SUC") for Oahu in the 1977 General Plan. A major purpose of designating Ewa as the SUC is to encourage some future Honolulu area employment and population growth to locate in Ewa instead of in Honolulu, which is designated as the Primary Urban Center ("PUC").

The intention is to have Ewa develop as a largely self-contained community, with a large portion of Ewa residents holding jobs located in Ewa, and where the urban facilities and services required by Ewa residents and businesses will be provided within Ewa. If Ewa develops in this way, future congestion in the PUC might be reduced or at least prevented from becoming significantly worse. Furthermore, the costs of future major transportation system construction may be reduced or eliminated if future growth of commuter traffic into the PUC can be restrained by the development of an SUC in Ewa.

In view of Ewa's designation as the SUC for Oahu, EJC plans to develop Ewa as a largely self-contained community of the kind described above. Achievement of such a community will involve, among other things, development of a town center to provide a true urban center for the Ewa area. EJC is now preparing an implementation program for an Ewa Town Center ("ETC"). The Town Center will provide the urbanized core to coalesce all of the present and planned development in the Ewa area into a true secondary urban center for Oahu. To carry out the work of preparing this program, EJC has formed an ETC

development planning team comprised of EJC staff and land planning, urban design, engineering and economic consultants. Kenneth Leventhal & Company is the economic consultant for the team.

Purpose and Overview

The primary objective of our study was to prepare absorption projections through the year 2005 for the major land uses needed, suitable and feasible for development in the type of ETC required to produce a true SUC in Ewa. The major objectives for the Ewa SUC stated in the County's General Plan were largely incorporated in the ETC concept and land uses.

The following types of parameters were projected for ETC during our study:

- Housing units and building space
- Land absorbed
- Population
- Employment

The major ETC land uses for which absorption projections were prepared are:

- Several types of housing units
- Light industrial/R&D/high tech
- Office
- Commercial
- Government office space and facilities
- Other public uses
- Heavier industrial in the James Campbell Industrial Park

To prepare the ETC projections it was necessary to project population for the Ewa communities and developments outside ETC, and to project their populations it was necessary to project their housing units. Consequently, the projections include not only detailed projections for ETC, but also housing unit and population projections for all of Ewa. Employment was also projected for the Ewa developments outside ETC in order to provide a complete set of total housing unit, population and employment projections for Ewa.

The Ewa area included in the projections is delineated on the map of Figure 1, and is in accordance with the Ewa Master Plan. The projections include the following developments that exist today in Ewa (their locations are shown in Figure 2):

Makakilo	Barbers Point Naval Air Station
Honokai Hale/Nanakai Gardens	Ewa Beach
James Campbell Industrial Park	Ewa Plantation Villages
Barbers Point Deep Draft Harbor	

The projections also include the following developments on which physical development is expected to begin in the near future (also shown in Figure 2):

West Beach

Ewa Marina

Ewa Plantation

General Approach and Methodology

The study and projections were based on or incorporate the following major approaches and assumptions:

FIGURE 2
Location Map

- All projections were made in the form of high, mid and low-range projections. Ranges were projected because of the uncertainty associated with projecting the rate at which the unique and pioneering ETC development, located in a largely undeveloped area of Oahu, might develop. The range of projections should represent the range within which actual future ETC development has a high probability of following.

- All projections were made for five-year time periods covering the full projection period of 1986-2005.

- All projections were based on the Oahu population and employment projections made by DPED in July, 1984, and are long-term average projections that do not project specific future business cycles or their effects.

- The range of projections describe the potential rate of future ETC development based on demand. The projections assume that EJC, the County and the State will take the actions necessary to develop and supply the full range of ETC products and facilities at rates falling within the range of projections. The actions assumed are the typical kinds of actions taken to plan, design, approve, build and market a multi-use urban center such as ETC.

- Our extensive experience with all aspects of many large, multi-use projects similar to ETC was applied thoughout the study.

The projections were prepared by carrying out the following series of major analytical steps:

1. A large volume of data about the Oahu economy, demographics and competitive real estate markets was collected and organized.

2. The general kinds of land uses appropriate for the town center were defined. This definition process included incorporating the County's GP objectives for the Ewa SUC into the ETC concept and land uses to the greatest extent possible.

3. An extensive analysis of the historical and projected demand/supply relationships for the Honolulu, Central Oahu, and Ewa housing markets was done. Projections of ETC and other Ewa development housing unit absorption were prepared based on the analysis.

4. The housing unit absorption projections were converted into population projections by applying appropriate persons/housing unit amounts to the projected housing units.

5. An analysis was made of the light industrial parks located in the western area of Honolulu, including the relationship of their absorption to growth in Oahu employment. Projections of light industrial space absorption in the Town Center were made based on the analysis.

6. Historical office space absorption in Honolulu was analyzed and related to growth in Oahu employment, and future absorption of Honolulu office space was projected. Projections of ETC absorption of this type of regional office space were then made based on the analysis and on an analysis of ETC's competitive situation.

7. The absorption of local population-serving office space in ETC was projected by applying an office space/person demand factor to Ewa's projected population. Local

population-serving office space is defined as space occupied by firms that primarily serve local Ewa population.

8. The demand for land for various government facilities and public uses in ETC was projected by applying land use/population relationships to the projected populations for ETC and Ewa.

9. Demand in ETC for typical urban commercial centers and facilities needed to serve the ETC and Ewa populations was projected by applying building space demand factors/person to the ETC and Ewa population projections.

10. The historical patterns of land absorption in James Campbell Industrial Park ("JCIP") were analyzed, and potential sources of future demand for JCIP land were studied including the effect of development and operation of the Barbers Point Deep Draft Harbor. Projections of future land absorption in JCIP were prepared based on these analysis.

11. Projections of ETC employment were generated by applying square feet/employee factors to building space projections, or employees/acre factors to land use projections, as appropriate.

12. Absorption of some ETC land uses was projected directly in acres. Land absorption for other uses was projected by applying floor area ratios to projected building space absorption, and by applying housing unit densities to projected housing unit absorption.

All of the projections were prepared using a large, complex computer model developed specifically to model the unique characteristics of the Ewa Town Center and the Ewa area.

Summary of the Projections

The projections for Ewa and the the Ewa Town Center are summarized in Tables 1-3. Following are some of the important points indicated by the summary tables. The comments are based on the mid-range projections.

- Total Ewa area population by the year 2005 is projected to be about 63,000, with Ewa Town Center accounting for 9,000 residents. This population is an increase of about 30,000 over the 1985 Ewa area population.

- The projected 2005 Ewa area population of 63,000 is 6.6% of the 954,500 population projected for Oahu in 2005 by DPED. Ewa population growth could be substantially higher than the mid-range projection if some of the planned residential developments are very successful and absorb at a higher rate. The high-range population projection of 99,000, which would have a fairly low probability of being achieved, would represent 10.4% of Oahu's projected population in 2005.

- Most of the 3,000 housing units projected for development in Ewa Town Center are planned to be affordable units.

- Present Ewa area civilian employment is approximately 4,400, and is projected to increase by about 22,000 to 26,000 employees by 2005. Ewa Town Center is planned to be the primary employment location in Ewa, and ETC accordingly provides almost 14,000 of the 22,000 increase in employment. The other significant generators of

TABLE 1

CHART SUMMARY FOR POPULATION, HOUSING UNITS, EMPLOYMENT & HOTEL/MOTEL ROOMS
EWA TOWN CENTER & ENTIRE EWA AREA
1985-2005

	1985	1986-1990	1991-1995	1996-2000	2001-2005	Totals As of 2005
• MID-RANGE •						
POPULATION						
Ewa Town Center	0	866	4,159	4,159	4,159	13,345
All Other Ewa	31,485	14,376	21,366	15,676	3,051	85,762
Total - Ewa	31,485	15,242	25,519	20,096	7,181	99,107
Cumulative Total - Ewa	31,485	46,647	72,166	92,073	99,253	
HOUSING UNITS						
Ewa Town Center	0	300	1,446	1,500	1,500	4,746
All Other Ewa	8,216	4,944	6,906	4,211	2,693	26,370
Total - Ewa	8,216	5,244	8,352	5,711	4,193	31,116
Cumulative Total - Ewa	8,216	13,460	21,812	27,523	31,716	
EMPLOYMENT						
Ewa Town Center	0	5,170	5,170	4,971	4,170	19,473
All Other Ewa	4,400	2,555	4,445	1,867	1,448	14,715
Total - Ewa	4,400	7,725	9,615	6,838	5,574	34,315
Cumulative Total - Ewa	4,400	12,125	21,740	28,578	34,315	
HOTEL/MOTEL ROOMS						
Ewa Town Center	0	0	0	0	100	100
All Other Ewa	0	500	1,500	1,000	4,000	4,000
Total - Ewa	0	500	1,500	1,000	4,100	4,100
Cumulative Total - Ewa	0	500	2,000	3,000	7,100	
• HIGH-RANGE •						
POPULATION						
Ewa Town Center	0	2,196	5,235	7,118	9,000	23,549
All Other Ewa	31,485	5,746	6,994	9,143	6,000	59,368
Total - Ewa	31,485	7,942	12,229	16,261	15,000	82,917
Cumulative Total - Ewa	31,485	39,427	51,656	67,917	82,917	
HOUSING UNITS						
Ewa Town Center	0	754	1,198	1,246	1,246	4,444
All Other Ewa	8,216	2,148	2,800	2,245	1,500	17,154
Total - Ewa	8,216	2,902	3,998	3,491	2,746	21,598
Cumulative Total - Ewa	8,216	11,118	15,116	18,607	21,598	
EMPLOYMENT						
Ewa Town Center	0	1,342	2,142	2,142	2,142	7,768
All Other Ewa	4,400	2,380	3,120	4,254	4,000	18,154
Total - Ewa	4,400	3,722	5,262	6,396	6,142	25,922
Cumulative Total - Ewa	4,400	8,122	13,384	19,780	25,922	
HOTEL/MOTEL ROOMS						
Ewa Town Center	0	0	0	0	0	0
All Other Ewa	0	500	2,000	1,000	4,000	7,500
Total - Ewa	0	500	2,000	1,000	4,000	7,500
Cumulative Total - Ewa	0	500	2,500	3,500	7,500	
• LOW-RANGE •						
POPULATION						
Ewa Town Center	0	1,285	3,235	2,250	2,250	9,020
All Other Ewa	31,485	2,109	4,145	4,170	4,000	45,909
Total - Ewa	31,485	3,394	7,380	6,419	6,250	54,929
Cumulative Total - Ewa	31,485	34,879	42,259	48,678	54,929	
HOUSING UNITS						
Ewa Town Center	0	455	1,455	755	755	3,420
All Other Ewa	8,216	1,055	1,865	2,000	2,000	15,136
Total - Ewa	8,216	1,510	3,320	2,755	2,755	18,556
Cumulative Total - Ewa	8,216	9,726	13,046	15,801	18,556	
EMPLOYMENT						
Ewa Town Center	0	1,342	2,142	2,142	2,142	7,768
All Other Ewa	4,400	2,380	3,120	4,254	4,000	18,154
Total - Ewa	4,400	3,722	5,262	6,396	6,142	25,922
Cumulative Total - Ewa	4,400	8,122	13,384	19,780	25,922	
HOTEL/MOTEL ROOMS						
Ewa Town Center	0	0	0	0	0	0
All Other Ewa	0	500	2,000	1,000	4,000	7,500
Total - Ewa	0	500	2,000	1,000	4,000	7,500
Cumulative Total - Ewa	0	500	2,500	3,500	7,500	

TABLE 2

ACREAGE & BUILDING SPACE SUMMARY
EWA TOWN CENTER
1985-2005

	HIGH-RANGE 1985	HIGH-RANGE 1986-1990	HIGH-RANGE 1991-1995	HIGH-RANGE 1996-2000	HIGH-RANGE 2001-2005	HIGH-RANGE Totals As Of 2005	MID-RANGE 1985	MID-RANGE 1986-1990	MID-RANGE 1991-1995	MID-RANGE 1996-2000	MID-RANGE 2001-2005	MID-RANGE Totals As Of 2005	LOW-RANGE 1985	LOW-RANGE 1986-1990	LOW-RANGE 1991-1995	LOW-RANGE 1996-2000	LOW-RANGE 2001-2005	LOW-RANGE Totals As Of 2005
Building Space																		
Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ewa Business Park	0	226,344	587,337	637,148	630,744	2,081,593	0	136,188	276,103	448,133	516,443	1,376,867	0	92,348	177,108	338,280	383,653	991,381
Commercial Development	0	961,596	587,196	418,616	227,162	2,114,570	0	742,329	186,011	234,404	232,996	1,393,940	0	719,905	110,493	149,780	154,438	1,134,616
Civic Center	0	40,000	110,000	130,000	150,000	430,000	0	20,000	40,000	80,000	100,000	240,000	0	0	40,000	40,000	60,000	140,000
Other Public Uses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Incremental Total	0	1,227,940	1,204,533	1,185,764	1,007,906	4,626,163	0	898,517	500,114	762,737	849,439	3,010,827	0	812,245	327,601	528,060	598,091	2,265,997
Cumulative Total	0	1,227,940	2,432,473	3,618,237	4,626,163		0	898,517	1,398,631	2,161,369	3,010,827		0	812,245	1,139,846	1,667,906	2,265,997	
Acres																		
Residential	0.0	51.5	141.1	141.1	112.9	446.6	0.0	18.9	89.3	112.6	90.1	310.9	0.0	7.3	51.8	81.9	65.6	206.6
Ewa Business Park	0.0	16.8	41.8	45.9	44.1	150.5	0.0	10.2	19.8	32.2	37.3	99.5	0.0	7.1	12.7	24.3	27.7	71.8
Commercial Development	0.0	84.9	44.7	37.0	18.3	184.9	0.0	65.7	14.3	20.8	20.7	123.5	0.0	63.7	9.8	13.3	13.7	100.5
Civic Center	0.0	9.5	11.9	12.7	12.6	46.7	0.0	6.3	4.2	7.6	9.1	27.3	0.0	4.7	3.7	4.0	5.5	17.9
Other Public Uses	0.0	160.4	181.4	161.7	110.3	613.7	0.0	97.8	72.0	100.3	101.3	371.6	0.0	89.9	41.2	65.7	67.7	264.5
Incremental Total	0.0	323.2	420.9	398.4	300.1	1,442.6	0.0	199.0	201.7	273.5	258.6	932.8	0.0	172.7	119.3	189.2	180.2	661.4
Cumulative Total	0.0	323.2	744.1	1,142.5	1,442.6		0.0	199.0	400.6	674.2	932.8		0.0	172.7	292.0	481.2	661.4	

TABLE 3

SUMMARY OF PROJECTED USES
EWA TOWN CENTER
1985-2005

	HIGH-RANGE 1985	HIGH-RANGE 1986-1990	HIGH-RANGE 1991-1995	HIGH-RANGE 1996-2000	HIGH-RANGE 2001-2005	HIGH-RANGE Totals As Of 2005	MID-RANGE 1985	MID-RANGE 1986-1990	MID-RANGE 1991-1995	MID-RANGE 1996-2000	MID-RANGE 2001-2005	MID-RANGE Totals As Of 2005	LOW-RANGE 1985	LOW-RANGE 1986-1990	LOW-RANGE 1991-1995	LOW-RANGE 1996-2000	LOW-RANGE 2001-2005	LOW-RANGE Totals As Of 2005
Residential:																		
Housing Units	0	300	1,440	1,500	1,500	4,740	0	90	750	1,100	1,100	3,040	0	0	435	755	775	1,965
Acres	0.0	51.5	141.1	141.1	112.9	446.6	0.0	18.9	89.3	112.6	90.1	310.9	0.0	7.3	51.8	81.9	65.6	206.6
Population	0	846	4,159	4,330	4,330	13,665	0	265	2,194	3,225	3,225	8,909	0	0	1,265	2,230	2,288	5,782
Ewa Business Park:																		
Building Square Footage	0	226,344	587,337	637,148	630,744	2,081,593	0	136,188	276,103	448,133	516,443	1,376,867	0	92,348	177,108	338,280	383,653	991,381
Saleable Acres	0.0	16.8	41.8	45.9	44.1	150.5	0.0	10.2	19.8	32.2	37.3	99.5	0.0	7.1	12.7	24.3	27.7	71.8
Employees	0	672	2,156	2,375	2,390	7,593	0	531	1,024	1,663	1,933	5,151	0	369	658	1,256	1,435	3,719
Commercial Development:																		
Commercial Hotel/Motel Rooms	0	0	0	0	100	100	0	0	0	0	0	0	0	0	0	0	0	0
Building Square Footage	0	961,596	587,196	418,616	227,162	2,114,570	0	742,329	186,011	234,404	232,996	1,393,940	0	719,905	110,493	149,780	154,438	1,134,616
Saleable Acres	0.0	84.9	44.7	37.0	18.3	184.9	0.0	65.7	14.3	20.8	20.7	123.5	0.0	63.7	9.8	13.3	13.7	100.5
Employees	0	2,686	1,487	1,172	625	5,887	0	2,091	536	868	461	3,944	0	2,025	317	430	443	3,215
Civic Center Development:																		
Building Square Footage	0	40,000	110,000	130,000	150,000	430,000	0	20,000	40,000	80,000	100,000	240,000	0	0	40,000	40,000	60,000	140,000
Saleable Acres	0.0	9.5	11.9	12.7	12.6	46.7	0.0	6.3	4.2	7.6	9.1	27.3	0.0	4.7	3.7	4.0	5.5	17.9
Employees	0	357	747	887	810	2,928	0	343	264	481	562	1,690	0	256	237	250	352	1,095
Other Public Uses:																		
Building Square Footage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Saleable Acres	0.0	160.4	181.4	161.7	110.3	613.7	0.0	97.8	72.0	100.3	101.3	371.6	0.0	89.9	41.2	65.7	67.7	264.5
Employees	0	1,064	790	638	281	2,773	0	703	259	348	343	1,644	0	676	149	210	216	1,253
Ewa Town Center Grand Totals:																		
Housing Units	0	300	1,440	1,500	1,500	4,740	0	90	750	1,100	1,100	3,040	0	0	435	755	775	1,965
Population	0	846	4,159	4,330	4,330	13,665	0	265	2,194	3,225	3,225	8,909	0	0	1,265	2,230	2,288	5,782
Commercial Hotel/Motel Rooms	0	0	0	0	100	100	0	0	0	0	0	0	0	0	0	0	0	0
Building Square Footage	0	1,227,940	1,204,533	1,185,764	1,007,906	4,626,163	0	898,517	500,114	762,737	849,439	3,010,827	0	812,245	327,601	528,060	598,091	2,265,997
Saleable Acres	0.0	323.2	420.9	398.4	300.1	1,442.6	0.0	199.0	201.7	273.5	258.6	932.8	0.0	172.7	119.3	189.2	180.2	661.4
Employees	0	5,176	5,180	4,991	4,166	19,373	0	3,680	2,071	3,152	3,321	12,432	0	3,327	1,341	2,147	2,647	9,282
Ewa Town Center Cum. Totals:																		
Housing Units	0	300	1,740	3,240	4,740		0	90	840	1,940	3,040		0	0	435	1,190	1,965	
Population	0	846	5,025	9,355	13,685		0	265	2,459	5,684	8,909		0	0	1,265	3,495	5,782	
Commercial Hotel/Motel Rooms	0	0	0	0	100		0	0	0	0	0		0	0	0	0	0	
Building Square Footage	0	1,227,940	2,432,473	3,618,237	4,626,163		0	898,517	1,398,631	2,161,369	3,010,827		0	812,245	1,139,846	1,667,906	2,265,997	
Saleable Acres	0.0	323.2	744.1	1,142.5	1,442.6		0.0	199.0	400.6	674.2	932.8		0.0	172.7	292.0	481.2	661.4	
Employees	0	5,176	10,276	15,268	19,373		0	3,680	5,759	8,911	12,432		0	3,327	4,688	6,834	9,282	

Ewa employment growth are West Beach and James Campbell Industrial Park.

- By the year 2005, the employment/population ratio for Ewa is projected to be about 42%. This represents an excellent balance between jobs and residents in Ewa, and is close to the projected Oahu ratio of 47%. The 42% ratio indicates that Ewa residents will probably generate only a limited number of peak hour commute trips into Honolulu.

- The projections indicate absorption of over three million square feet of building space in Ewa Town Center by 2005, with the Ewa Business Parks and ETC commercial uses each absorbing about 1.4 million square feet. The large commercial absorption of 740,000 square feet shown for the 1986-1990 period is to a large extent demand for community-level commercial uses by the present Ewa area population. That demand is now satisfied by Ewa residents shopping outside Ewa, primarily in the Waipahu-Pearl Ridge corridor. As commercial centers are developed in Ewa Town Center over the next 5-10 years, Ewa residents will progressively shift to ETC commercial centers for their shopping needs.

- Approximately 930 net acres of land area are projected to be absorbed in Ewa Town Center by the year 2005. "Net" acres are acres directly used by ETC public and private uses, and do not include land absorbed by streets, drainage, utility easements, etc., or land absorbed by college campuses. The ETC land absorbed by such uses could be 20%-30% of the net acres absorbed, implying a gross ETC absorption of some 1,100-1,200 acres by 2005. A more precise estimate of ETC gross acreage absorption will be produced by the Ewa Town Center implementation program now being prepared by EJC.

Ewa Town Center

The Ewa Town Center (ETC) is being planned for development as a true urban center with all the urban services, activities, and facilities needed by the Ewa area. The map of Figure 2 shows the general location of ETC. A more precise location for ETC and all its specific projects is being defined as part of the implementation program being prepared for ETC. Development of ETC is planned to start as soon as the necessary government approvals are obtained. The specific projects currently being planned for ETC are summarized briefly below:

- Ewa Business Parks ("EBP"): EBP consists of one or more business parks constructed in a number of phases. The parks will be spacious, attractive and landscaped. EBP will contain a mixture of attractively designed light industrial/R&D/high-tech and low-rise office buildings that are intended to supply the needs of a wide range of businesses. EBP will be a major employment center in ETC.

- Ewa Civic Center: The Ewa Civic Center is the ETC location for Federal, State and County government offices, local population-serving government administrative offices, police and fire facilities, and other appropriate public facilities, such as a library.

- Other Ewa Public Land Uses: This category of ETC uses includes schools, parks and recreation facilities, hospitals, medical clinics, and churches as well as an appropriate college/university campus. These uses will be located in appropriate places throughout ETC.

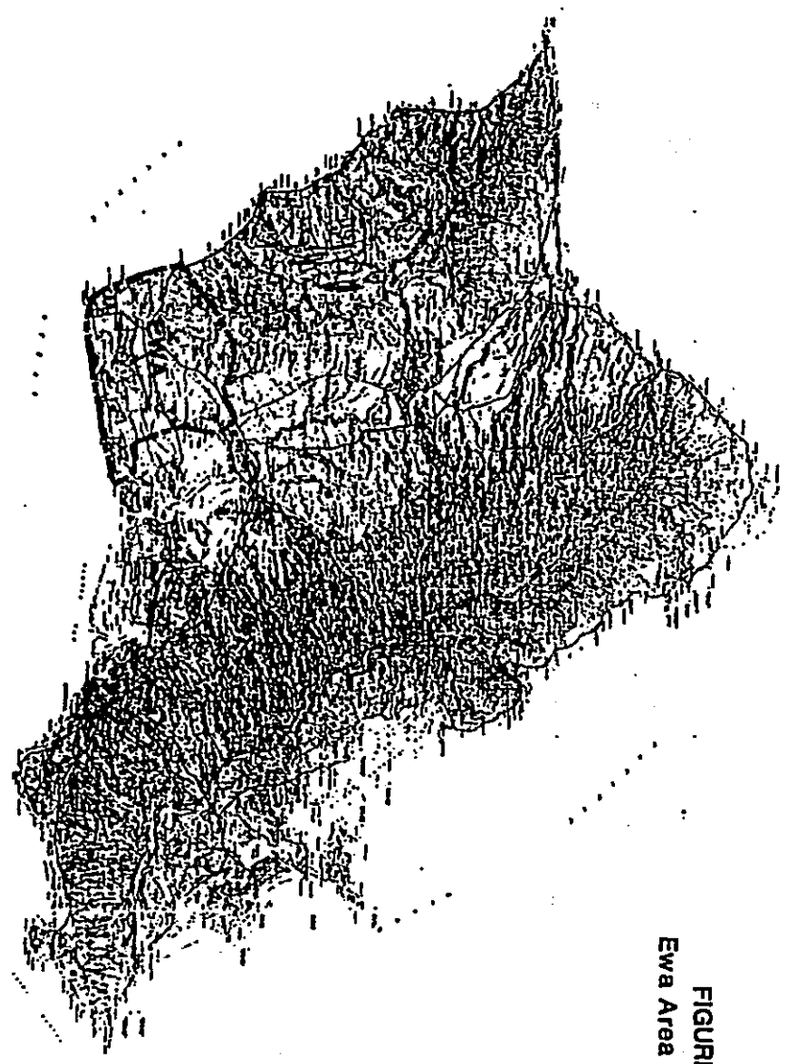


FIGURE 1
Ewa Area Included

- Ewa Town Center Commercial: The ETC commercial category includes the full range of commercial facilities, primarily retail facilities, needed to serve the Town Center and Ewa area populations. These facilities will be developed in the form of attractive shopping and activity complexes, and will be located at a variety of appropriate locations in the Town Center.

- Ewa Town Center Housing: Most of the ETC housing is planned to be affordable housing targeted for the lower end of the price/rent spectrum. A full range of housing will be provided, including single-family detached tract homes, single-family detached patio homes, townhouses and other types of attached homes, condominiums, and apartments. One purpose of providing affordable housing is to provide an adequate supply of housing for employees working in the Town Center.

Ewa Town Center Housing

An extensive analysis was performed of historical and projected housing markets on Oahu, including:

- Aggregate demand/supply relationships for housing in Honolulu, Central Oahu, and Ewa.

- The demand/supply situation for those areas based on household incomes and housing unit prices/rent.

- The competitive sitvawion of Ewa in the housing market compared to Central Oahu and Honolulu.

The housing market analysis indicated the following:

- Low future annual increments of aggregate demand for housing units on Oahu due to:
  - A low projected rate of population growth.
  - The projected stabilization and then slow increase in fertility rates, implying a future stable or slowly increasing average household size.
- A very low future annual demand for higher priced homes on Oahu (over $200,000).
- A steadily increasing share of Oahu housing unit absorption in Ewa and Central Oahu compared to Honolulu due to:
  - Low future housing unit absorption rates in Honolulu since most of the housing units produced will have to be expensive and much of the product will be high-rise condominiums, for which there is low demand.
  - High rates of absorption of attractive, preferred types of housing in the lower-middle to upper-middle price range in Central Oahu and Ewa ($90,000 - $200,000), excluding affordable housing.
- The existing and planned major housing developments in Central Oahu and Ewa will largely satisfy future demand for middle-priced housing in Central Oahu and Ewa, and also fully satisfy demand for higher priced housing.
- Very little housing is now being produced at affordable prices on Oahu (under $90,000 for single-family detached houses; under $70,000 for townhouses; under $50,000 for condomiums).

- There is now, and will continue to be in the future, a very large demand for such affordable housing.

The results of the housing market analysis led to the conclusion that most ETC housing should be affordable housing, for the following reasons:

- Existing and planned residential developments in Central Oahu and Ewa will fully supply the demand for middle and higher-priced housing in those areas, making entry of ETC into these highly competitive segments of the housing market difficult.
- There is a present and projected future substantial under-supply of affordable housing relative to demand on Oahu, and thus a large unsatisfied demand opportunity for ETC in this segment of the housing market.
- Affordable housing is needed for ETC, West Beach and JCIP employees.

The following general types of housing units were projected for development in ETC:

- Single-family detached tract homes at 4-5/acre.
- Single-family patio homes (attached and detached) at 6-8/acre.
- Townhouses and attached homes at 10-15/acre.
- Low-rise condominiums at 20-30/acre.
- Low-rise apartments at 20-30/acre

Housing development cost analyses and our experience with affordable housing projects indicate that these types of housing can be produced in affordable price/rent ranges.

The projected absorption of housing units in the Ewa Town Center is summarized in Table 4. The ETC housing unit absorption projections shown in the Table are substantially lower than the projected demand for affordable housing units, reflecting the longer time generally required to design and produce affordable housing compared to middle and upper-priced housing, and also reflecting the lower production rates inherent during initial development of a new urban center.

Ewa Population

In order to prepare the various projections for ETC, it was necessary to make population projections for the other residential developments in Ewa, which were divided into two major categories:

- Communities that are not expected to experience any significant future residential development since essentially all of the residential land in those communities has been developed (Honokai Hale/Nanakai Gardens, Barbers Point NAS, Ewa Beach).

- Communities that are expected to experience further residential development (ETC, Ewa Marina, Makakilo, West Beach, Ewa Plantation).

The population projections were derived by applying average number of persons per housing unit to the housing unit projections for these communities. The projected populations for all of the Ewa communities are summarized in Table 5.

TABLE 5

SUMMARY PROJECTIONS
EWA TOWN CENTER - RESIDENTIAL
1985-2000

	1985	1990	2000	1985	1990	2000
Set Family Rent ($1/month):						
Housing Units						
Acres						
Population						
Set Family Rent ($7/month):						
Housing Units						
Acres						
Population						
Condominium ($12/month):						
Housing Units						
Acres						
Population						
Condominium ($25/month):						
Housing Units						
Acres						
Population						
Apartments ($25/month):						
Housing Units						
Acres						
Population						
Total Residential Developments:						
Housing Units						
Acres						
Population						
Cumulative Residential Developments:						
Housing Units						
Acres						
Population						

The Ewa Business Parks

The Ewa Business Parks ("EBP") are planned to be one or more business parks developed in a number of phases. EBP are intended to provide developed lots and building space to house three major categories of users: Light Industrial/R&D/high-tech; regional office; local population serving office.

EBP are planned to provide an attractive and spacious environment for businesses, similar to attractive Southern California business parks. The concept is to provide an attractive alternative business environment on Oahu for firms that would prefer this kind of environment, which does not now exist on Oahu.

The demand for light industrial/R&D/high-tech space in ETC was estimated primarily by analyzing the historical absorption experience of three existing light industrial parks in Honolulu and the relationship of their absorption to Oahu employment growth. The three light industrial parks analyzed in depth are: Central Park; Pearl City Park; Gentry Park.

These light industrial parks were selected for the following reasons:

- Each had an absorption track record of at least five years.
- They are the most similar to the planned EBP, although they do not have many of the features planned for EBP.
- The parks are located in the western urbanized portion of Honolulu in areas that have urbanized in somewhat the way ETC will urbanize.

- They have users generally of the types that are expected to locate in EBP.

The following major findings resulted from analysis of the three parks:

- The three parks have absorbed 120,000-140,000 square feet of building space annually over the last five years. Central Park was by far the most successful park, primarily due to its location and good freeway access, and absorbed a high proportion of that space. During that five-year period, total employment on Oahu grew very little, indicating that most of the users locating in the three parks relocated into the three parks from previous locations elsewhere in Honolulu.

- Many users of light industrial space in Honolulu appear to be ready to relocate to the periphery of the urbanized area if adequate space is provided in more attractive, less congested, and lower priced parks.

- There is only a small supply of developed lots now available in the Central and Pearl City parks.

- Redevelopment activities in existing light industrial areas of Honolulu, such as Kaka'ako, will be forcing a significant number of light industrial space users to relocate in the future.

- The foregoing findings indicate that a significant number of light industrial space users can be attracted to a business park in ETC that offers:

  - A more attractive, spacious environment

  - Lower prices than the three parks analyzed and in other light industrial areas in Honolulu

  - Affordable housing in ETC for employees of the firms locating in ETC.

Very modest rates of absorption of light industrial building space were projected for EBP during the five years through 1990, with increasing rates of absorption projected thereafter as EBP becomes established. The projected absorption of light industrial space and land in EBP is summarized in Table 6.

The demand for regional office space in EBP was estimated by analyzing the historical and projected future absorption of office space in the downtown Honolulu office corridor. Regional office space is defined as space occupied by firms that primarily do not serve the local population but rather serve firms and businesses throughout the State or in large regions.

The historical absorption of Honolulu office space since 1968 was analyzed and related to the growth in total Oahu employment over that same period. The analysis indicated absorption of an increasing number of square feet of office space per employee during the last ten years. This relationship was projected through the year 2005 and then applied tr the DPED employment projections for Oahu to produce projections of Oahu office space absorption over the same period. The projected absorption ranged from about 220,000 square feet per year to 280,000 square feet per year.

Oahu presently does not have any suburban regional office space concentrations, such as the EBP planned for Ewa Town Center. However, over the last 20 years numerous successful suburban office parks have been developed around the periphery of every major

urban area on the mainland. The success of such suburban office parks demonstrates clearly that many firms will move from central high-rise office concentrations to low-rise office space in suburban parks for a variety of reasons. The Ewa Business Parks are planned to be similar to those successful suburban office parks on the mainland.

The success of such suburban parks indicates strongly that EBP will be able to attract an appreciable number of present and future regional office space using firms to EBP. Since ETC is located beyond the present Honolulu urbanized area, and since EBP will be a pioneering-type of development on Oahu, very modest absorption rates of regional office space in EBP were projected for the first ten years. Absorption was projected to increase after that time as ETC urbanizes and the Ewa Business Parks become established. The projected absorption of regional office space in EBP is summarized in Table 6.

Local population-serving office space is office space occupied by firms that primarily serve local population and businesses in the Ewa area. The demand for this type of office space in EBP was estimated by applying a demand factor of 5,000 square feet of office space per 1,000 people to the projected populations for certain selected Ewa area communities. This factor was derived from a factor typical for urbanized areas in Southern California, which was reduced by 10% to reflect the lower incomes of households that will be occupying affordable housing in ETC.

Net acreage absorption in EBP was calculated by applying appropriate floor area ratio factors to the building space absorption projected for EBP.

The projected absorption of local population-serving office space and net acreage in EBP is summarized in Table 6.

ETC Civic Center

A Civic Center is planned for development in the Ewa Town Center. It is envisioned to be an attractive, spacious complex that will serve as the location for most government offices and facilities in ETC. The two major types of Civic Center users are anticipated to be:

- Federal, State, and County government offices and facilities serving the local area population, such as: administrative offices; police and fire facilities; a library.
- Federal, State and County government offices that provide administrative services for a much larger area than Ewa (regional governmental offices).

In the past there has been little development of regional government office space outside Honolulu, with the exception of some Federal facilities. However, given Ewa's SUC designation and the stated County objective of encouraging urban development and employment in the SUC, it is assumed that various agencies at the State and County level will establish substantial regional administrative operations in office space in the ETC Civic Center.

Since the location of administrative operations depends on discretionary decisions by government agencies and not on market forces, modest levels of regional government office space absorption were projected in the early years of ETC development, with the rate of such office space absorption increasing as the Town Center develops. The projected absorption of regional government office space in the Civic Center is shown in Table 7. The office building space projections were converted to land absorption using a floor area ratio of .3.

The land used in the Civic Center by government operations serving the local Ewa population was estimated using demand factors related to various specific Ewa area populations. For each of the uses, a relevant service population was defined and an applicable net acreage per person factor was applied to the Ewa population projections to estimate the net acres required. The net acreage per person factors used were derived from standard land use planning factors used on the mainland and Oahu. The projected absorption of land in the Civic Center by local population-serving government activities is summarized in Table 7.

ETC Other Public Uses

Development of a true urban center that will serve the needs of Ewa residents requires the following additional public facilities: schools; parks and recreation facilities; hospital and medical clinics; churches. These uses will be located throughout ETC in appropriate places. Land absorption for these other public uses was projected using demand factors related to the Ewa population. For each of the uses, a relevant service population was defined, and an applicable net acreage per person factor was applied to the Ewa population projections to estimate the net acreage required. The net acreage per person factors used in the projections were developed from standard land use planning factors used for Southern California urbanized areas. The acreage absorption projected for these other public uses in the town center is summarized in Table 8.

By the year 2005, the Ewa area is projected to have a substantial population in the range of 60,000-80,000 persons. A community of this size will need the educational services of one or more college-level institutions. At a minimum, a community college campus would be needed. A campus of the University of Hawaii or a private four-year college would also be appropriate since such a campus located in Ewa would serve Western Honolulu,

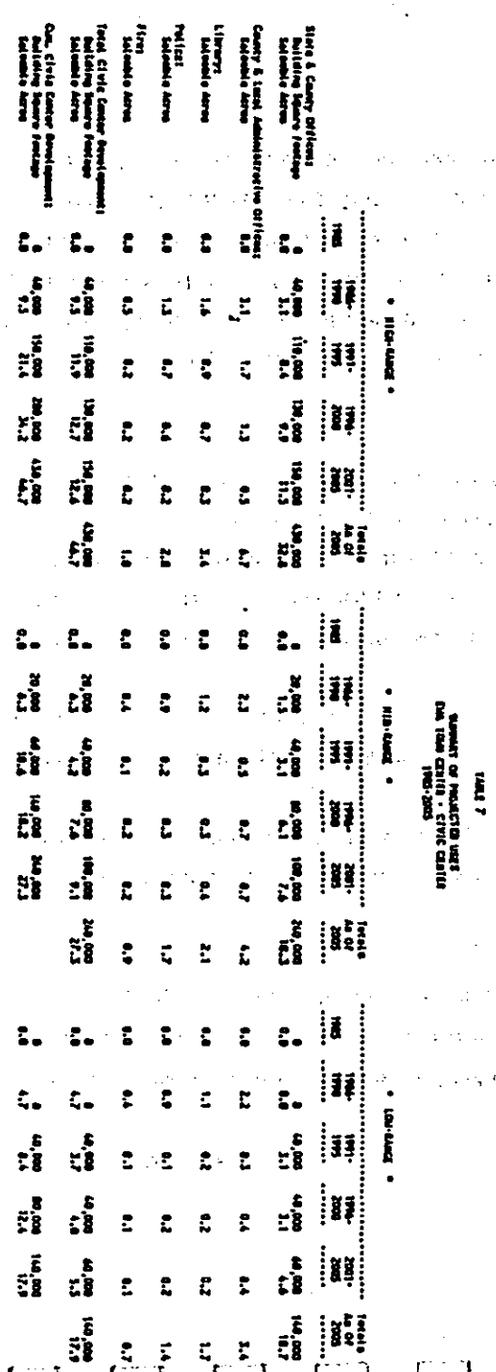
Central Oahu and Waianae, as well as the Ewa community. The land needed by one or more such college/university campuses was not included in the ETC absorption projections because the land requirement and campus development timing should be determined by separate studies of the college/university facilities and campus areas needed.

ETC Commercial

Population, employees and businesses in ETC will need a full range of commercial goods and services provided in the Town Center. In addition, ETC is the logical central location for certain kinds of commercial facilities and services that serve the whole Ewa area and even some peripheral areas, such as a regional mall, discount center, and an auto sales center. Demand for commercial center space in ETC was estimated by grouping all of the various kinds of required commercial activities into the types of centers and facilities commonly developed today for commercial activities. The types of centers and facilities used were:

- Neighborhood shopping center
- Community shopping
- Discount and home improvement center
- Automobile and boat center
- Commercial recreation
- Regional mall
- Hotel/motel

These types of ETC commercial facilities will be appropriately located at various places in the Town Center. Demand for each of the facilities and centers was estimated using demand factors related to ETC and certain Ewa area populations. For each of the



centers/facilities a relevant population was defined, and a building square foot/person factor was applied to the population projections to estimate demand. The factors used were derived from demand factors for a typical Southern California urbanized area. The basic demand factors were reduced by 10% to reflect: The high proportion of affordable housing in ETC, implying lower average household incomes and commercial demand; and the lower average household incomes in communities such as Ewa Beach, Honokai Hale, and Ewa Village.

The demand for business-type hotel/motel rooms in ETC was estimated by a special analysis. The room demand projection was based on the building space projections for the Ewa Business Parks and the Civic Center, and took into account the 4,000 transient accommodation resort units planned for West Beach.

Table 5 summarizes the building space, hotel room, and net acres absorption projected for ETC commercial centers/facilities. The projected demand for building square feet was converted into demand for net acres using floor area ratios of .2-.35.

James Campbell Industrial Park

The land absorption projections for James Campbell Industrial Park (JCIP) are based on analyses of:

- Historical absorption patterns in JCIP.
- The types of users that have located in JCIP, and changes in the type of users over time.

- Additional demand for JCIP land that will be generated by operations of the Barbers Point Harbor (BPH).

The general historical pattern of JCIP land absorption has been one of:

- Fairly high rates of land absorption in the early years of JCIP as users requiring large areas located in JCIP due to the lack of large amounts of less expensive, developed heavy industrial land elsewhere in the Honolulu area.

- Slowly declining absorption, with low levels of absorption in recent years. The firms locating in JCIP in recent years have tended to be more of a light industrial and distribution character than the heavy industrial users of early years.

Throughout its history, land has been absorbed in JCIP at a rate substantially higher than the rate of growth in Oahu employment would indicate. Even during the last five years of low JCIP land absorption rates, absorption has been higher than the rate of employment growth for Oahu, which has changed very little during the past five years. This indicates that firms continue to be willing to relocate/expand out of Honolulu to JCIP due to:

- Unavailability of suitable large land parcels in Honolulu.

- High land prices/rents and building space rents in Honolulu.

- Increasing congestion in Honolulu.

- Redevelopment of some downtown industrial areas.

In view of the foregoing, it appears that future land absorption in JCIP, excluding absorption due to BPH, will be at levels and have characteristics more closely resembling JCIP absorption of the past 5-10 years than absorption prior to that period. During 1975-1980, land absorption in JCIP averaged 12-15 acres a year, with absorption since 1980 averaging approximately five acres per year. The lower rate of absorption since 1980 was due in part to the recent recession and the highly publicized controversy over the recent substantial increase in land rents at JCIP. Future land absorption in JCIP, excluding the effect of BPH, is anticipated to fall somewhere between the 1975-1980 absorption and the post-1980 absorption, or an estimated absorption rate of 8-12 acres per year.

Operation of BPH adjacent to JCIP will generate some demand for JCIP land from firms with operations related to BPH activity. A number of studies were done 10-15 years ago of anticipated BPH activity and the resulting affect of such activity on JCIP absorption. These studies generally concluded that BPH activities would add an additional 7-15 acres per year to JCIP land absorption after BPH was fully developed and operational. The studies were based on projections of Oahu economic growth that were substantially higher than the current projections of future Oahu economic growth. In view of the lower projected economic growth rate, it was estimated that BPH would add 8-12 acres per year to JCIP land absorption for a number of years after BPH becomes fully developed and operational.

The projected absorption of JCIP land and building space is summarized in Table 10. JCIP land absorption was converted to building space absorption using an assumed floor area ratio of 0.2.

Ewa Employment

Civilian employment in ETC and JCIP was estimated by applying the following kinds of factors to the absorption projections for ETC and JCIP uses:

- For projections of building space: Number of employees per 1,000 square feet of space.
- For certain acreage projections: Number of employees per acre.
- For certain public uses: Number of employees per 1,000 population.

The factors used are based on typical factors experienced in Southern California urban areas and planning factors used on Oahu. The employment projections for planned Ewa developments outside ETC and JCIP are based on the developers' projections. Employment in certain other Ewa developments was assumed to remain constant at current levels (Ewa Beach, Barbers Point NAS, Makakilo). The employment projections for ETC and the Ewa area are summarized in Table 11.

TABLE 10

BUDGET PROJECTION
CAMPBELL INDUSTRIAL PARK
1985-2005

	HIGH-RANGE						MID-RANGE						LOW-RANGE					
	1985	1986-1990	1991-1995	1996-2000	2001-2005	Totals As Of 2005	1985	1986-1990	1991-1995	1996-2000	2001-2005	Totals As Of 2005	1985	1986-1990	1991-1995	1996-2000	2001-2005	Totals As Of 2005
Campbell Industrial Park:																		
Building Square Footage	0	792,792	1,045,440	1,045,440	1,045,440	3,929,112	0	592,416	845,864	871,200	871,200	3,179,880	0	426,888	644,688	696,960	696,960	2,465,496
Saleable Acres	0.0	91.0	120.0	120.0	120.0	451.0	0.0	68.0	97.0	100.0	100.0	365.0	0.0	49.0	74.0	80.0	80.0	283.0
Cumulative Totals:																		
Building Square Footage	0	792,792	1,838,232	2,883,672	3,929,112		0	592,416	1,437,480	2,308,680	3,179,880		0	426,888	1,071,576	1,768,536	2,465,496	
Saleable Acres	0.0	91.0	211.0	331.0	451.0		0.0	68.0	165.0	265.0	365.0		0.0	49.0	123.0	203.0	283.0	

APPENDIX B

An Evaluation of the Profitability Impact on Oahu Sugar Company Resulting from Secondary Urban Center Land Withdrawals.

Jack Larsen, Agro-Industrial Consultant. March 1986.

AN EVALUATION OF THE PROFITABILITY IMPACT ON OAHU SUGAR COMAPNY RESULTING FROM SECONDARY URBAN CENTER LAND WITHDRAWALS

MARCH 1986

JACK LARSEN AGRO-INDUSTRIAL CONSULTANT
P.O. BOX 10374, HONOLULU, HAWAII 96816 TELEPHONE (808) 734-8187

JACK LARSEN AGRO-INDUSTRIAL CONSULTANT
PRESIDENT, AGROLAND, INC. TELEPHONE (808) 734-8187
P.O. BOX 10374, HONOLULU, HAWAII 96816

March 18, 1986

Mr. Charles Ehrhorn
Administrator Residential/Resort Properties
James Campbell Estate
828 Fort Street Mall Suite 500

Dear Mr. Ehrhorn;

Attatched hereto is my recently completed report entitled An Evaluation of the Profitability Impact on Oahu Sugar Company Operations Resulting from Secondary Urban Center Land Withdrawals.

Please let me know if there is additional information you require or if a change of focus is desireable. I have enjoyed working on this report and only regret the shortage of time to do a more complete analysis.

Respectfully submitted,

Jack L. Larsen

Jack L. Larsen

TABLE OF CONTENTS

		PAGE NO.
I.	The Requirement for US Congressional Sugar Support	1
II.	Two Productivity Levels of 100,000 and 80,000 Tons Sugar Annually Can Maintain Profitability Through Double and Single Mill Systems	3
III.	Operating Cost Reductions and Yield Improvements at OSCo	5
IV.	Longterm Crop Land Removal is Compatible with Profitable Operations at OSCo	
Graph	OSCo Land Requirment for 100,000 Ton Annual Sugar Production at Various Yield Levels	8A
Map & 2 Overlays	Ewa Development Plan Amendment Requests	8B
V.	No Known Crops Are Feasible Sugar Replacements at OSCo	9

LIST OF TABLES

Table No.		Page No.
1	Hawaiian Sugar Planter Association 10 Year Report of Sugar Production	15
2	Average Tons Sugar per Acre Yields and Acres Harvested on Plantation Fields and Campbell Estate Areas	16
3	Proposed Longterm Sugar Area Withdrawal Schedule for Secondary Urban Center	17
4	Long Term Area Withdrawal Outside the Secondary Urban Center	18
5	Estimated Cattle Lease Rent Potential for Campbell Estate Lands Leased to OSCo	19
6	Projected Yield and Intrinsic Feed Value Comparsions Between Forage Crop Options	20

AN EVALUATION OF THE PROFITABILITY IMPACT

ON OAHU SUGAR COMPANY OPERATIONS

RESULTING FROM SECONDARY URBAN CENTER LAND WITHDRAWALS

Five major factors that determine the continuing profitability of Oahu Sugar Company (OSCo) are listed below.

(I) Sugar production in Hawaii will depend upon the continued protection of the US sugar industry by the US Congress.

(II) It is very likely that profitable OSCo operations will require approximately 100,000 tons of sugar annually in a double mill system and 80,000 tons with a single mill train.

(III) Operating cost reductions and yield increases will continue to be the primary function of OSCo management.

(IV) Long term crop land withdrawals for urban use remain compatable with profitable sugar operations at OSCo.

(V) No alternative crop prospects were found that are economically feasible sugar crop replacements at OSCo.

I. The Requirement for US Congressional Sugar Support

The 1985 US Congress passed a five year farm bill that includes an 18.5 cents per pound price floor ($370 per ton) for the US sugar industry and established import restrictions limiting cheap foreign sugar from being dumped in the US market. These barriers and price support mechanism should allow the most efficient sugar producers a profit margin on their operations.

At the present time world sugar production is in surplus so that

increased world prices in the short term are not realistic. The world price for refined sugar has ranged between four and six cents a pound for the last three years and will likely continue in this price range for the foreseeable future. At a raw sugar price of $370 per ton less than half the Hawaiian plantations are showing a profit today. The largest ones are profitable where the bulk of sugar is produced so that the entire industry can be profitable while inidvidual operations are not.

The farm bill support mechanism is a guarantee for the Federal government to purchase US produced sugar at 18.5 cents a pound. The right to sell to the government can be exercised by any producer if the wholesale domestic market price falls below this level. Until recently no producer had sold sugar to the Federal government, so the support structure had not cost the government any cash outlays.

The arguement that the US consumer is forced to pay more than the current world price for sugar is true and does increase the cost of some food in the US market. The fact is that world-wide sugar production is subsidized by each country of origin to some degree and the world market surplus is composed of marginal sugar from many countries and probably is less than 10 percent of total sugar produced in most countries. Many dump their surplus sugar on the world market and sell it at any price. US market quotas are eagerly sought and US quotas are often surreptitiously filled between countries to acquire dollars. If the 10 percent of surplus world production (9 millioin tons) was dumped on the US market, all US sugar producers would be forced out of business. Eventually the US consumer would likely pay higher prices for imported sugar and there would be no domestic long range production source available for US emergency

requirements.

Although the US consumer pays more for sugar than the world price, it is not clear that the US consumer would reap the cost differential of 10 to 12 cents a pound if import were allowed to enter the domesitc market. The food processing and soft drink industries continue to be strong advocates for opening up the sugar import quotas. If this happens, these industries would be able to buy cheap sugar and manipulate their profit margins between the low priced sugar imports and the high priced US retail market with little benefit flowing to the average consumer.

Another threat to the traditional US sugar producer is the domestic erosion in per capita sucrose consumption and the replacement of sucrose with lower priced fructose (high frutose corn syrup-HFCS) by most of the industrial food processors. Only the most efficient sucrose producers among the beet and cane sugar growers will survive this major market shift. The last stronghold of the sucrose producer is in crystallized retail sugar where competition continues strong from beet, foreign import quotas and the growing use of artifical sweeteners.

A small drop in the US price would be disastrous for the Hawaiian sugar industry. Congress is the last barrier holding off the demise of the industry and without their support no effort in cost reduction or yield improvement would be valid.

II. Two Productivity Levels of 100,000 and 80,000 Ton Sugar Annually Can Maintain Profitability Through Double and Single Mill Systems

Hawaiian sugar industry profitability was studied in depth by Bruce C. Plasch in a report prepared for the DPED in April, 1981 titled Hawaii's Sugar Industry, Problems, Outlook and Urban Growth Issues. In this report, OSCo was submitted as an example where competing urban and agricultural land use continues to be a problem but can be worked out with careful balancing between the two demands. In his economic projection, Plasch maintains that 100,000 tons of annual sugar production at OSCo was necessary to utilize the double mill capacity, support the overhead, general administration and maintain profitability. This volume would keep OSCo as the fourth largest sugar producer in the State.

A more recent draft report in January 1986 for the American Planning Association by Plasch, has revised this earlier production requirement to a lower figure by following Amfac's idea of converting the present double train mill to a single mill train that would be profitable at 80,000 tons. This operating level was confirmed by Bill Balfour, President and Manager of OSCo who concurs that 9,000 acres could produce this sugar and maintain a viable operation providing costs can be contained and the sugar price support continues. His concern is verified by the fact that OSCo was eleventh low cost producer out of the thirteen operating plantations in 1985 yet they were second in sugar yield per acre.

To be conservative in this evaluation, the double mill requirement of 100,000 ton annual production has been used as a threshold to project crop land requirements in conjunction with improved sugar yields. A different operation would be involved in the single mill configuration that would have a reduced land requirement and be operated similar to the Amfac Kekaha plantation which is profitable at the 50,000 ton level.

A 10 year summary of HSPA data on the sugar industry shows in Table 1 that OSCo has averaged 100,000 tons annually with a range from 91,800 to 114,300. In 1985 OSCo produced 97,500 tons of sugar harvested from 6560 acres to report 14.87 tons sugar per acre (TSPA) their record yield. A doubling of annual harvested area does not exactly equal plantation area because of variable crop age and idle acres but is used in this report as a rule of thumb guide.

III. Operating Cost Reductions and Yield Increases at OSCo

Over the last four years management and staff at OSCo has performed a remarkable job in increasing yields and reducing costs. Since Amfac Inc. adapted the OSCo survival plan in June 1982, the plantation has changed operations in several ways and continues its search for both cost and yield improvements which are still the main focus of plantation management.

They attribute the gain in yield between 1981 and 1985 to several operating changes that were consciously made in pursuit of reduced costs and increased yields. Table 2 illustrates the dramatic improvement of the last five years compared with the ten year history of yield and areas cultivated at OSCo.

Over 4,400 acres of cultivated area were dropped from production following the final harvest on these fields between 1980-'83. In summary these areas included the Bishop Estate lands with lease termination in 1980 (The number 500 fields known as Waiawa) and some land returned to Dole for pineapple production totaling almost 1800 crop acres, Campbell Estate lands in Kunia where pumping costs were excessive, 1,220 acres, Campbell Estate lands at Ewa, 993 acres where poor soil and poor water were negative high cost factors and some of the Waikele area owned by Amfac approximately 400 acres.

Management gained the flexibility to allocate water resources with this 4,400 acre contraction of cultivated area. The plantation staff credits the most dramatic yield and cost improvement to reducing the amount of low quality pump water (high salt content) and replacing it with sweet water from Waihole ditch and the better artesian wells. The area reduction and subsequent operating changes had the double advantage of reducing pumping costs and keeping the salt buildup below the cane root zone. Pumping costs (a function of electrical demand) were droppped by $5.0 million per annum between 1980 and '85. Mill operations are scheduled for 42 weeks annually in order to generate power to cover most of the pumping load.

Another contributer to yield and cost reduction was the replacement of furrow irrigation with drip. This increased labor efficiency for an irrigator who serviced from 100 to 125 acres per man by furrow to 450 to 500 acres by drip. The real yield improvement from drip comes from applying water uniformly over the entire field as it is needed rather than by furrow system where excessivley wet and dry sections of each crop line were a problem in many furrow irrigated fields. The fields do not receive more water as a result of drip since the traditional 100 acre demand for a million gallons of irrigation water still applies. In 1985 the 14,000 acres of cultivated area still requires about 140 million gallons per day. The contraction of 4,400 acres resulted in a reduction of the

poorest quality 44 million gallons of water which were not potable and often too poor for crops.

The 45 to 5.0 TSPA average yield gain experienced between 1981 and 1985 is attributed to several factors shown below. Further improvements are anticipated.

Improvement Factor	TSPA
Sweet water impact	3.5
Uniformity of irrigation	1.5
Better variety	.75 (potential)
Milling improvements	1.0 (partially realized)
Elimination of poor areas	.5
Total Yield Improvemnt Potential	7.25

In 1985 OSCo established the highest yield for a two year crop of cane sugar in the world at 21.62 TSPA from 210 acres of Field 211 in the Robinson area just mauka of Waipahu. The figures was verified by HSPA not to be a function of area manipulation nor mill sugar allocation. This is the potential productivity for other areas at OSCo. On a good average year, management expects to attain a plantation yield of 16 to 17 TSPA.

IV. Longterm Crop Land Removal is Compatible with Profitable Operations at OSCo

The data in Table 2 shows a rapid increase in average plantation yields from 11.4 TSPA in 1980 to almost 15.0 tons in 1985 while

Campbell area averages have improved even more since many of the poorest Campbell fields in Ewa and Kunia have been withdrawn and are now idle.

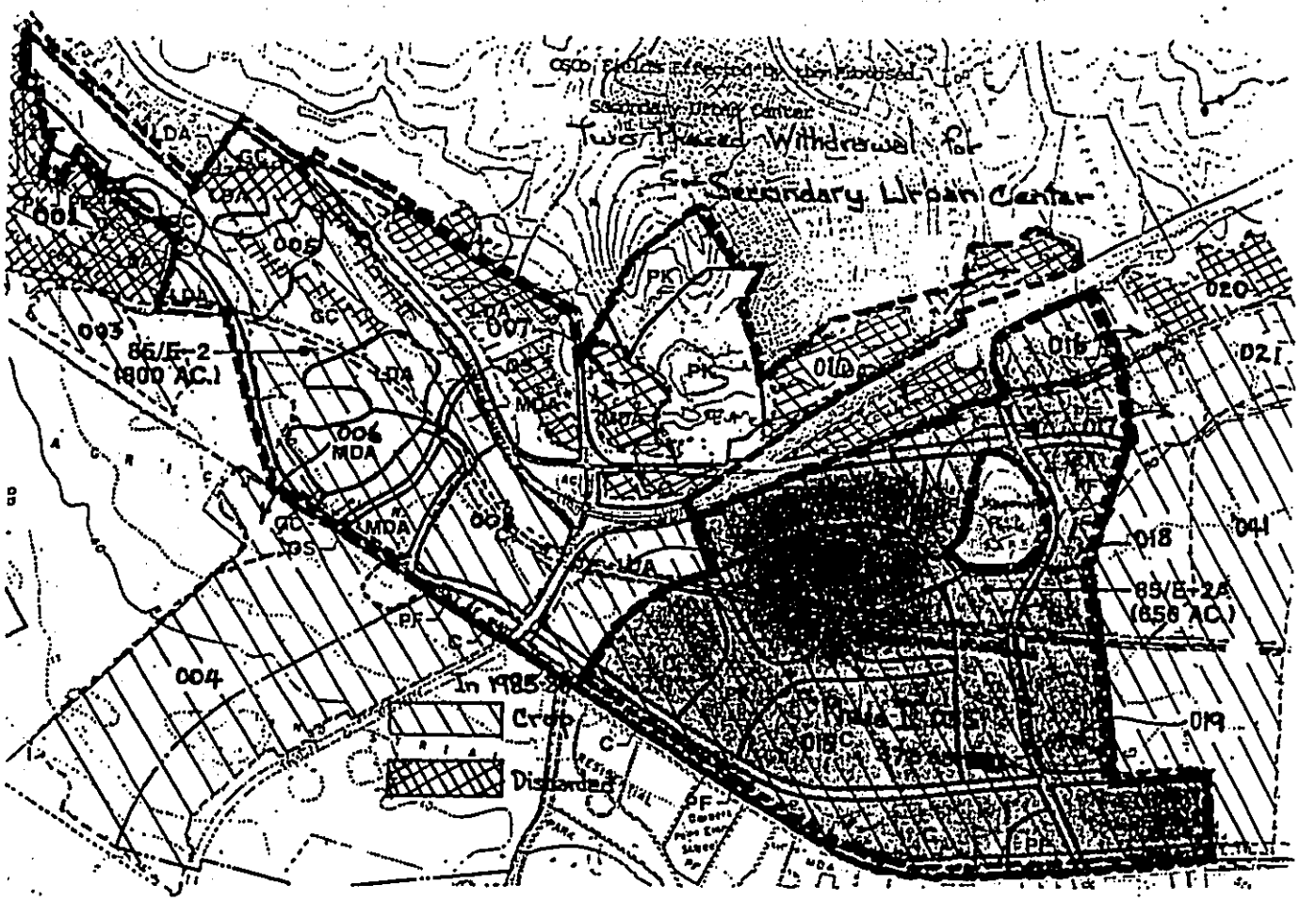
The attatched graph illusrates the obvious conclusion that as yields increase the cultivated acres required to maintain production at 100,000 tons will decrease. As yields have improved from the 11.0 TSPA range in 1977 to 15.0 TSPA today the cultivated area has declined from over 19,000 acres to 14,200 acres in 1985 releasing 4,400 acres from sugar production. This trend is expected to continue although the easiest yield improvements have already been made.

If plantation projections attain the 16 and17 TSPA, then area requirements will drop to under 12,000 acres as shown on the attatched graph while continuing to operate at 100,000 tons. At the point in the future when Amfac decides to curtail production and operate a one mill factory, land withdrawals of an additional 3,000 acres becomes feasible.

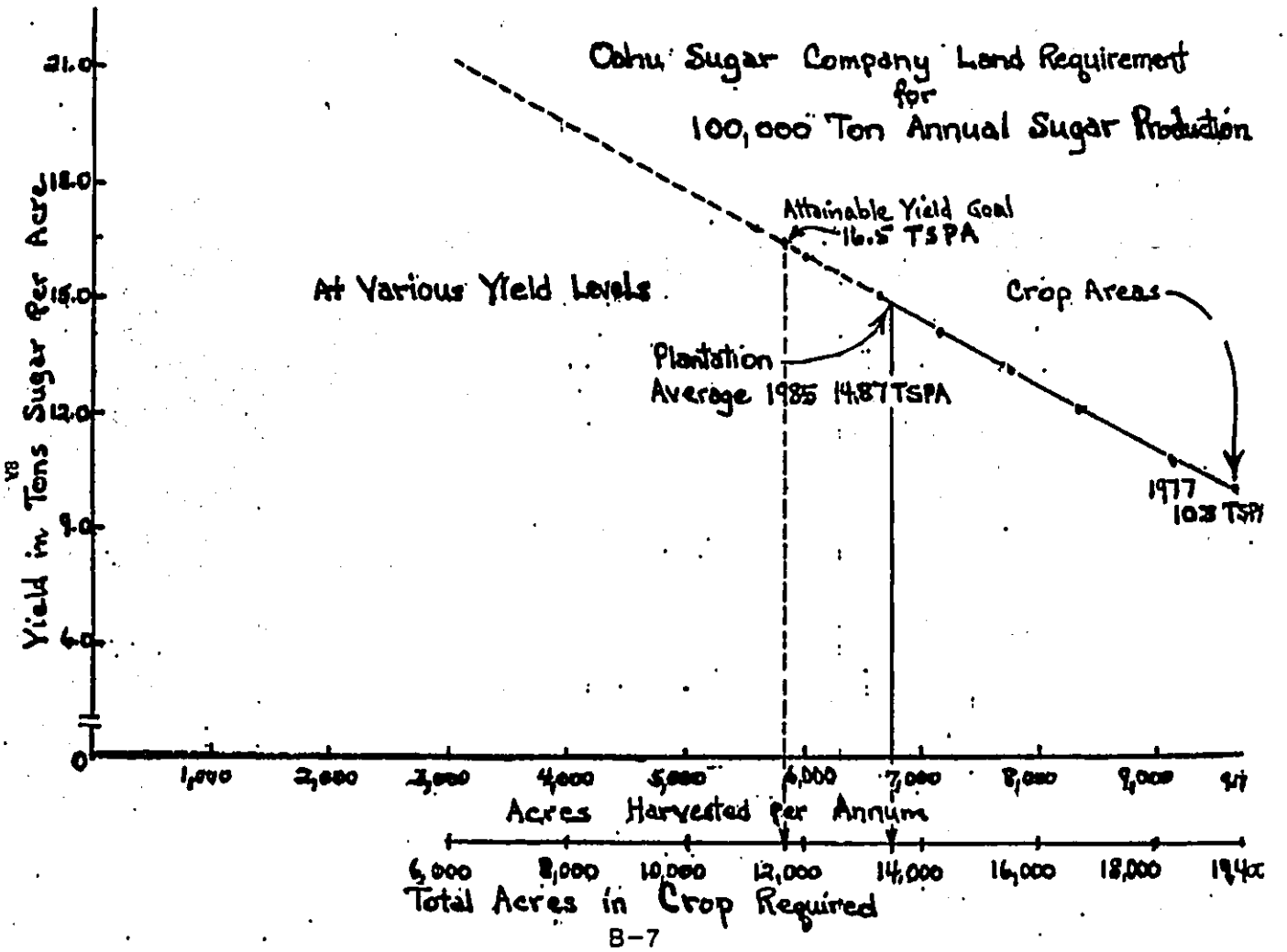
For each .1 TSPA increase in average yield another 89 acres can be released from cultivation and still maintain 100,000 tons of annual sugar production. Plantation yield estimates show an average 15.35 TSPA in 1986 and if attained could release 427 acres while still holding to the 100,000 ton level.

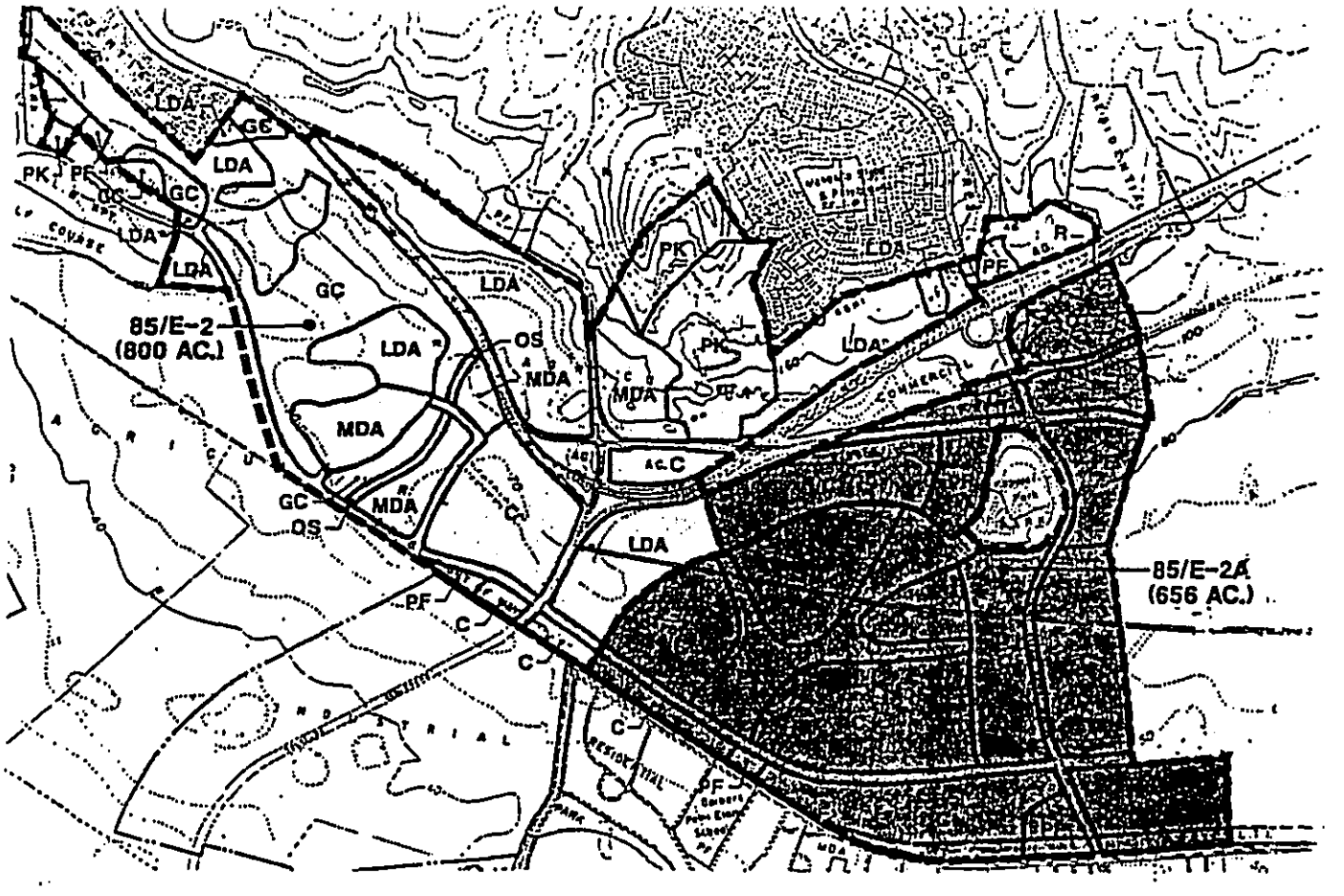
('86 Est. of 15.35 TS -14.87 TS in '85 = 49 10th x 89 ac. = 427 ac.)

By selectively relinquishing increments of cultivated crop land around the proposed Secondary Urban Center, overall plantation operations

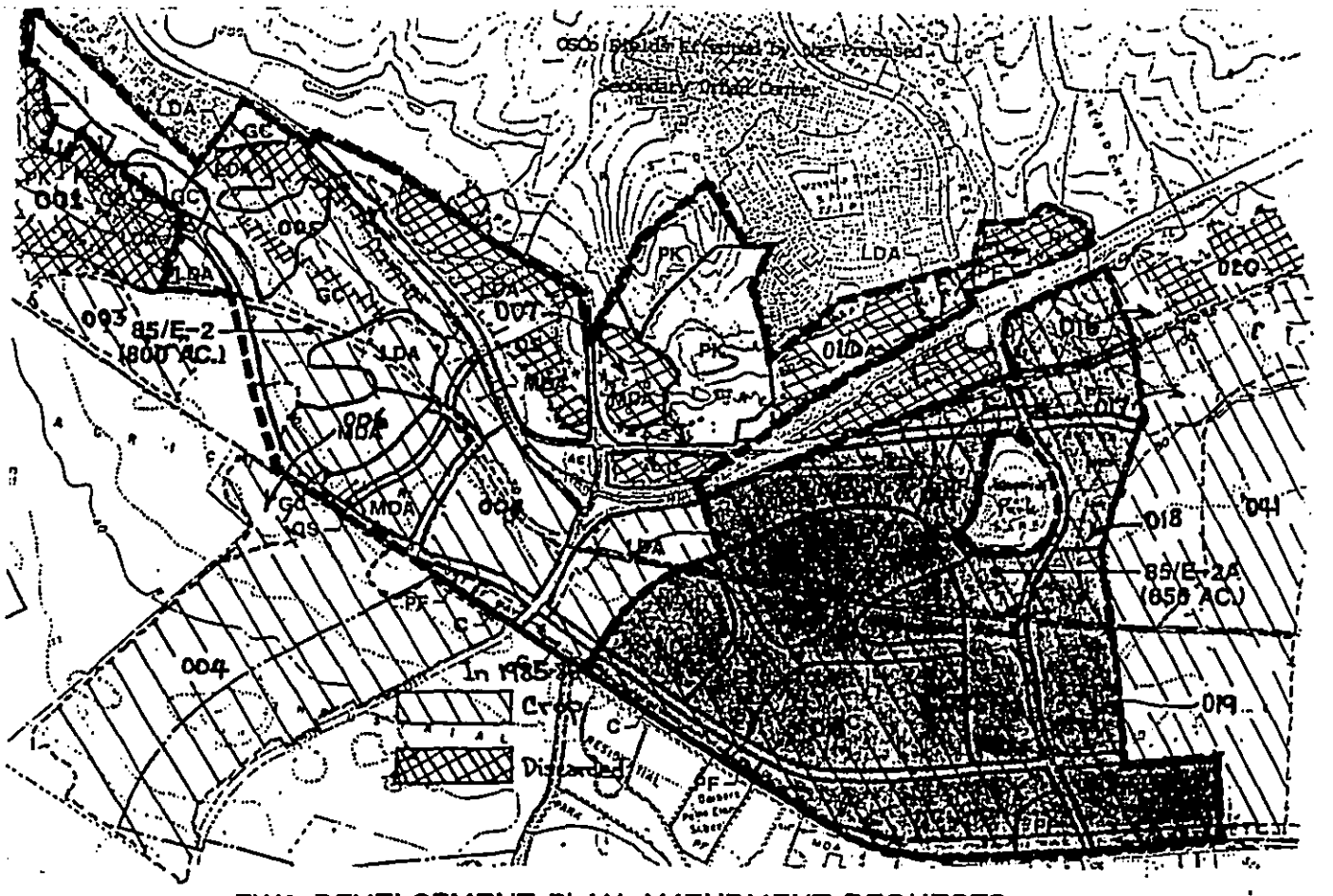


EWA DEVELOPMENT PLAN AMENDMENT REQUESTS
85/E-2 AND 85/E-2A (AMENDED)





EWA DEVELOPMENT PLAN AMENDMENT REQUESTS
85/E-2 AND 85/E-2A (AMENDED) FEB.1986



EWA DEVELOPMENT PLAN AMENDMENT REQUESTS
85/E-2 AND 85/E-2A (AMENDED) FEB.1986

will not be jeopardized nor should operating costs on adjacent fields increase. The proposed incremental conversion of these areas to urban over the next 10 to 20 years is illustrated on the Map (Ewa Development Plan Amendment Requests) and two transparent overlays. the Phased Withdrawal Overlay No.1 separate the withdrawal area into above and below the Waimanalo road. All withdrawal area above the Waimanalo road will be taken before going below this cane haul artery which will end sugar farming in any areas to the West of the urban center. Withdrawal of cultivated area in this pattern has received acceptance by OSCo management as their preference for acerage losses in this area. Naturally plantation managment would prefer to relinquish only the very lowest yielding fields at the extreme ends of the irrigation and transport system. However, these scattered fields do not lie in large enough blocks nor do they fit into long range urban plans.

The two phased withdrawal is detailed by fields in Table 3. Ultimately the total loss of cultivated areas to the West of the Secondary Urban Center East boundry would amount to 1247 acres of sugar and is itemized by fields in Table 4. This amount of crop area reduction at some time in the distance future would probably not be a concern of the sugar operation.

V. Alternaitve Crops Are Not Feasible As Sugar Replacement at OSCo

The June 1995 termination date of the Campbell/Amfac lease has focused the attention of both organizations to continue their diligent search for corp alternatives to sugar. None were found that can effectively utilize the 8,900 acres of cultivated Campbell land. There is

crop that can use the large area and contribute the level of income derived from sugar operations. At an average of 15 TSPA in 24 months (7.5 TSPA/year), gross income of approximatly $3,000 per acre annum is derived from current sales prices of $400 per ton for sugar and molasses.

If sugar fails without a viable crop replacement, the land would return to cattle range as it was before sugar. Without irrigatin on Campbell land, range beef carrying capacity would be limited and income would decline to between $20 and $120 per acre annum depending upon rainfall variation between Ewa and mauka Kunia. Table 5 estimates the beef carrying capacity at several rainfall levels in these areas.

The economic potential for forage crop production in Hawaii to supply the Oahu dairy industry or Ewa feed-lot has been studied over the years by different consultants. No fodder crop has been found as an economic alternative to sugar. Recently, operational field trials were completed by Amfac to determine the economics of growing sugar cane and sudax for dairy fodder. The trials were installed, cultivated and harvested for over a year. The Green Feed Cooperative (a forage harvesting enterprise organized and financed to chop pineapple plants by the Oahu dairymen) was retained to harvest the fodder into dairymens' trucks at fieldside. Details of this trial are held by Amfac. They have revealed that the operating costs were too high to allow a profit on growing these two relatively low value fodder crops.

The value of feed crops is determined by the intrinsic value of the feed and can be calculated accurately as the amount of digestible crude protein (DCP) and non-protein total digestible nutrients (NPTDN) in each

unit of feed. It is measured as the sum of total digestable nutrients (TDN) and digestible crude protein (DCP). Many alternative sources of nutrients are available on the Honolulu feed market.

The availability and price of feed is determined by mainland production and costs plus freight to Honolulu. Locally grown fodder competes with these imports and if nutrients supplied in the fodder are priced higher than the equivalent import on the Honolulu market, no producer can afford to use the fodder and stay competitive with his peers.

This is the economic obtacle revealed in the Amfac fodder trial. Initially the fodder was priced at $15 per ton and chopping costs at $7.00 produced $22.00 per ton feed at field side it was thought to be a marginally acceptable product. When Amfac found operating costs were too high they raised the fodder price to $25.00 per ton which pushed the final cost to $32.00 per ton-- far above the intrinsic feed value.

The intrinsic values of six different fodder crops are comparied in Table 6. The data shows that none of the ruffage feeds that have been tried in Hawaii by operators over the years can be competitive with equivalent nutrients supplied from the mainland. Bailed alfalfa hay from Molokai comes the closest in nutrient value to imported alfalfa hay.

Amfac is currently organizing a pilot alfalfa trial on two operational areas of 50 acres at Ewa and should start in June 1986. If the experiment proves that the crop is economically feasiblein Hawaii, total replacement of imported alfalfa hay, cubes and pellets would require

approximately 3,000 acres of crop land to produce an annual yield of 11 to 12 tons of dry hay per acre and replace mainland imports which amounted to 32,000 tons in 1984.

One problem confronting the alfalfa grower in Hawaii, and not a factor on the mainland, is the frequency of scattered rain showers that can disrupt the in-field hay drying process The need to harvest 12 months a year in Hawaii also causes a problem in wet weather when the operation must be carried out to harvest the crop before excess maturity and blow down ruin it.

As an alternative to hay, green chop alfalfa can be ensiled in field bunkers. There may be a market opportunity for high quality alfalfa silage production in Hawaii. Under this system, the drying problem would be elimanated and a surge pile of feed could be established that makes possible a continuous feed supply to the dairy farmer. The economics of these alternatives will be watched closely by Amfac and Campbell Estate who have vested interests in finding alternative crops for sugar.

It is often stated that small farmers can utilize relatively small amounts of land for intensive agriculture such as ornamental crops and high density swine, poultry or dairy farms. However, the economics of all these crop alternatives is in serious doubt at the present time.

Ornamental production area throughout the State amouonted to 1715 acres in 1984 down four percent from '83. The US ornamental industry is faced with serious low cost competition entering the US market from Central America and threaten ing US producers who are contracting. In

Hawaii, Amfac is one of the largest and most knowledgable ornamental producers and they do not lack area for expansion nor do they seek it at the present time.

Two years ago an economic study on swine, poultry and dairy operations was done for a selected area at Barber's Point harbor for Campbell Estate. All three of these production options were found to be non-competitive with established operators who had already amortized much of their initial investment. The market for local products is not expanding and offers no chance for a new producer to come in and compete on the local level as well as with cheaper mainland imports.

Small farmer production of vegetables and mellons is often considered to be a viable crop option for land supplied with irrigation. Four years ago a study was done for Campbell Estate land at Kahuku where both water and excellent truck farm land had been leased to the Kahuku Farmers Cooperative some years earlier at the termination of the plantation. At no time were these truck farm areas being more than 50% utilized by the coop members. At the same time the State was organizing an agricultural park for truck and banana farmers at Kahuku, Waianae, Waiahole and Waimanalo Phase I totaling 1203 acres on Oahu alone. The statewide total of ag-parks acerage was double this figure. The present status of these park plans is not known.

Not all vegetable crops can be grown in Hawaii to compete with mainland imports. Those that can compete when grown on the hot low lying areas are limited to the following: watermellon,sweet corn, green pepper, eggplant, cucumber, Italian squash, miscellaneous small volume

vegetables and bananas. Total import replacement of these items could be grown on Oahu on 871 acres which would be rotated in one to three crops per year. The leafy vegetables would not be competive with Kula and the Volcano producers if grown in the OSCo area.

Pineapple production is not feasible on the Ewa plain nor on coral impregnated soil and would not be a crop option for the land surrounding the secondary urban center. The best pineapple land in the state is located on the red soil areas above Waipahu up to the central Wahiawa plain. With irrigation and a southern exposure to the winter sun, this area would be ideal for off season fresh fruit production.

At one time biomass crop options were being considered as an alternative to import fuel. They would be harvested and burned in the sugar boilers during off season to generate power for sale to the utility. With the reduction in fuel oil this option is no longer considered in conjunction with sugar operations. Bagass remains the sole economic biomass fuel in Hawaii.

In summary there are presently no economic crop options for sugar replacement at OSCo or the areas under consideration. The future for US sugar production seems stable for the next five years until congress again reconsiders their support for this crop.

Table 2. Average Tons Sugar per Acre Yields and Acres Harvested on Plantation Fields and Campbell Area

Year	Campbell Estate		Plantation Total	
	Crop Acres	TSPA	Crop Acres	TSPA
1976	6,220	10.8	9,700	10.6
1977	5,780	10.3	9,000	10.4
1978	6,487	10.9	9,300	10.8
1979	5,978	11.4	9,450	11.3
1980	6,344	11.2	9,300	11.4
1981	5,376	11.3	8,500	11.9
1982	5,478	11.8	7,800	11.9
1983	4,258	13.4	7,050	13.2
1984	4,477	13.6	6,500	14.2
1985	3,340	15.6	6,050	14.9

Source: Campbell Estate Records and Plantation Operations Graph. in the Manager's Office.

Table 1.

HAWAIIAN SUGAR PLANTERS' ASSOCIATION

10-YEAR REPORT OF SUGAR PRODUCTION

1975-1984

Short Tons—Raw Value*

	1975 Tons	1976 Tons	1977 Tons	1978 Tons	1979 Tons	1980 Tons	1981 Tons	1982 Tons	1983 Tons	1984 Tons
HAWAII										
Hamakua Sugar Co.	65,159	64,327	73,246	77,617	+	—	—	—	—	—
Laupahoehoe Sugar Co.	78,109	78,405	76,105	81,946	+	—	—	—	—	—
Honokaa Sugar Co., Inc.	—	—	—	—	157,045	141,092	151,445	144,425	157,285	172,306
Hilo Coast Processing Co.	129,547	131,875	112,428	110,142	113,100	105,364	112,601	112,860	111,806	112,820
Ka'u Agribusiness Co., Inc.	60,395	55,634	55,921	57,573	60,746	63,181	63,311	54,508	65,785	63,215
Kohala Corporation	21,414	++	—	—	—	—	—	—	—	—
Puna Sugar Co., Ltd.	57,295	59,237	55,429	58,180	56,459	56,609	55,877	57,273	56,903	61,879
Totals	412,019	388,478	373,527	387,459	388,341	367,046	386,234	369,086	391,857	390,820
KAUAI										
Gay & Robinson, Inc.	18,397	17,308	17,853	17,031	17,735	16,811	17,425	16,856	16,320	15,618
Kekaha Sugar Co., Ltd.	48,128	45,120	47,093	46,751	48,869	48,651	55,410	47,217	54,819	48,303
The Lihue Plantation Co., Ltd.	82,233	71,771	78,364	74,260	79,045	74,009	74,733	68,510	62,381	73,015
McBryde Sugar Co., Ltd.	61,364	53,648	56,712	54,763	57,045	54,710	56,353	54,306	43,388	52,005
Olokele Sugar Co., Ltd.	29,808	28,637	31,663	30,254	29,708	28,487	31,297	30,144	27,662	27,379
Totals	239,930	216,547	231,685	223,059	232,402	222,668	236,118	217,111	204,570	216,946
MAUI										
Hawaiian Commercial & Sugar Co.	177,963	185,405	187,678	170,166	176,234	188,004	188,526	166,001	214,605	223,414
Pioneer Mill Co., Ltd.	53,719	48,425	49,772	46,178	50,768	49,842	41,198	44,943	52,142	55,060
Wailuku Sugar Co.	28,988	28,819	27,743	28,998	25,814	28,405	24,630	23,704	20,599	21,354
Totals	260,670	262,649	265,193	245,342	252,816	266,251	254,374	234,648	287,146	299,828
OAHU										
Oahu Sugar Co., Ltd.	119,277	103,086	92,406	*102,082	107,150	104,350	102,144	93,217	92,991	91,785
Waialua Sugar Co., Inc.	80,203	79,697	70,928	70,991	79,028	62,917	70,671	68,851	67,640	62,435
Totals	199,580	182,783	163,334	173,073	186,178	167,267	172,815	162,068	160,631	154,220
HAWAII	412,019	388,478	373,527	387,459	388,341	367,046	386,234	369,086	391,857	390,820
KAUAI	239,930	216,547	231,685	223,059	232,402	222,668	236,118	217,111	204,570	216,946
MAUI	260,670	262,649	265,193	245,342	252,816	266,251	254,374	234,648	287,146	299,828
OAHU	199,580	182,783	163,334	173,073	186,178	167,267	172,815	162,068	160,631	154,220
TOTAL - ALL ISLANDS	1,107,199	1,050,457	1,033,739	1,028,933	1,059,737	1,023,232	1,047,541	982,913	1,044,204	1,061,814

*Raw value is 96° sugar.
+Merged to form TheoDavies Hamakua Sugar Company, February 1, 1979. Name changed to Hamakua Sugar Company, Inc. effective January 18, 1984.
++Operations terminated December 31, 1975.

D.R.Inouye:TH
1/18/85

Table 3. Proposed Long Term Sugar Area Withdrawal Schedule For the Secondary Urban Center

Field No.	Crop Acres	Percent Requir'd	Requir'd Acres	Type of Use
016	45	100	45	Comm.
017	81	60	49	HHA
018	92	15	14	HHA
014	125	100	125	HHA
012	229	35	80	
Phase I Total			313	
Below Waimanalo Road				
019	198	45	89	HHA
035	109	100	109	HHA
015	83	100	83	
012	229	40	92	
Phase II Total			373	
Secondary Urban Center Total			686	

Table 4. Long Term Sugar Area Withdrawals Outside The Secondary Urban Center

Field No.	Crop Acres	Percent Requir'd	Requir'd Crop Acres
003	38	100	38
005	94	70 (-disc'd)	66
006	33	100	33
008	121	100	121
004	246	100	246
012 (Balnc.)	229	25	57
West Beach Exemp't Crop Area Total			561
Secondary Urban Center Crop Area Total			686
GRAND TOTAL LONG TERM CROP AREA REMOVAL			1247

TABLE 5

Estimated Cattle Lease Rent Potential For Campbell Estate Lands Leased to OSCo.

The total demised area shows variable average rainfall from mauka Kunia to makai Ewa that ranges from a maximum 30 inches to 12 inches per year or less.

R.G. Location	Years of Record	State R.G. Number	Av. Annual Rainfall Rainfall in	Bracket	Est. Cary. Capctih Ac.	Gross Catl. Value/ Ac.	20% of Gross
Fld. 155	10	738.4	28.4				
" 130	13	734.4	28.7	25 - 30"	1.5	$120	$24.00
" 120	10	733.1	27.5				
HSPA S.S.	12	740.4	22.8	17 - 24"	5.0	36	7.20
Wai. Mill	78	750.0	17.0				
Honouli.	22	742.3	14.0				
Ewa Mill	64	741.0	13.3	12 - 16"	10.0	18	3.60
Pmp 10	64	727.0	12.4				

Rules of thumb for cattle operations:

(1) Unirrigated pasture areas require 30 inches of well distributed annual rainfall in order to carry one head per acre all year. Months with less than 1.0 inch of rain will require a rest period.

(2) Lease rent, taxes and irrigation costs should account for 20% of the gross value per head.

(3) Weaned steers on good pasture should gain 400 pounds of live weight per head per year.

Therefore, at current live cattle prices of $.45 per pound an area carrying one head per acre would generate $36.00/ac. for lease rent, taxes and irrigation costs.

$.45 x 400 lbs. = $180 x 20% = $36.00

TABLE 6.

Projected Yield and Intrinsic Feed Value Comparisons Between Forage Crop Options

(DCP = 15.5¢/Pound and NFTDN = 10.6¢/pound)

	A	B	C	D	E	F	G	H	I	J
Selected Crop Alternatives	Percent[1] Dry Mat.	DCP	NFTDN	Tons/ Acre/ Crop	Crops/ Year	Total T/Ac/Yr	Moisture Adjust. Intrinsic Value $/T	$/Ac/Yr.	Market Price $/T	$/Ac/Yr
(1) Corn Fodder Lone/Ancient @ Kahuku (U of H Department of Animal Science)	27.5	1.50	17.0	16.0	2.0	32.0	12.42	397	40.00	1,280
(2) Guinea Grass Fodder (Unirrigated)	26.2	.4	9.7	6.0	3.0	18.0	6.34	114	18.00a	324
Guinea Grass Fodder (Irrigated) (U of H and Joe Barrao Waimanalo)	23.8	1.95	11.0(e)	7.7	8.0	61.5	7.78	479	20.00[3]	1,232
(3) Sorghum Fodder (Irrigated) (Dekalb similar) (Dominguez)	27.0	.4	15.6	8.6	6.0	51.6	8.89	459	20.00	1,032
(4) Sugar Cane Fodder (Irrigated) (U of H)	26.0	.8	15.0	28.0	2.0	56.0	9.19	515	22.04	1,232
Pineapple Green Chop (U of H)	18.5	1.30	15.4	50.0	.25	12.5	7.45	93	14.25[5]	178
Alfalfa Fodder Baled Hay Local - Molokai	24.0	3.6	14.0	4.0	12.0	48.0	10.88	522	25.00[6]	1,200
Baled Hay Import - West Coast (Dominguez)	88.0	15.9	35.1	1	12.0	12.0	123.72	1,485	Molokai 140.00	1,680
	88.0	15.9	35.1	3	4.0	12.0	123.72	1,485	Oregon 200.00	2,400

1. Feed values are calculated on 90% dry matter basis for percent digestible crude protein (DCP) plus non-protein total digestible nutrients (NFTDN) priced at lowest equivalent feed cost in Honolulu (1st Quarter 1983).
2. Dry matter adjustment ratio Sugar example, Dried product @ 90% DM: 26%DM of green chop cane = 3.46 ratio.
3. It is assumed that irrigated grass fodder will sell at a higher price than non-irrigated, which is less nutritious.
4. Market value includes $7.00/T chopping charge and $15.00/T paid to plantation: 56T x $15 = $840/ac/yr.
5. Market price set for green chop pineapple plants.
6. Estimated price for green chop alfalfa since none has been sold commercially for 20 years.

Appendix C

Affordable Housing vs. Protecting Interior Residential Speech Perceptor: The State Airports Division Ldn 60 Issue.

A position paper of the Estate of James Campbell.
February 10, 1987.

AFFORDABLE HOUSING vs. PROTECTING INTERIOR RESIDENTIAL SPEECH PERCEPTOR

The State Airports Division Ldn 60 Issue

A Position Paper of
The Estate of James Campbell

February 10, 1987

A. BACKGROUND

In June, 1981, the Airports Division of the State of Hawaii DOT released its "Honolulu International Airport and Environs Master Plan Study." This report promulgated land use compatibility standards stricter than the national guidelines adopted in 1980 by the Federal Interagency Committee on Urban Noise (comprised of DOT, DOD, EPA, VA, and HUD) and each agency individually.

The standard at issue is the annual average, both day and night, of noise exposure stated in decibels. It takes into account both the loudness and number of noise occurrences in deriving a measure known as "Ldn" (loudness, day and night). The various agencies have identified the Ldn levels above which acoustical treatment (sound attenuation) should be applied in order to provide a satisfactory interior noise environment. For example, for residential dwelling, HUD Part 51 states:

> For the purpose of this regulation and to meet other program objectives, sites with day-night average sound level of 65 and below are acceptable and allowable.

B. THE STATE AIRPORTS DIVISION POSITION

1. The 60 Ldn Standard: The 1981 HIA report, prepared under contract with Peat, Marwick, Mitchell & Co., reasons as follows:

> Because of the open living environment in Honolulu and because no residential building insulation is needed for heating purposes, the level of aircraft noise may have to be lower than elsewhere before land use compatibility can be ensured. Therefore, the FAA guidelines were modified by Peat, Marwick, Mitchell & Co. to reflect the Ldn 60 to 65 in Table E-1.

With reference to residential construction between 60 and 65 Ldn, Table E-1 contains language similar to the above, concluding "the Ldn 60 to 65 area may not be compatible without additional noise level reduction." Table F-1, in a section containing regulations proposed for adoption by local authorities, states with reference to residential construction between 60 and 65 Ldn:

> Existing development shall be compatible, but new development shall be compatible only with the installation of acoustical treatment.

2. The Underlying Premise: The premise underlying the airport division's position is stated on page F-11 of the HIA report: "The objective is to achieve an interior noise level of Ldn 45 in habitable spaces." This Ldn 45 level is based upon the EPA "Levels Document," which identifies 45 Ldn as the level, indoors in residential areas, at which there will not be any interference or annoyance because of noise.

C. THE CONFLICT WITH THE NEED FOR AFFORDABLE HOUSING IN HAWAII

Important social decisions should not be made by one division of a department of State government, but since 1981, both State Land Use and City and County of Honolulu zoning decisions have followed the HIA study as if it were gospel. In the following pages, this paper will explore the practical effect, misunderstood premise, and inconsistent application of the 60 Ldn standard.

1. Practical Effect of the 60 Ldn Standard

a. The Enclosed, Air-Conditioned House in Hawaii: A basic problem created by the HIA study is how to achieve sufficient noise level reduction to achieve the 45 Ldn "objective." A related environmental study by Darby-Ebisu Associates, completed in conjunction with the HIA study, reveals the developer's dilemma:

> Significant degrees of noise reduction in excess of 15 dB are not achievable without resorting to partial or complete closure of windows and doors. Without closure, no significant increases in noise reductions occur by increasing wall thickness from single to double wall construction or by increasing the mass of the wall or roof systems.

This, then, leads to an inescapable conclusion: If the HIA study is followed, new houses located in 60-65 Ldn areas near Hawaii's airports must be air conditioned. This adds considerably to both the initial cost and monthly electricity expense of such houses.

The problem is ironically exacerbated by the noise from such air conditioners. With reference to homes in the Ewa Beach area, Darby-Ebisu noted:

Because of the relatively small lot sizes in the areas of interest, use of window air conditioning units (which are also noise emitters) to effect insulation against aircraft noise will probably result in violations of local State and County property line noise limits.

The inescapable conclusion: larger lot sizes. Given Hawaii's high land and infrastructure cost-per-lot, this deals all but a death blow to affordable housing in 60-65 Ldn areas.

b. Application of the HIA "Precedent" to other Airfields - the Ewa Example: Since 1981, there has been a clear trend by both the State Land Use Commission and the Honolulu City Council toward following the State Airports Division position. Examples include the following: Puuloa Homes, HSM & Associates (Ewa Marina), and West Beach Estates. The latter is particularly noteworthy since the source of the 60 Ldn impact on West Beach is the Barbers Point Naval Air Station AICUZ report. Thus, what originated as the Airports Division position on Honolulu International Airport has now apparently been expanded to apply to land use decisions on other airfields, including military.

The far-reaching impact of such action is shown in Exhibit "A," which depicts the incremental impact on Ewa acreage of the stricter 60 Ldn standard (when related to the Navy's AICUZ, which is being disputed by the Campbell Estate). The estimated impact is 2,500 acres; if one were to assume a density ratio of eight units per acre, as many as 20,000 potential homes would have to be air conditioned. Using only one-third of HIA study's estimated $29,280 per unit "insulation cost" results in additional cost to potential homebuyers of $195 million!

2. The Misunderstood Premise: The underlying 45 Ldn interior noise level premise is clearly misunderstood by most. First, it should be understood that it has nothing whatsoever to do with loss of hearing. The EPA estimates that it would take an exposure of 71.4 decibels of intermittent noise, 24 hours per day, 365 days per year, for 40 years to produce no more than 5 dB hearing damage. Since increasing noise levels are a logarithmic function, the 45 Ldn level is a minute fraction of the hearing loss level.

To provide the reader with a relative comparison of a typical day's noise exposure, attached as Exhibit "B" is an excerpt from the EPA Levels Document. It is worth noting, when referring to this chart, that Honolulu International Airport does not allow jet traffic over the Ewa area between the hours of 7:00 p.m. and 7:00 a.m.

What, then, is the 45 Ldn level based on? Following are excerpts from the EPA Levels Document:

> The identified indoor level of Ldn 45 incorporates a margin of safety for 100% protection of speech perceptor . . . . Perhaps the most fundamental misuse of the Levels Document is treatment of the identified levels as regulatory goals:
>
> - They are NOT regulatory goals . . .
> - These levels were developed without concern for economic and technological feasibility.
> - Are intentionally conservative to protect the most sensitive portion of the American population.
> - And include an additional margin of safety.

In summary, it would appear that the Airports Division, in its effort to assure that not a single person will lose one word of conversation (plus an additional margin of safety), is promulgating an "objective" that was never intended by the EPA to be a regulatory goal.

3. Inconsistent Application of Standards: The 14th Amendment of the U. S. Constitution guarantees equal protection of the laws. In this instance, is the same noise standard being applied to a property owner affected by airplane noise as is applied to a property owner affected by vehicular traffic noise? Apparently not. Developers have recently been required to erect walls and take other measures adjacent to noisy highways but, to the best of our knowledge, to achieve the equivalent of 65 Ldn. It would appear that the State Department of Transportation is promulgating a double standard.

To again provide the reader with a relative comparison, in this case with highway noise, attached as Exhibit "C" is a chart showing typical Honolulu ambient noise levels. It is readily apparent that, even with an enclosed air conditioned structure reducing the outside noise level by 20 Ldn, imposing an "objective" similar to the Airport Divisions would simply not be feasible.

Is aircraft noise around Honolulu International really a problem? There are numerous homes in areas exceeding 65 Ldn, not to mention 60 Ldn. As a part of the HIA study, Peat, Marwick, Mitchell & Co. reviewed the Honolulu Tower noise complaint file and found:

Almost all complaints received were attributable to either low-flying general aviation aircraft or to helicopter (primarily military) activity, and not to Honolulu International Air Carrier operations. The citizens who complained usually resided far from the airport.

Finally, as part of the 1981 HIA study, a survey was taken of Oahu residents living in areas that might be affected by aircraft operations. When relating the actions of the Airports Division to the few number of households citing aircraft noise as a problem (see Exhibit "D"), one has to wonder how such a non-sequitur could occur.

D. CONCLUSION

The Airports Division is currently updating the Airport Master Plan and conducting an FAA Part 150 noise study. To date, the division has been adamant in not changing its stance on this issue; in fact, there have been indications of further tightening of the standards. It is hoped that, in the process of review and approval of the 1987 study, our appointed and elected officials will weigh the social issues of the need for affordable housing vs. the need to protect 100% of the interior residential speech perceptor of the most sensitive residents with an additional margin of safety.

Until the new study is complete, and in the event of no change in the Airport Division's position, the State Land Use Commission and County Councils will face decisions on this issue. Again quoting the EPA Levels Document:

> People who formulate local noise abatement programs cannot escape the responsibilities of making economic and political compromises for their constituencies . . . (the Levels Document) is best viewed as a technical aid to local decision makers who seek to balance scientific information about effects of noise on people with other considerations, such as cost and technical feasibility . . . . Pragmatically, it is unlikely that local, state, or Federal regulatory strategies will seek to attain such levels for all situations in the near future.

We hope that the information provided herein will prove useful to those government officials that may be confronted with judgmental decisions on this issue.

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2/11/87

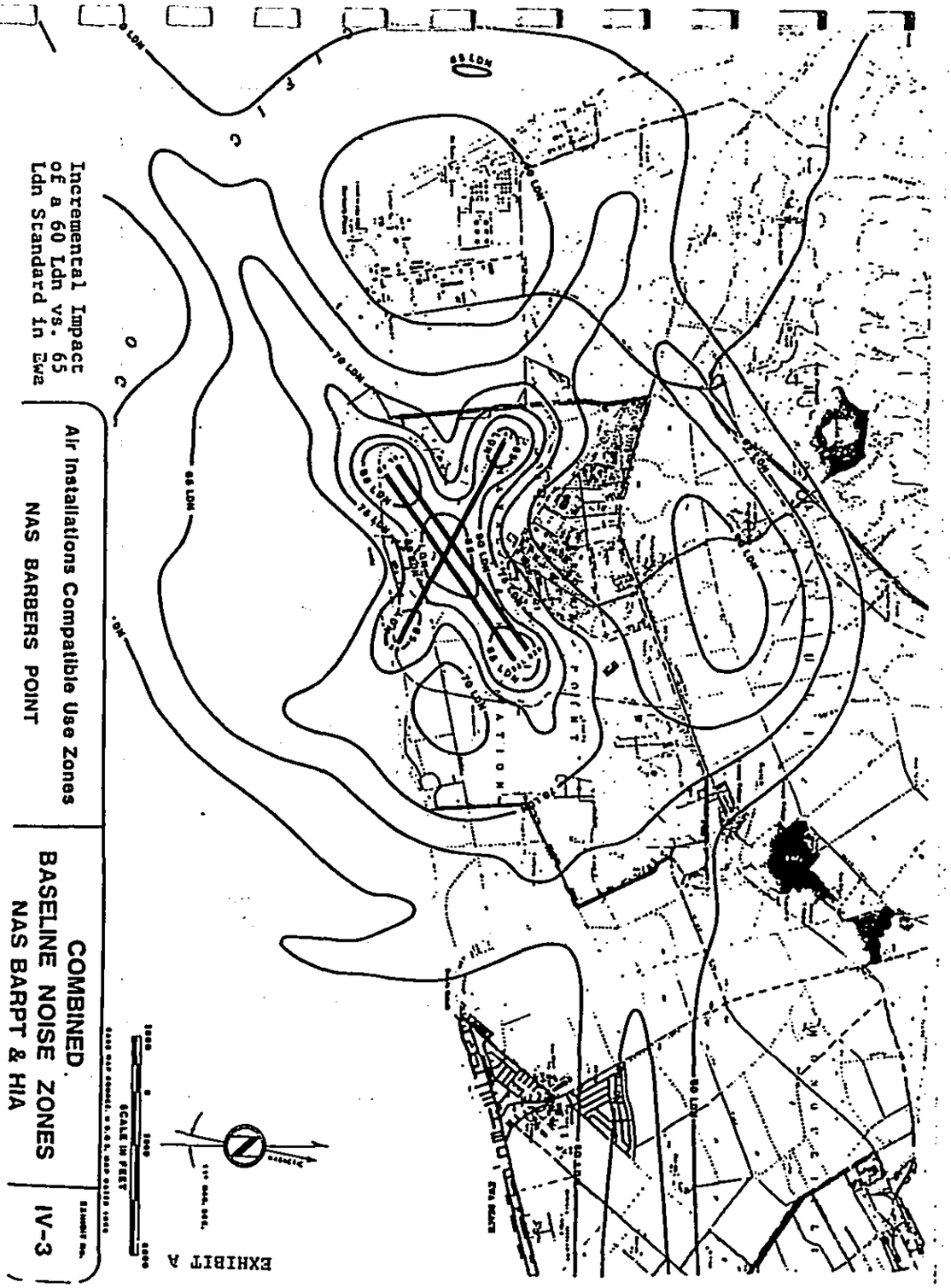


Exhibit B

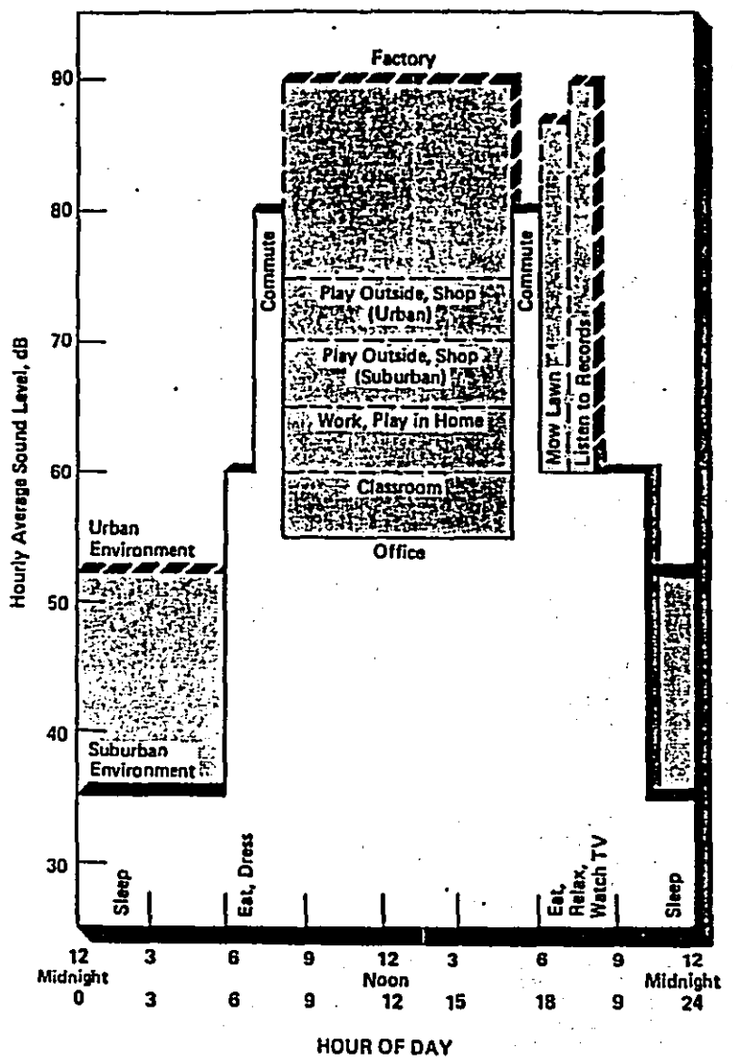
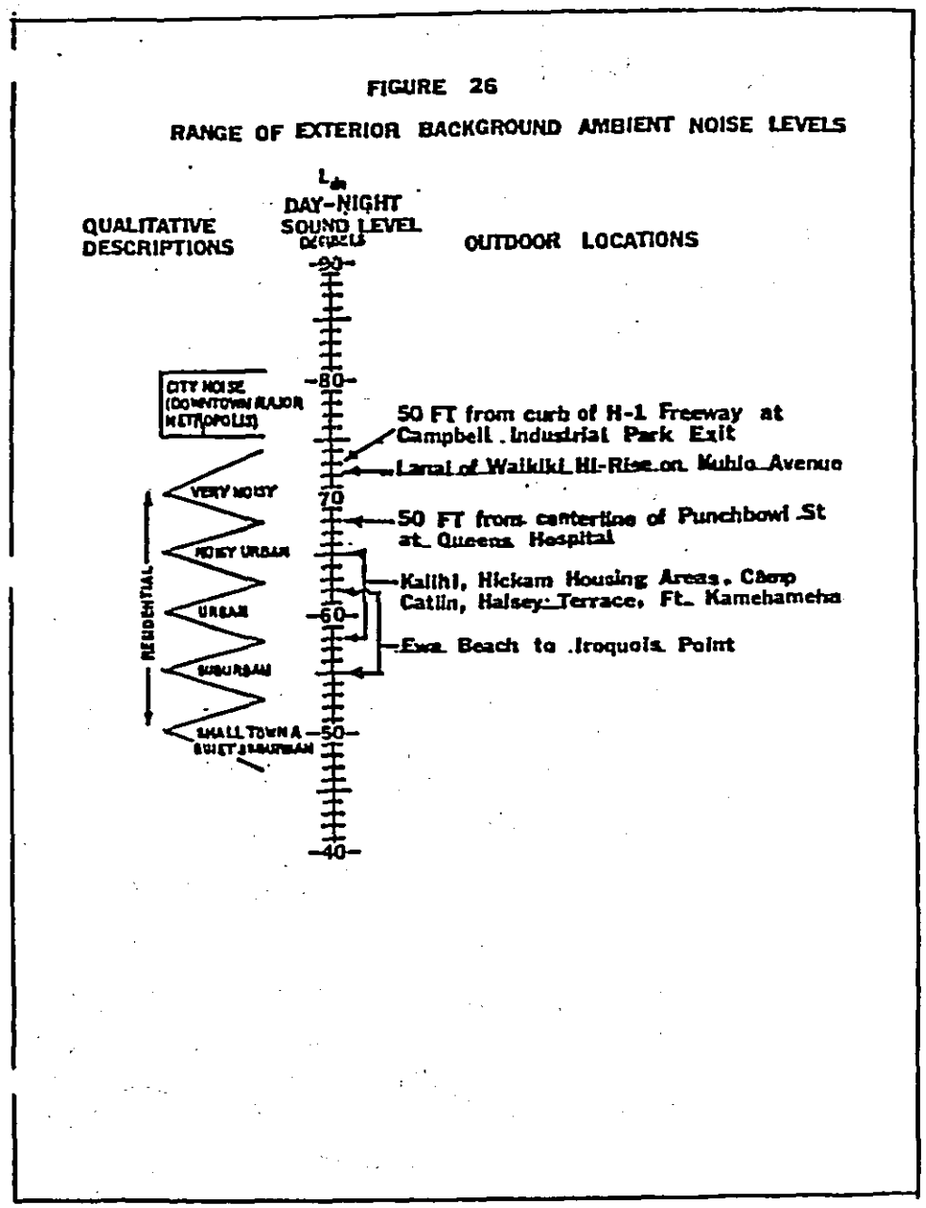


FIGURE 9. GENERALIZED INDIVIDUAL NOISE EXPOSURE PATTERNS

16

Exhibit C



AN EXAMPLE OF TAKING ACTION CONTRARY TO STUDY FINDINGS

	Results of SMS Study*	Logical Conclusion	Action Taken by DOT
Aircraft Noise	11 out of 401 households (2.7%) cited aircraft noise as a problem.	Aircraft noise in airport environs not a significant problem.	Establish a standard stricter than the national guideline without considering (1) cost/feasibility, or (2) the extent to which the policy exacerbates the affordable housing problem in Hawaii.
Traffic Noise	63 out of 401 households (15.7%) cited surface traffic noise as a problem.	Traffic noise may well be a problem--mentioned almost six times more frequently than aircraft noise.	Follow the national standard.

*SMS Research, "A Survey to Assess the Impact of Aircraft Noise on Households Within the Traffic Corridor of Honolulu International Airport," May, 1979.

Exhibit D

APPENDIX D

Biological Survey.

Char & Associates. November 1986.

BIOLOGICAL SURVEY

SECONDARY URBAN CENTER

'EWA DISTRICT, ISLAND OF O'AHU

by

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D-1

Prepared for: HELBER, HASTERT, VAN HORN & KIMURA
November 1986

Table of Contents

page

INTRODUCTION 1

FLORA SURVEY 3

Survey Methods 3

Description of Vegetation Types 4

1. Cane fields 5

2. Scrubland 5

3. Ruderal vegetation 7

4. Kiawe - koa-haole thickets 7

Rare, Threatened, or Endangered Species 9

Plant Species List 10

FAUNA SURVEY 18

Survey Methods 18

Faunal Habitats 18

Annotated Species List 20

Birds (Aves) 20

Mammals (Mammalia) 24

Threatened or Endangered Species 25

DISCUSSION AND RECOMMENDATIONS 27

LITERATURE CITED 28

BIOLOGICAL SURVEY

SECONDARY URBAN CENTER

'EWA DISTRICT, ISLAND OF O'AHU

INTRODUCTION

The Estate of James Campbell proposes to develop approximately 1,400 acres of land as a Secondary Urban Center. The self-contained community will have a full range of urban services, housing, jobs, businesses, and public facilities. The land is presently zoned "Agriculture" by the State. The Estate is petitioning the State Land Use Commission to redesignate the petition area to the "Urban" designation. An Environmental Assessment is required as part of the petition. A flora and fauna survey to describe the major biotic communities; inventory the species; search for rare, threatened, or endangered species; and identify areas of probable environmental concerns or problems was conducted in October 1986.

The ± 1,400-acre project site is located within the 'Ewa District, island of O'ahu. The Barbers Point Naval Air Station and cane fields cultivated by Oahu Sugar Company border the south boundary; to the north lies the residential community of Makakilo; to the west is the residential community of Honokai Hale and the West Beach Resort area; and to the east are Oahu Sugar Company cane fields.

The project area consists largely of gently sloping land, with elevation ranging from 50 feet along the OR&L railbed near the Naval Air Station to nearly 500 feet at Pu'u Palailai. The Palailai Landfill is found in the

former quarry area. The soils generally belong to the Lualuale-Fill land - 'Ewa association, which are well drained, fine to moderately fine textured soils.

Sugar cane fields occupy more than 75% of the project site. Oahu Sugar Company ceased farming the lands mauka of the H-1 Freeway and behind Honokai Hale in 1982. A scrubland vegetation now occupies these abandoned fields. Scattered throughout the project area are kiawe - koa-haole thickets, the largest of which forms a narrow band along the Naval Air Station fenceline and around the old quarry near the main entrance to the station.

FLORA SURVEY

A survey of the flora on the project area was undertaken on 15 and 23 October 1986. The vegetation on the project site is dominated by introduced (or alien species). These introduced species are the prinicpal components of the four major vegetation types recognized on the site.

Of a total of 113 plant species inventoried, 100 (88.5%) are introduced, 11 (9.7%) are native, and 2 (1.8%) are of Polynesian introduction. None of the native species are considered rare, threatened, or endangered.

Survey Methods

Prior to undertaking the field survey, a search was made of the pertinent literature to familiarize the principal investigator with other biological studies conducted in the general area.

Existing topographic maps were examined to determine access, terrain characteristics, and potential logistical and technical problems. The major access onto most parts of the project area was provided by the paved and unpaved roads (largely cane-haul roads) which transect the site.

A walk-through survey method was used. Species identifications were made in the field; plants which could not be positively identified were collected for later determination in the herbarium and laboratory. Notes were made of the species present in each of the major vegetation types. The species recorded are indicative of the time and environmental conditions under which the survey was conducted. A survey taken during the wetter months (November

through January) would no doubt yield variations in abundance ratings, especially of the annual species, as well as slight differences in the number of species inventoried.

Description of Vegetation Types

There are no flora surveys which deal specifically with the entire project area. The portion of the project area makai (south) of the H-1 Freeway, however, was surveyed extensively during the 'Ewa Plains botanical survey sponsored by the U. S. Fish and Wildlife Service (Char and Balakrishnan 1979). In addition, a botanical survey of the proposed West Beach Resort area (Char 1979) includes that portion of the project area immediately behind the Honokai Hale subdivision. In both studies, sugar cane fields covered most of the area. Scattered here and there were kiawe forests and koa-haole scrub. These wooded areas often harbored remnant populations of native species.

During the present survey, four major vegetation types were recognized on the ± 1,400-acre project site. Sugar cane fields cover more than 75% of the site. The fields mauka of the H-1 Freeway and behind Honokai Hale have been taken out of cultivation since 1982. A scrubland of mixed grass and shrub species now covers these abandoned fields.

In some areas, such as along the Barbers Point Naval Air Station boundary, are kiawe - koa-haole thickets. These vary in structure and composition. Associated with the paved roadways are narrow bands of vegetation which are periodically maintained. The ruderal plant communities are found in these areas.

1. Cane fields -- The sugar cane fields along with their associated network of cane-haul roads and irrigation and drainage systems cover more than 75% of the project site. This vegetation type occurs on fairly deep, well-drained soils overlaying a coralline base. Sugar cane (Saccharum officinarum) forms large mono-dominant stands.

Agricultural lands are dynamic systems, changing with the different stages of cultivation practices. Cane fields may vary from newly harvested, bare fields to short-stature, open stands to tall-stature, very dense stands.

A number of weedy species are associated with the cane fields. Many are annual species adapted to the frequent disturbances related to cultivation practices. Weedy species such as wild bittermelon (Momordica charantia var. pavel), little bell (Ipomoea triloba), swollen fingergrass (Chloris inflata), sow thistle (Sonchus oleraceus), and buffelgrass (Cenchrus ciliaris) may be locally common along the margins of the cane fields. Low-lying, moist margins support leptochloa (Leptochloa uninervia), nutgrass (Cyperus rotundus), and Brachiaria subquadripara. Occasionally plantings of chili pepper (Capsicum annuum) and pumpkin (Cucurbita pepo) may be found.

Along the drainage ways, which provide a more moist and less disturbed environment, koa-haole (Leucaena leucocephala), castor bean (Ricinus communis), Guinea grass (Panicum maximum), Californiagrass (Brachiaria mutica), and woodrose (Merremia tuberosa) may be abundant.

2. Scrubland -- This vegetation type covers the abandoned sugar cane fields mauka of the H-1 Freeway and behind Honokai Hale next to the

West Beach Resort area. Oahu Sugar Company stopped farming these fields in 1982. Weedy species have since invaded these fields and now form an open, low prairie structure. A few, very scattered, small clumps of sugar cane (Saccharum officinarum) can still be found. The network of cane-haul roads and irrigation systems is still evident, although overgrown in many places.

Within the scrubland vegetation itself, there is a pattern of different plant associations relative to certain topographic, drainage, and man-made features. Usually, the scrubland is composed of a mixture of small shrubs, 1 to 3 feet high, and various grass species. The most abundant shrubs are 'uhaloa (Waltheria indica var. americana), 'ilima (Sida fallax), hoary abutilon (Abutilon incanum), and virgate mimosa (Desmanthus virgatus). Andropogon pertusus, buffelgrass (Cenchrus ciliaris), and the two panicgrass varieties (Panicum maximum var. maximum, Panicum maximum var. trichoglume) are the most frequently encountered grasses.

In some places a mixed grass association with such species as Natal redtop (Rhynchelytrum repens), buffelgrass (Cenchrus ciliaris), Guinea grass (Panicum maximum), or swollen fingergrass (Chloris inflata) may be abundant, and the number of shrubs may be small.

The scrubland behind Honokai Hale shows evidence of recent fire. In this area fuzzy rattlepod (Crotalaria incana) is locally common and 40% to 50% of the ground is bare. Koa-haole shrubs (Leucaena leucocephala) are found scattered along the old cane-haul roads and drainage ways. Occasionally, young kiawe trees (Prosopis pallida), 6 to 9 feet high, may be found in the scrubland.

In low-lying areas which may collect runoff, Guinea grass (Panicum maximum), green panicgrass (Panicum maximum var. trichoglume), and castor bean (Ricinus communis) are abundnat.

3. Ruderal vegetation -- For this study, the ruderal vegetation has been defined as that narrow band of vegetation which borders the paved roads -- principally the H-1 Freeway, Farrington Highway, and Makakilo Drive. The ruderal or weedy roadside vegetation is subject to continued disturbance from vehicular and pedestrian traffic as well as periodic maintenance. Continued disturbance prevents the normal stable associations from being formed.

Buffelgrass (Cenchrus ciliaris) is usually the most abundant species, although in some places Andropogon pertusus may be common, often forming small patches. Prickly sida shrubs (Sida spinosa) may also sometimes form small, localized patches. Other species often found along the roadside include Indigo endecaphylla, Alternanthera repens, Bermuda grass (Cynodon dactylon), coat buttons (Tridax procumbens), golden crown-beard (Verbesina encelicides), and Calyptocarpus vialis.

4. Kiawe - koa-haole thicket -- This vegetation type covers a relatively small portion of the project area. It generally consists of an open kiawe forest (Prosopis pallida) with a subcanopy layer of koa-haole shrubs (Leucaena leucocephala). For this study, a number of different structural types have been "lumped" under this vegetation type.

The kiawe - koa-haole thicket mauka of the H-1 Freeway, near the Board of Water Supply water tank, is an open woodland composed of 18 to 25 feet tall trees. Buffelgrass (Cenchrus ciliaris), Natal redtop (Rhynchelytrum repens), and green panicgrass (Panicum maximum var. trichoglume) are the most frequently encountered grasses. Koa-haole shrubs are common. This part of the project area was formerly used for grazing and fencelines, watering troughs, and stone walls can be found throughout this area.

Along the Barbers Point Naval Air Station boundary, the thicket is composed primarily of koa-haole shrubs, 12 to 18 feet tall, with scattered kiawe trees, 25 to 30 feet tall. Sisal plants (Agave sisalana) are common in this area. In 1893, a large sisal plantation, to provide raw material for the manufacture of marine or sisal rope and sisal twine, was started at Sisal, 'Ewa District. The old town of Sisal was located near the Naval Air Station.

Around and in the abandoned quarry located just outside the main gate of the Naval Air Station, trees of 'opiuma (Pithecellobium dulce) are scattered throughout the kiawe - koa-haole thicket. Shrubs of Christmas berry (Schinus terebinthifolius) and pluchea (Pluchea odorata, Pluchea x fosbergii) are also frequently observed. A large pond is found in the quarry; it is or was part of the water system developed by the sugar company. A pumping station, no longer in use, is also found near the pond.

In areas where the thicket is dense, the ground is heavily shaded and covered with litter from the plants above. Scattered here and there are shade-tolerant species such as asystasia (Asystasia gangetica) and bristly foxtail (Setaria verticillata).

Rare, Threatened, or Endangered Species

Two officially listed endangered plant species, the 'Ewa Plains 'akoko (*Euphorbia skottsbergii* var. *kalaeloana*) and *Achyranthes rotundata*, are known from the nearby Barbers Point Naval Air Station and Deep-draft Harbor Site. However, none of these plants were found on the project site during the course of this survey. Char and Balakrishnan (1979), during their comprehensive survey of the 'Ewa Plains area, also did not find any plants considered rare, threatened, or endangered (Fosberg and Herbst 1975, U. S. Fish and Wildlife Service 1980) within the ± 1,400-acre site now proposed for development.

The vegetation on the project area has been disturbed and greatly modified for a long period of time. Most of the land within the project area is actively under sugar cane cultivation. Other portions of the project area have been used for grazing, growing sisal, quarrying coral, or are periodically maintained. Because of these past and present disturbances, introduced plant species dominate the landscape and form the major components of the four vegetation types.

Plant Species List

In the plant species list which follows, families are arranged alphabetically within each of two groups: Monocotyledons and Dictoyledons. Taxonomy and nomenclature of the two groups of flowering plants follow St. John (1973) except where more recently accepted names are used. Hawaiian names used are in accordance with Porter (1972) or St. John (1973). The following information is provided:

1. Scientific 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 alien = not native to the Hawaiian Islands; brought here intentionally or accidentally after Western contact.
4. Vegetation types. Four vegetation types are recognized on the project area and are discussed in detail in the text. They are:

   1 = Cane fields

   2 = Scrubland

   3 = Ruderal vegetation

   4 = Kiawe – Koa-haole thickets
5. The relative abundance of each species or its absence (–) within each of the two vegetation types. These ratings reflect the abundance of a particular species within the project area and are not applicable to areas outside the project. The following symbols are employed:

   A = abundant = the major species in a given vegetation type

Scientific name	Common name	Status	Vegetation types 1	2	3	4
MONOCOTYLEDONS						
AGAVACEAE (Agave Family)						
Agave sisalana Perrine ex Engelm.	sisal, malina	X	-	-	-	Lc
AMARYLLIDACEAE (Amaryllis Family)						
Zephyranthes flava (Herb.) Nichols.	yellow zephryanthes	X	-	-	-	R
COMMELINACEAE (Spiderwort Family)						
Commelina benghalensis L.	hairy honohono	X	-	U	U	U
Commelina diffusa Burm. f.	honohono	X	U	-	-	U
CYPERACEAE						
Cyperus rotundus L.	nutgrass, kili'o'opu	X	O	U	-	-
Eleocharis sp.		X	-	-	-	R
GRAMINEAE						
Andropogon pertusus (L.) Willd.		X	U	Lc	O	U
Andropogon sp.		X	-	-	U	-
Brachiaria mutica (Forsk.) Stapf	Californiagrass	X	Lc	Lc	-	-
Brachiaria subquadripara (Trin.) Hitch.		X	R	-	-	-
Cenchrus ciliaris L.	buffelgrass	X	O	A	A	C
Chloris inflata Link	swollen fingergrass, mau'ulei	X	O	Lc/O	O	O
Chloris radiata (L.) Sw.	radiate fingergrass	X	-	-	-	U
Chloris virgata Sw.	feather fingergrass	X	U	O	O	U
Cynodon dactylon (L.) Pers.	Bermuda grass, manienie	X	O	U	O	U
Dactyloctenium aegyptium (L.) Willd.	beach wiregrass	X	-	R	R	-
Digitaria ciliaris (Retz.) Koel.	crabgrass	X	-	R	R	-
Digitaria violascens Link	kukaipua'a-uka	X	-	R	-	-
Eragrostis cilianensis (All.) Vignolo-Lutati	stinkgrass	X	O	O	O	U
Eragrostis sp.		X	R	-	-	-
Heteropogon contortus (L.) Beauv. ex R. & S.	pili, piligrass	I	-	-	-	R
Leptochloa uninervia (Presl) Hitch. & Chase	leptochloa	X	U	-	-	-
Panicum maximum Jacq. var. maximum	Guinea grass, panicgrass	X	Lc	Lc/C	O	O
Panicum maximum var. trichoglume Eyles ex Robyns	green panicgrass	X	U	Lc/C	O	O

C = common = distributed throughout a given vegetation type in large numbers

Lc = locally common = found in localized patches where it occurs in large numbers but otherwise rare to uncommon in a given vegetation type

O = occasional = distributed widely throughout a given vegetation type in moderate numbers

U = uncommon = observed infrequently but more than 10 times within a given vegetation type

R = rare = observed less than 10 times in a given vegetation type.

Scientific name	Common name	Status	Vegetation types 1	2	3	4
Rhynchelytrum repens (Willd.) C. E. Hubb.	Natal redtop	X	R	Lc/C	O	U
Saccharum officinarum L.	sugar cane, ko	P	A	U	-	-
Setaria verticillate (L.) Beauv.	bristly foxtail	X	R	U	-	U
Tricachne insularis (L.) Nees	sourgrass	X	U	U	U	R
LILIACEAE (Lily Family)						
Aloe vera L.	aloe, panini 'awa'awa	X	R	-	-	-
DICOTYLEDONS						
ACANTHACEAE (Acanthus Family)						
Asystasia gangetica (L.) T. Anders.	asystasia, Chinese violet	X	R	-	-	O
AMARANTHACEAE (Amaranth Family)						
Achyranthes indica (L.) Mill.		X	-	-	-	U
Alternanthera repens (L.) Ktze.	khaki weed	X	-	-	U	-
Amaranthus spinosus L.	spiny amaranth, pakai-kuku	X	O	O	O	U
Amaranthus viridis L.	slender amaranth, pakai	X	U	U	U	-
ANACARDIACEAE (Mango Family)						
Schinusterebinthifolius Raddi	Christmas berry, wilelaiki	X	R	U	-	U
ARALIACEAE (Ginseng Family)						
Brassaia actinophylla Endl.	octopus tree	X	-	-	-	R
BORAGINACEAE (Heliotrope Family)						
Heliotropium curassavicum L.	nena, kipukai	I	-	R	-	-
CACTACEAE (Cactus Family)						
Opuntia ficus-indica (L.) P. Mill.	prickly pear, panini	X	-	-	-	R
CAPPARACEAE (Caper Family)						
Gynandropsis gynandra (L.) Briq.	wild spider flower, honohina	X	U	U	U	R

Scientific name	Common name	Status	Vegetation types 1	2	3	4
CHENOPODIACEAE (Goosefoot Family)						
Atriplex muelleri Benth.		X	-	-	R	-
Atriplex semibaccata R. Br.	Australian saltbush	X	U	U	O	O
Chenopodium album L.	pigweed, 'aheahea	X	-	-	U	-
Chenopodium carinatum R. Br.	keeled goosefoot	X	-	-	R	-
COMPOSITAE (Daisy Family)						
Bidens cynapifolia HBK.	West Indian beggar's tick	X	R	R	-	U
Bidens pilosa L.	Spanish needle, ko'oko'olau	X	-	U	-	R
Calyptocarpus vialis Less.	hierba del cabello	X	-	-	O	-
Crassocephalum crepidioides (Benth.) S. Moore	crassocephalum	X	R	-	-	-
Emelia fosbergii Nicol.	red pua-lele	X	O	-	-	-
Emelia sonchifolia (L.) DC.	lilac pua-lele	X	O	-	-	-
Pluchea x fosbergii Cooperrider & Galang	hybrid pluchea	X	R	U	-	-
Pluchea indica (L.) Less.	Indian pluchea	X	-	U	-	-
Pluchea odorata (L.) Cass.	pluchea	X	U	Lc/O	Lc/O	O
Sonchus asper (L.) Hill	spiny sowthistle	X	R	-	-	-
Sonchus oleraceus L.	sow thistle, pua-lele	X	O	-	-	-
Synedrella nodiflora (L.) Gaertn.	synedrella	X	-	-	R	-
Tridax procumbens L.	coat buttons	X	O	O	O	-
Verbesina encelioides (Cav.) B. & H. ex Gray	golden crown-beard	X	U	O	O	U
Xanthium saccharatum Wallr.	cocklebur, kikania	X	-	U	-	-
CONVOLVULACEAE (Morning-glory Family)						
Ipomoea cairica (L.) Sweet	koali	I	R	-	-	U
Ipomoea obscura (L.) Ker-Gawl		X	R	U	-	-
Ipomoea triloba L.	little bell	X	Lc	O	O	-
Merremia aegyptia (L.) Urban	hairy merremia, koali-kua-hulu	I	-	O	-	U
Merremia tuberosa (L.) Rendle	woodrose, pili-kai	X	Lc	-	-	-
CUCURBITACEAE (Squash Family)						
Cucumis dipsaceus Ehrenb. ex Spach	wild cucumber	X	-	R	-	-
Cucumis sativa L.	cucumber	X	-	-	R	-
Cucurbita maxima Duch.	winter squash	X	R	-	-	-
Cucurbita pepo L.	pumpkin, pala'ai, pu	X	U	-	-	-

Scientific name	Common name	Status	Vegetation types 1	2	3	4
Momordica charantia var. pavel Crantz	wild bittermelon	X	O	O	O	O
Sicyos microcarpus Mann	sicyos	E	-	-	-	U
EUPHORBIACEAE (Spurge Family)						
Euphorbia geniculata Ortega	wild spurge, kaliko	X	O	O	O	-
Euphorbia glomerifera (Millsp.) L. C. Wheeler	glomerate spurge	X	O	O	O	-
Euphorbia heterophylla L.	fire plant	X	R	-	-	-
Euphorbia hirta L.	garden spurge, koko-kahiki	X	O	O	O	U
Euphorbia sp.		X	-	-	-	U
Ricinus communis L.	castor bean, koli	X	U	Lc/O	O	R
LABIATAE (Mint Family)						
Leonotis nepetaefolia (L.) Ait. f.	lions-ear	X	R	O	U	U
Ocimum gratissimum L.	wild basil	X	-	U	-	U
LEGUMINOSAE (Pea Family)						
Acacia farnesiana (L.) Willd.	klu, kolu	X	-	U	U	O
Cassia lechenaultiana DC.	partridge pea, lauki	X	-	-	R	-
Crotalaria incana L.	fuzzy rattlepod, kukae-hoki	X	O	Lc/O	O	U
Crotalaria pallida Aiton		X	U	O	U	R
Desmanthus virgatus (L.) Willd.	virgate mimosa, slender mimosa	X	O	O	O	-
Indigofera endecaphylla Jacq.		X	-	-	O	-
Indigofera suffruticosa Mill.	indigo, 'iniko	X	-	O	U	O/U
Leucaena leucocephala (Lam.) de Wit	koa-haole, ekoa	X	R	Lc/O	O	A/C
Phaseolus atropurpureus DC.	wild bush bean	X	-	-	R	-
Phaseolus lathyroides L.	cow pea, wild bush bean	X	-	U	O	-
Pithecellobium dulce (Roxb.) Benth.	'opiuma	X	-	R	R	U
Prosopis pallida (Humb. & Bonpl. ex Willd.) HBK.	kiawe	X	-	O	U	A/C
Samanea saman (Jacq.) Merr.	monkeypod	X	-	R	-	-
LOGANIACEAE (Strychnine Family)						
Buddleja asiatica Lour.	dogtail, butterfly bush, huelo-'ilio	X	-	R	-	-

Scientific name	Common name	Status	Vegetation types 1	2	3	4
MALVACEAE (Mallow Family)						
Abutilon grandifolium (Willd.) Sweet	hairy abutilon, ma'o	X	U	U	U	U
Abutilon incanum (Link) Sweet	hoary abutilon, ma'o	I	R	C	O	Lc/O
Gossypium barbadense L.	cotton, pulupulu-haole	X	R	-	-	-
Malvastrum coromandelianum (L.) Garcke	false mallow, hauuoi	X	U	R	O	U
Sida fallax Walp.	'ilima	I	U	C	C	C
Sida rhombifolia L.	cuba jute	X	-	-	U	-
Sida spinosa L.	prickly sida	X	O	O	O	-
Thespesia populnea (L.) Soland. ex Correa	milo	P	-	-	-	R
MELIACEAE (Mahogany Family)						
Melia azedarach L.	pride of India, chinaberry, 'inia	X	-	R	-	-
MORACEAE (Mulberry Family)						
Ficus microcarpa L. f.	Chinese banyan	X	-	-	-	R
MORINGACEAE (Moringa Family)						
Moringa oleifera Lam.	horseradish tree, kalamungai	X	R	-	-	-
NYCTAGINACEAE (Four O'clock Family)						
Boerhavia coccinea Mill.		X	U	R	U	-
Boerhavia diffusa L.	alena	I	-	R	-	-
OXALIDACEAE (Wood Sorrel Family)						
Oxalis corniculata L.	yellow wood sorrel, 'ihi	I	-	-	-	R
PASSIFLORACEAE (Passion Flower Family)						
Passiflora foetida L.	scarlet-fruited passion-flower, pohapoha	X	-	R	-	R
POLYGONACEAE (Buckwheat Family)						
Antigonon leptopus H. & A.	Mexican creeper	X	-	-	-	R

Scientific name	Common name	Status	Vegetation types 1	2	3	4
PORTULACACEAE (Purslane Family)						
Portulaca oleracea L.	common purslane, 'ihi	X	O	O	O	-
SOLANACEAE (Tomato Family)						
Capsicum annuum L.	chili pepper, nioi	X	R	R	-	-
Datura stramonium L.	jimson weed, kikania-hacole	X	-	-	-	-
Lycopersicon pimpinellifolium Mill.	currant tomato	X	C	C	C	-
Nicandra physaloides (L.) Gaertn.	apple-of-Peru	X	-	-	-	-
Nicotiana glauca Grah.	wild tobacco, pake	X	-	C	R	-
Solanum nigrum L.	black nightshade, popolo	X?	-	-	-	-
Solanum seaforthianum Andr.	blue potato vine	X	-	C	-	C
STERCULIACEAE (Cocoa Family)						
Waltheria indica var. americana (L.) R. Br. ex Hosaka	'uhaloa, hi'aloa	I	O	C	O	R
VERBENACEAE (Verbena Family)						
Lantana camara L.	lantana, lakana	X	-	R	-	-
Stachytarpheta jamaicensis (L.) Vahl	Jamaica vervain, owi, oi	X	-	R	-	-
ZYGOPHYLLACEAE (Tribulus Family)						
Tribulus terrestris L.	puncture vine	X	U	-	-	-

FAUNA SURVEY

The following survey was undertaken to provide information primarily on the bird and mammal populations on the ± 1,400-acre Campbell Estate parcel proposed for development.

Seventeen species of birds were recorded from the study site: 16 are foreign (or introduced) species and one is an indigenous migratory species. Two species of mammals were recorded from the site, the Indian Mongoose and the Feral Cat.

Survey Methods

The field work was carried out over two days in October 1986: on 15 October between 1200 and 1500 and on 23 October between 0730 and 1400. Birds were detected by both sight and their vocalizations. To ensure a more comprehensive study, the list of birds recorded during the field survey was compared with checklists made from other bird surveys for the Environmental Impact Statements of adjacent areas such as Makakilo (U. S. Department of Housing and Urban Development 1978), Barbers Point Deep-draft Harbor (M. & E. Pacific 1978), and Campbell Industrial Park (Belt, Collins and Associates 1980).

The presence of mammals at the site was determined by visual observations, and, indirectly, by tracks and scat.

Faunal Habitats

The study site is covered by four basic types of vegetation: (1) scrubland,

most of which covers abandoned can fields; (2) cane fields, including the vegetation occurring along the margins of the fields and in drainage ditches; (3) kiawe - haole-koa thicket, which occurs in several places, one of which is an abandoned quarry; and (4) ruderal vegetation, occurring mostly along roadsides. More complete descriptions of these vegetation types can be found in the flora survey.

Over the four types of vegetation, a total of 17 bird species was recorded. Due to the highly disturbed nature of the vegetation, as well as the dry climate on this part of O'ahu, all but one of the bird species observed were introduced (non-native) ones. The sole native species, the Pacific Golden Plover (Pluvialis dominica), is a wide-ranging migratory species. The 16 introduced species were Cattle Egret, Feral Rock Dove (the Common Pigeon), Spotted Dove, Zebra Dove, Black-rumped Waxbill, Chestnut Mannikin, House Finch, House Sparrow, Northern Cardinal, Nutmeg Mannikin, Red Avadavat, Red-crested Cardinal, Red-vented Bulbil, Common Myna, Common Barn Owl, and Japanese White-eye.

The only mammal actually observed was the Feral Cat, but scat and tracks of the Indian Mongoose (Herpestes auropunctatus) were found along the edge of the cane fields.

At least two bird species and a number of mammal species probably utilize the site but were not observed during the course of the study. The Northern Mockingbird (Mimus polyglottos) reported from the Barbers Point Deep-Draft Harbor site (H. & E. Pacific 1978) and Campbell Industrial Park (Belt, Collins and Associates 1980) can be expected to utilize the study area to

some degree. The Black-crowned Night Heron (Nycticorax nycticorax hoactli) is a resident native species which is not subspecifically distinct from the populations in America. It usually nests in trees in coastal areas and feeds in ponds, marshes, lagoons, and tidepools. No individuals were seen during the survey, but they may inhabit the trees surrounding the ponds in the quarry.

The mammal species which are likely to occur in the study site include the Roof Rat (Rattus rattus), the Norway Rat (Rattus norvegicus), the Polynesian rat (Rattus exulans), and the feral dog (Canis familiaris).

No terrestrial reptiles or amphibians were noted during the study. The Hawaiian Islands do not have any native amphibians or terrestrial reptile species. It is likely, however, that geckos such as the Mourning Gecko (Lepidodactylus lugubris) and several other gecko and skink species occur in the areas with thickets.

Annotated Species List

Common and scientific names of the bird species are in accordance with those listed in Hawaii's Birds (Hawaii Audubon Society 1984).

I. Birds (Aves)

A. ARDEIDAE

Cattle Egret (Bubulcus ibis); Foreign

The Cattle Egret is common in Pearl Harbor, where it feeds in wetland areas and occasionally in disturbed, dryland areas. Several egrets were seen flying over the study site, but this species is not likely to make

much use of the area because of lack of a suitable habitat.

B. CHARADRIIDAE

Pacific Golden Plover (Pluvialis dominica); Migratory

The Pacific Golden Plover (also called American Golden Plover and Kolea in Hawai'i) is an indigenous migratory species which winters in the islands and leaves for the Arctic by early May. It is found in various open habitats from sea level to 10,000 feet elevation. Several of these were seen feeding in the abandoned cane fields and open ruderal areas.

C. COLUMBIDAE

Feral Rock Dove (Columba livia); Foreign

The Common Pigeon is an introduced species which is common in urban areas on O'ahu. A flock of about 30 indivduals was observed flying across the study site. None were observed landing, and it is unlikely that they utilize the study site because of lack of a suitable habitat.

Spotted Dove (Streptopelia chinensis); Foreign

The Spotted Dove (also known as Chinese Dove or Lace-necked Dove) is an introduced species which is common in cultivated and habitated areas throughout the islands. At the study site, many individuals were observed on the ground in open places, scrublands, and in trees in the areas with thickets.

Zebra Dove (Geopelia striata); Foreign

The Zebra Dove (also known as Barred Dove) is an introduced species which is very common in cultivated and habitated areas throughout the islands,

often congregating in flocks. At the study site, numerous, mostly solitary birds were observed on the ground in open ruderal areas, scrublands, and thickets.

D. FRINGILLIDAE (sensu lato)

Black-rumped Waxbill (Estrilda troglodytes); Foreign

The Black-rumped Waxbill (also known as Red-eared Waxbill) was reported in Hawaii's Birds as occurring around Diamond Head. At the study site it is common in flocks on the edges of the cane fields and in ruderal areas with high ground.

Chestnut Mannikin (Lonchura malacca); Foreign

The Chestnut Mannikin (also known as Black-headed Munia or Black-headed Mannikin) is an introduced species reported to be particularly common around Pearl Harbor and Wahiawa. At the study site it is common in flocks or singly along the edges of cane fields, scrublands, and in ruderal areas.

House Finch (Carpodacus mexicanus); Foreign

The House Finch (also called Papayabird), is an introduced species common in urban areas and forests on all the main islands. It was occasionally observed in the project area, mostly near thickets.

House Sparrow (Passer domesticus); Foreign

The House Sparrow is an introduced species common in residential and disturbed places in the lowlands of all the main islands. At the study site it is occasional in thickets.

Northern Cardinal (Cardinalis cardinalis); Foreign

The Northern Cardinal (also called Kentucky Cardinal) is an introduced species occasional to common in the lowlands of the larger main islands. It is occasional at the study site in the thickets and in trees in the quarry area.

Nutmeg Mannikin (Lonchura punctualata); Foreign

The Nutmeg Mannikin (also known as the Spotted Munia or Ricebird) is an introduced species which is common in the lowlands of all the main islands, often congregating in large flocks. At the site it is common in flocks in grassy areas along the edges of the cane fields.

Red Avadavat (Amandava amandava); Foreign

The RedAvadavat (also called Red Munia and Strawberry Finch) is an introduced species which is common around Pearl Harbor. At the study site it is common in grassy areas and on the edge of the cane fields, singly or in mixed flocks with other species of Lonchura.

Red-crested Cardinal (Paroaria coronata); Foreign

The Red-crested Cardinal (also called the Brazilian Cardinal) is an introduced species found in urban and disturbed areas in the lowlands of all the larger main islands but is common only on O'ahu. It was common at the study site in the thickets.

E. PYCNONOTIDAE

Red-vented Bulbil (Pyconotus cafer); Foreign

The Red-vented Bulbil is an introduced bird common in urban areas on O'ahu.

At the site it is common in trees of the quarry, in the thickets, and in the scrublands.

F. STURNIDAE

Common Myna (Acridotheres tristis); Foreign

The Common Myna is an introduced species which is very common in habitated and agricultural areas, only occasionally living in forest areas. At the study site it was occasional in cultivated areas, but most of the individuals seen were just flying through the area and are not likely to make much use of it.

G. TYTONIDAE

Common Barn Owl (Tyto alba); Foreign

The Common Barn Owl is an introduced predatory species which is occasional in the area. A single individual was seen in a tree in the thicket near the quarry.

H. ZOSTEROPIDAE

Japanese White-eye (Zosterops japonica); Foreign

The Japanese White-eye (commonly called by its Japanese name, Mejiro) is an introduced species which is common on all the islands from the lowlands up to treeline. At the study site several individuals were observed in the thickets.

II. MAMMALS (Mammalia)

A. VIVERRIDAE

Indian Mongoose (Herpestes auropunctatus); Foreign

Scat and tracks of the mongoose were seen along the edge of the cane

fields, and it can be expected to be found in all four vegetation types.

B. FELIDAE

Feral Cat (Felis catus); Foreign

One cat was seen on the edge of the study site in abandoned cane fields, but it is not certain if it was feral or a pet from the nearby residential area.

Threatened or Endangered Species

No threatened or endangered species were observed in the study area during the course of this survey.

A reservoir situated in the study site may have been utilized by native waterbirds at one time but is now dried out and overgrown with weeds. The vegetation around the ponds in the quarry could at times be utilized by some native wetland birds, particularly by the Black-crowned Night Heron, but the area is so disturbed and away from the coast that other wetland birds such as the Black-necked Stilt or Ae'o (Himantopus mexicanus knudseni), American Coot or 'Alae-ke'oke'o (Fulica americana alai), Common Moorhen or 'Alae-'ula (Gallinula chloropus sandvicensis), and Hawaiian Duck or Koloa (Anas wyvilliana) cannot be expected to make much or any use of it. The thicket vegetation is composed entirely of introduced trees, and thus no native birds could be expected to use the area except, perhaps, the Hawaiian Owl (Asio flammeus sandwichensis), which is scarce on O'ahu and prefers areas with less human activity. It is considered endangered by the State Department of Land and Natural Resources.

The endangered Hawaiian Hoary Bat (Lasiurus cinerius semotus) is the only native land mammal in the Hawaiian Islands. It may fly into and feed around the area in the evenings, but there is no record of this. Bats forage for insects in openings in woodlands, along the shore, or over ponds and streams near the sea during dusk and at night. Very little is known about the crepuscular habits of this species (Tomich 1969, Van Riper and Van Riper 1982).

DISCUSSION AND RECOMMENDATIONS

The terrestrial biological communities found on the ± 1,400-acre parcel proposed for development occur in similar habitats throughout the lowlands of the Hawaiian Islands.

The vegetation on the project area had been highly disturbed by sugar cane cultivation. Past activities include grazing, a sisal plantation, and a quarry. As a result, introduced species are dominant. Of a total of 113 vascular plant species inventoried during this survey, 100 (88.5%) were introduced. The 11 native species found on the project area occur in similar environmental habitats throughout the islands. Some, such as the 'uhaloa, hoary abutilon, and 'ilima, are considered "weedy natives." None of these native species is considered rare, threatened, or endangered.

The vertebrate fauna is composed primarily of foreign or introduced species. Seventeen (17) bird species were observed, sixteen (16) were foreign, and one (1) is a migratory, winter visitor. Mongoose and Feral Cat were observed on the site.

Some bird species will likely increase in numbers, as the proposed project will provide a number of parks. This will increase suitable nesting and feeding sites -- trees and grassy areas. Species commensal with man, such as the Common Myna and House Sparrow, are also expected to increase in numbers.

While the proposed project will result in the loss of vegetation and some faunal habitat, it is expected to have only a minimal impact on the total island populations of the species involved.

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APPENDIX E

Preliminary Archaeological Reconnaissance Survey.
Paul H. Rosendahl, Inc. November 1986.

PAUL H. ROSENDAHL, Ph.D., Inc.
Consulting Archaeologist

Report 275-111886 November 24, 1986

The Estate of James Campbell
c/o Helber, Hastert, Van Horn & Kimura
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

RECEIVED
NOV 2 1986
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Subject: Preliminary Archaeological Reconnaissance Survey For Environmental Assessment (EA) Ewa Town Center/Secondary Urban Center, Land of Honouliuli, Ewa, Island of Oahu (TMK:9-1-16: Por.4,5,17; 9-1-16:1, Por.4,6,9,16,18,24,30; 9-2-19:Por.1)

Gentlemen:

At the request of Mr. Mark Hastert of Helber, Hastert, Van Horn & Kimura, acting for their client, The Estate of James Campbell, Paul H. Rosendahl, Ph.D., Inc. (PHRI) conducted a preliminary archaeological reconnaissance survey of the Ewa Town Center (ETC)/Secondary Urban Center (SUC) project area in Honouliuli, Ewa, Island of Oahu. The archaeological work was done in conjunction with the preparation of an Environmental Assessment (EA) as part of a petition for a State Land Use Boundary District Amendment.

A preliminary reconnaissance is simply a limited field inspection, the basic objectives of which are four-fold: (a) to locate previously identified sites; (b) to determine the presence or absence of any other previously unidentified sites; (c) to assess the potential significance of identified sites; and (d) to recommend any further archaeological work that might be necessary or appropriate. Preliminary reconnaissance survey field work was carried out on November 5, 1986, by PHRI Senior Archaeologist Dr. Alan E. Haun and PHRI Field Archaeologist Mr. Richard A.K. Gilman. Approximately 18 man-hours of labor were expended in carrying out the field work.

Field work findings were subsequently discussed with Dr. Ross Cordy--staff archaeologist in the State Historic Preservation Office, Department of Land and Natural Resources. An oral report on the field work findings was given to Mr. Thomas Fee of Helber, Hastert, Van Horn & Kimura on November 11, 1986. The present letter report constitutes the final report on the preliminary reconnaissance survey.

Based on a preliminary review of available background literature and records, and discussions with Mr. Hastert, the following specific objectives were determined to constitute an adequate scope of work for the proposed preliminary reconnaissance survey of the Ewa Town Center/Secondary Urban Center project area:

1. To review and evaluate available archaeological and historical literature relevant to the immediate project area;

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2. To conduct a limited sample field inspection of the approximately 1,400 acre project area;

3. To determine the nature of the physical conditions of the project area that would influence the conduct of any subsequent archaeological field work, should it be necessary; and

4. Prepare an appropriate scope of work (including specific field work and other non-field tasks) and accurate man-hour estimates for any subsequent archaeological work, such as a full-scale reconnaissance survey, that might be necessary.

The basic purpose of such a full-scale archaeological reconnaissance survey would be to identify--to discover and locate on available maps--all sites or features of possible archaeological significance. A reconnaissance survey is extensive rather than intensive in scope and is conducted to determine the presence or absence of archaeological resources within a specified project area. Reconnaissance survey indicates both the general nature and variety of archaeological remains present, and the general distribution and density of such remains. A reconnaissance survey permits a general significance assessment of the archaeological resources, and facilitates the formulation of realistic recommendations and estimates for such further archaeological work as might be necessary or appropriate. Such further work could include intensive survey--detailed recording of sites and features, and selected test excavations; and possibly subsequent mitigation--data recovery research excavations, interpretive planning and development, and/or preservation of sites and features with significant scientific research, interpretive, and/or cultural values.

Research value refers to the potential of archaeological resources for producing information useful in the understanding of culture history, past lifeways, and cultural processes at the local, regional, and interregional levels of organization. Interpretive value refers to the potential of archaeological resources for public education and recreation. Cultural value, within the framework for significance evaluation used here, refers to the potential of archaeological resources for the preservation and promotion of cultural and ethnic identity and values.

The Ewa Town Center/Secondary Urban Center project area consists of approximately 1,400 acres located in the Land of Honouliuli, Ewa, Island of Oahu (TMK:9-1-16:Por.4,5,17; 9-1-16:1,Por.4,6,9,16,18,24,30; and 9-2-19:Por.1) (see attached map). The majority of the parcel is bounded by Farrington Highway and the H-1 Freeway to the north, the Oahu Railway and Land Company right-of-way (railroad tracks) to the south, State Highway 901 to the east, and Honokai Hale Subdivision and privately-owned land to the west. Two small areas within this large parcel, Puu Kapolei and a triangular piece of land formed by H-1 and State Highways 93 and 901, were not part of the field inspection project area. In addition to the large parcel, three other areas are included within the project area as follows: (1) a roughly rectangular parcel bounded by State Highway 901 to the west, Farrington Highway to the south, H-1 and the present Urban

District boundary to the north, and Makalapa Gulch to the east; (2) an irregularly-shaped parcel lying between the H-1 Freeway and the present Urban District boundary, and including the quarry and landfill at Puu Palailai and narrow strips of former sugarcane land to the east and west of State Highway 901; and (3) a roughly rectangular, c. 2,000 ft-wide parcel, which parallels Farrington Highway on its upslope (north) side, from the east end of Honokai Hale (west end of parcel) to a large water tank at the eastern end.

Most of the project area has been extensively modified in recent times, primarily by sugarcane cultivation. Oahu Sugar Company, Limited currently cultivates all of the project area situated on the seaward side of Farrington Highway and the H-1 Freeway, except for a small abandoned limestone quarry located at the intersection of State Highway 901 and the Oahu Railroad and Land Company ROW, and several small areas where sugarcane was formerly cultivated (adjacent to Honokai Hale and to the intersection of H-1 and State Highway 901). This cultivation has involved extensive grading as evidenced by several large piles of boulders located between Honokai Hale and Kalaeloa Boulevard.

The portions of the project area situated on the inland side of H-1 include recently modified areas (landfill and quarry on Puu Palailai, and former sugarcane fields) and four small relatively unmodified areas with the latter comprising approximately 60 acres. Relatively unmodified areas include a strip of land that parallels the Urban District boundary where it crosses Puu Palailai; the lowermost portions of Awanui and Palailai Gulches, and an unnamed gulch immediately west of Palailai Gulch; and a roughly triangular-shaped parcel located at the northwesternmost corner of the project area above the 200 ft contour.

The vegetation cover ranges from moderate to very dense. Dense areas are comprised of cultivated sugarcane (Saccharum sp.). Former cane lands are characterized by scattered sugarcane, other grasses, and occasional koa-haole (Leucaena glauca [L.] Benth.). The relatively unmodified areas noted above are characterized by grasses, koa-haole, kiawe (Prosopis pallida [Humb. and Bonpl. ex Willd] HBK.), and klu (Acacia farnesiana [L.] Willd.).

Although no archaeological remains are known to exist within the project area, one previously identified site and a second reported site, are adjacent to it. The Oahu Railroad and Land Company ROW (Site 50-80-12-9714), which bounds the project area on the seaward side, is listed on the National Register of Historic Places. A heiau and large rockshelter are reported to have been located on Puu Kapolei by McAllister (1933); however, these were said to have been destroyed prior to McAllister's 1930 field work.

Preliminary reconnaissance survey field work conducted on November 5, 1988 by PHRI consisted of both systematic pedestrian transects, and a combination of vehicular coverage and pedestrian point inspections. Field work was facilitated by black-and-white aerial photo-topographic maps (scale 1"=200', R.M. Towill, 1989), and an aerial photograph of Campbell Estate Land (approx. scale 1"=1,000', 9/21/82). Systematic pedestrian

coverage concentrated on those portions which, on the basis of the aerial photographs and discussions with Mr. Bill Dement, Field Engineer for Oahu Sugar Company, Limited, appeared to have been least modified by sugarcane cultivation and other activities. Systematic coverage consisted of pedestrian transects following topographic contours, with distances between survey personnel varying between 20.0 and 30.0 m, depending upon terrain and vegetation. The remaining portions of the area were examined by unsystematic vehicular and pedestrian point inspection coverage. The locations and approximate extents of all located sites were plotted on to the topographic maps, and the general nature and probable significance of sites noted. No individual site numbers were assigned, but sites were marked with plastic flagging tape.

Two sites, an irrigation ditch and a WWII military structure, were identified within the project area (see attached map for site locations). The irrigation ditch extends from the western edge of the project area where it was fed by a siphon pipe from Pumping Station 10. The ditch gradually descends from the 200 ft contour at the western edge of the project area, to the c. 160 ft contour at the northeasternmost corner of the project area. The ditch is constructed of concrete and stone. Elevated flumes constructed of timbers and galvanized steel bridge the gulches. Several other recent historic features where noted along the ditch. The remains of two structures and a roadbed are present immediately below the ditch where it crosses Palailai Gulch; however, these are located slightly above the present project area boundary. A wall parallels the irrigation ditch on the upslope side along its western extent. These features appear to be associated with the construction and/or use of the irrigation system, which was used to irrigate the sugarcane fields located upslope from the present H-1 Freeway.

A multi-level ferro-concrete WWII military structure was identified on the summit of Puu Palailai. The structure appears to be an observation point, as it consists of a staircase-like series of rooms, each having a large opening or window facing the ocean. Associated with the concrete structure is a small, circular, dry-laid stone masonary walled enclosure. It also appears to be military-related because of the presence of sand in the walls, probably from sandbags. The feature may be a revetment for a small gun position for defense of the observation point.

A tentative evaluation of the archaeological significance of sites identified within the project area, made on the basis of the preliminary reconnaissance survey field inspection findings, indicates that all are of minimal research, cultural, or interpretive significance, primarily because they all appear to be less than 50 years old. The sites are presumably well-documented in Oahu Sugar Company/Campbell Estate files and military records; however, this has not been verified. Therefore, no further archaeological work is recommended. This recommendation is made on the basis of the preliminary reconnaissance survey field inspection, and is given with the general qualification that during any development activity involving the extensive modification of the land surface there is always the possibility--however remote--that previously unknown or unexpected subsurface cultural features or deposits might be encountered. In such a situation, immediate archaeological consultation should be sought.

If you have any questions concerning our preliminary reconnaissance survey, please contact me at our Hilo office (808) 969-1763.

Sincerely yours,

Alan E. Haun, Ph.D.
Senior Archaeologist

Attachment: Project Area and Site Location Map

AEH:yks

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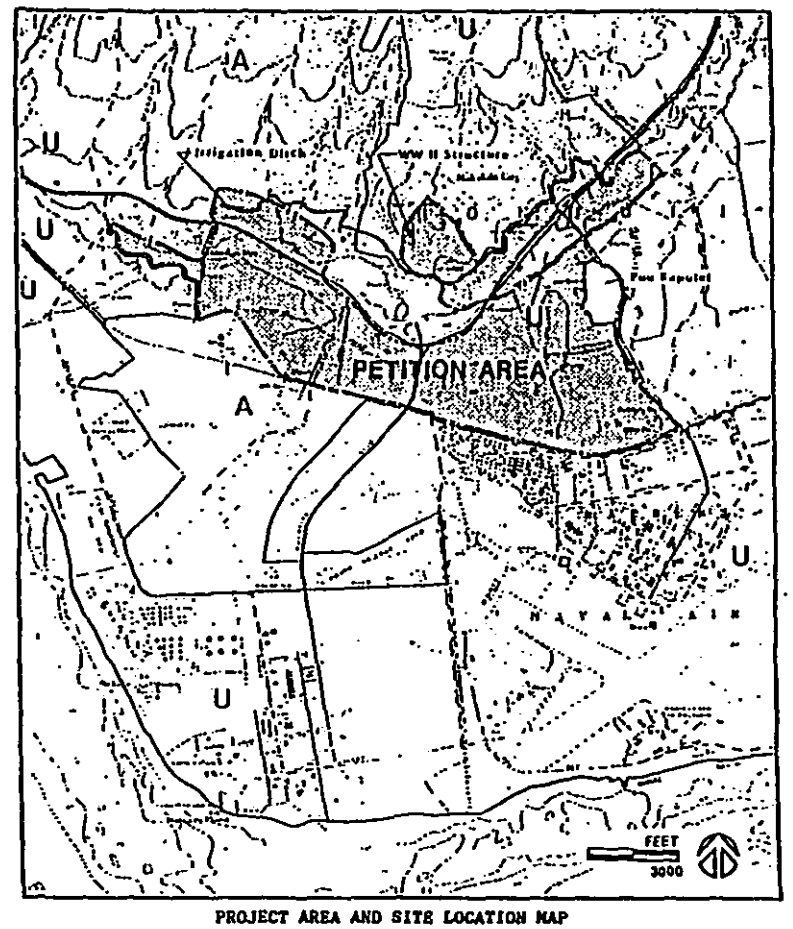
ATTACHMENT



PROJECT AREA AND SITE LOCATION MAP

Preliminary Archaeological Reconnaissance Survey
for Environmental Assessment (EA)
Ewa Town Center/Secondary Urban Center
Land of Honouliuli, Ewa, Island of Oahu

PHRI Project 86-275 November 1986

(Map taken from base map provided by Helber, Hastert, VanHorn & Kimura)

APPENDIX F

Air Quality Impact Report.

J. W. Morrow, Environmental Management Consultant.

April 27, 1987

AIR QUALITY IMPACT REPORT
SECONDARY URBAN CENTER
EWA, OAHU

April 27, 1987

J. W. MORROW
ENVIRONMENTAL MANAGEMENT CONSULTANT
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TABLE OF CONTENTS

		Page
1.	INTRODUCTION	1
2.	AIR QUALITY STANDARDS	2
3.	EXISTING AIR QUALITY	3
4.	CLIMATE & METEOROLOGY	5
5.	TERRAIN	7
6.	MOBILE SOURCE IMPACTS	7
	6.1 Mobile Source Activity	7
	6.2 Emission Factors	8
	6.3 Modeling Methodology	9
	6.4 Results	10
7.	AGRICULTURAL BURNING	12
8.	CAMPBELL INDUSTRIAL PARK	13
9.	ELECTRICAL GENERATION	14
10.	CONCLUSIONS AND SUGGESTED MITIGATIVE MEASURES	15

REFERENCES

TABLES

FIGURES

AIR QUALITY IMPACT ANALYSIS

SECONDARY URBAN CENTER

EWA, OAHU

1. INTRODUCTION

Both the City & County of Honolulu and private land owners have plans to make the Ewa District a secondary urban center for Honolulu. As a result of this urbanization process, there will be a variety of environmental impacts. The purpose of this study is to specifically address the regional air quality impacts associated with development of the area.

A major element in this development will be a town center being proposed by the Estate of James Campbell and which will be situated between the Barbers Point Naval Air Station (NASBP) and Makakilo. The area between Port Barrette Road (NASBP access road) and Kalaeloa Boulevard (Campbell Industrial Park access road) will include light industrial uses, general and government offices, civic center activities, and retail areas. West of Kalaeloa Boulevard, a college campus and related activities are planned. In the area east of Port Barrette Road and between the city center and NASBP, plans call for residential development including parks, schools, and neighborhood retail activities.

Since this type of development involves substantial traffic generation it constitutes an "indirect" source of air pollution as defined in the federal Clean Air Act[1]. This analysis will therefore focus primarily on these mobile sources.

2. AIR QUALITY STANDARDS

A summary of State of Hawaii and federal ambient air quality standards is presented in Table 1.[2,3] Note that Hawaii's standards are not divided into primary and secondary standards as are the federal standards.

Since the early 1970's the State's standards have been substantially more stringent than their federal counterparts and were absolute values not to be exceeded at all. In 1986, the Department of Health promulgated amendments to these standards making the TSP and SO_2 values the same as the federal standards and permitting one exceedance per year.

Primary standards are intended to protect public health with an adequate margin of safety while secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values.[4]

In the case of the automotive pollutants [carbon monoxide (CO), oxides of nitrogen (NOx), and photochemical oxidants (Ox), there are only primary standards. Until 1983, there was also a hydrocarbons standard which was based on the precursor role hydrocarbons play in the formation of photochemical oxidants rather than any unique toxicological effect they had at ambient levels. The hydrocarbons standard was formally eliminated in January, 1983.[5]

The U.S. Environmental Protection Agency (EPA) is mandated by Congress to periodically review and re-evaluate the federal standards in light of new research findings.[6] The last review resulted in the relaxation of the oxidant standard from 160 to 240 micrograms/cubic meter (ug/m^3).[7] The on-going review has resulted in suggestions that the carbon monoxide (CO) and sulfur dioxide (SO_2) standards be made more stringent, but final action has not been taken yet.

Finally, the State of Hawaii also has fugitive dust regulations for particulate matter (PM) emanating from construction activities.[8] There simply can be no visible emissions from fugitive dust sources.

3. EXISTING AIR QUALITY

The nearest air monitoring station to the project area is located at the Campbell Industrial Park. The State Department of Health

has monitored air quality at the park since 1971, and a summary of the data is presented in Table 2. Total suspended particulates (TSP), sulfur dioxide (SO_2), and nitrogen dioxide (NO_2) were all monitored on a 24-hour basis. Initially, the site was at the Barbers Point Lighthouse, but the proximity to the ocean resulted in very high TSP levels due to salt spray. The station was therefore moved to the Chevron Refinery site about 1.7 kilometers north of the lighthouse on March 17, 1972. In 1976, NO_2 monitoring was ceased. On August 7, 1979, the monitoring station was moved to a rooftop location at the same Chevron site.

It should also be noted that total suspended particulate monitoring with a high-volume sampler was ceased at the site in October, 1985. In November, 1985, a new PM-10 sampler was installed. This instrument measures respirable particulate matter under 10 microns in aerodynamic diameter.

It is evident from the data in Table 2 that both the National Ambient Air Quality Standards (NAAQS) and Hawaii Ambient Air Quality Standards (HAAQS) are being met for the two pollutants still being monitored.

Because the monitoring station is situated relatively close to the elevated sources, i.e., the stacks, located at the industrial park, the data collected may not be representative of the highest ambient pollutant levels resulting from the various industrial

sources at the park. Computer modeling done in conjunction with the City's resource recovery facility permitting indicated maximum SO_2 concentrations occurring some 1.0 to 1.5 kilometers north of the park in the flat terrain as well as on the hillsides also north of the park.[9]

Unfortunately, there are no routine monitoring data for the primary automotive pollutant, i.e., carbon monoxide. The nearest CO monitoring site is at the Department of Health building in downtown Honolulu some 16 miles east-southeast of the project area. Because of the current low level of development in the project area, it can be surmised that present CO levels are also relatively low.

4. CLIMATE & METEOROLOGY

Weather conditions at Campbell Industrial Park are typical of sites located on the leeward coast of Oahu. Long-term climatic data collected at Barbers Point Naval Air Station indicate mean daily maximum and minimum temperatures of 81 and 69 degrees Fahrenheit, respectively; mean annual rainfall of 20.3 inches; and prevailing winds from the northeast at 9 knots.[10] Annual rainfall is of interest because of its role in particulate matter removal from the atmosphere, while wind speed and direction are determinants of pollutant concentration and potential receptors, respectively.

Atmospheric stability is another important factor in determining the potential for air pollution problems. It is largely a function of insolation and wind speed, and an objective methodology for determining it has been developed by Turner.[11] Historical meteorological data from Barbers Point NAS which had been processed using the Turner method were reviewed.[12,13,14] They reconfirmed the annual predominance of northeasterly winds, but also indicated a significant occurrence of onshore winds primarily associated with a midday seabreeze regime.

Secondly, they indicate that almost 25% of the time slightly to moderately unstable conditions exist. Such conditions are conducive to bringing smoke plumes from elevated sources, e.g., smoke stacks, down to the ground within a relatively short distance downwind. Somewhat surprisingly, the data also show a very significant percentage (45%) of stable air conditions which tend to carry plumes largely intact for great distances. Such conditions can result in high pollutant concentrations if the plume reaches hills which are at approximately the same height as the stack. Stable conditions can also contribute to high pollutant concentrations if they coincide with peak traffic hours because automotive pollutants are emitted close to the ground.

5. TERRAIN

The terrain in the project area is generally flat and at an elevation of 10 feet above mean sea level. Vegetation in the area is generally limited to sugar cane, some trees in the industrial and residential areas, and grasses elsewhere. Going north, the elevation gradually increases to about 80 feet over a distance of some four kilometers and then rises more sharply to over 1,000 feet about seven kilometers from the shoreline. Because of its proximity to the ocean, the area is characteristically subjected to a land/seabreeze regime during periods when the prevailing northeasterly trade wind are weakened or absent. Wind shear can be quite noticeable in the area as near-surface onshore winds carry plumes from low level sources landward while higher reaching plumes are moving in the opposite direction with the synoptic flow.

6. MOBILE SOURCE IMPACT

6.1 Mobile Source Activity

A regional analysis of traffic activity associated with development of the Ewa Town Center and other major projects in the area was prepared for the period 1985 - 2005.[15] This study served as the basis for the mobile source air quality impact analysis reported herein. Because of the higher probability of simultaneous occurrence of high traffic volumes and adverse meteorological conditions during the early morning

hours, the a.m. peak traffic volumes were used in this study. It should also be noted that due to the available traffic data, this study was limited to freeflow sections of roads and highways. The principle roads and highways analyzed were:

- H-1 Freeway
- Farrington Highway
- Fort Weaver Road
- Kalaeloa Boulevard
- Renton Road

6.2 Emission Factors

Automotive emission factors for carbon monoxide were generated for calendar years 1985, 1990, 1995, 2000, and 2005 using the Mobile Source Emissions Model (MOBILE-3).[16] To localize the emission factors as much as possible the September, 1986 age distribution for registered vehicles in the City & County of Honolulu [17] was input in lieu of national statistics.

That same age distribution was the basis for the distribution of vehicle miles travelled as well. The cold start percentage was assumed to be 20.6% because the analysis focused on the a.m. peak-hour

6.3 Modeling Methodology

Due to the present state-of-the-art in air quality modeling, analyses such as this generally focus on estimating concentrations of non-reactive pollutants. For projects involving mobile sources as the principal air pollution source, carbon monoxide is normally selected for modeling because it has a relatively long half-life in the atmosphere (ca. 1 month), [18] and it comprises the largest fraction of automotive emissions.

In this instance, microscale screening analyses were performed for the following segments of the aforementioned roadways:

- o Farrington Highway
  - Kahe - Honokai Hale
  - Honokai Hale - Palailai Interchange
  - Palailai Interchange - Ft. Weaver Road
- o H-1 Freeway
  - Palailai Interchange - Kunia Interchange
- o Ft. Weaver Road
  - South of Farrington Highway
- o Renton Road
  - Palailai Interchange - Ft. Weaver Road
- o Kalaeloa Boulevard
  - South of Farrington Highway

Because of the generally low level of urbanization in the area which would otherwise contribute to a "heat island" effect and increased turbulence, a stable atmosphere (Category "F") [11] and 1 meter/second wind speed were assumed as worst case meteorological conditions during the a.m. peak hour. Preliminary modeling with 0, 10, 20, and 45 degree wind-road angles indicated that the 20-degree angle would produce the maximum pollutant concentrations.

The EPA guideline model CALINE-3 [19,20] was employed to estimate near-roadway carbon monoxide concentrations. An array of receptor sites at distances of 10 to 100 meters from the road edge were input to the model. Because of the current low level of development and traffic in the project area, a background CO concentration of 0.1 milligram per cubic meter (mg/m^3) was assumed for 1985, 1990, and 1995. As development occurs, the background will rise and was therefore assumed to be 1.0 mg/m^3 for the years 2000 and 2005.

6.4 Results

The results of this modeling study are presented in Tables 3 through 12. For each of the roadways under study, a general

trend over the 20-year period appears, i.e., there is initially a decline in maximum 1-hour CO levels, but then an increase after after 1995 (see Figures 1 - 6). In all cases, the federal 1-hour CO standard was complied with.

Only along the H-1 Freeway between Palailai and Kunia do possible violations of the State 1-hour CO standard appear in 2000 and 2005 (Table 5, Figure 2). The absence of the proposed Ewa Parkway during those years also appears to aggravate the potential violations (Table 6, Figure 2). In order to estimate the frequency of occurrence of these maximum concentrations, a more detailed analysis of one full year (1971, Barbers Point Naval Air Station) of hourly meteorological data was performed. The critical wind directions were from the northeast and southwest in order to form the "worst-case" wind-road angle identified in the modeling. The analysis indicated that the combined frequency of stable air (Stability "P") and 1 m/sec northeast and southwest winds was 10.4% or 38 mornings per year.

Concentrations along Farrington Highway and Fort Weaver Road, while showing the same upward trend in later years, still remained below the State standard. However, by 2005, both Farrington Highway west of Palailai and Kalaeloa Boulevard are also approaching that standard (see Figures 1 and 6).

Note that the highest concentrations occur within 10 - 20 meters of the highway and tend to decline sharply with distance away from the road (see Figure 7).

An estimate of compliance/noncompliance with federal and state 8-hour CO standards can also be inferred from these 1-hour concentrations. By applying a "persistence" factor of 0.6 to the 1-hour concentrations, one can derive maximum 8-hour estimates.

This "persistence" factor is recommended in an EPA publication on indirect source analysis [21] and has been further corroborated by analysis of carbon monoxide monitoring data in Honolulu which yielded the same 8-hour-to-1-hour ratio.[22]

Applying this factor to the 1-hour CO concentrations in Tables 3 through 12 yields essentially the same results as the 1-hour analysis. Concentrations along the H-1 Freeway and, in later years, along Farrington Highway near Honokai Hale, appear to exceed the State 8-hour CO standard.

7. AGRICULTURAL BURNING

Burning of sugar cane fields prior to harvest is a long-standing practice in Hawaii's sugar industry. Unfortunately for industry, however, as urbanization closes in around agricultural operations, it is inevitable that complaints about air pollution will arise. Cane fires result in the emission of particulates, carbon monoxide, and trace amounts of other organics. A complete quantitative characterization of cane smoke has yet to be

performed, however. Concentrations of particulates can reach high levels within about one mile of the fires[23]. Fortunately, fires are generally infrequent and only last about 20 - 30 minutes.

Until urbanization entirely replaces sugar cane cultivation in the Ewa District, there will be some human exposure and complaints about cane fire smoke.

8. CAMPBELL INDUSTRIAL PARK

The industrial sources at Campbell Industrial Park obviously affect air quality in the project area. The maximum concentrations of total suspended particulates (TSP) and sulfur dioxide, however, are in compliance with existing federal and state air quality standards. Neither monitoring nor computer modeling show violations of the current standards. Historically, there has been a problem meeting the State's TSP standard, and even with adoption of the less stringent federal standards, this may continue to be a problem as levels in the past have on occasion even exceeded those standards. SO_2 standards are being gradually approached as new sources come in and existing sources expand. The impending construction of the City's resource recovery facility and the future construction of other as yet unidentified sources in the industrial park will all

contribute additional increments of regulated and unregulated pollutants to the Ewa air. The responsible government agencies will have to watch the situation closely to insure that standards continue to be complied with in the future.

9. ELECTRICAL GENERATION

The residential, commercial and industrial development in the Ewa area will create a substantial additional demand for electrical power. The local utility, Hawaiian Electric Company, Inc., will have to provide the necessary generating capacity to meet this demand. Currently, Oahu's electrical demand is met primarily by the Kahe Generating Station which is located a few miles west of the proposed town center. That facility includes four approximately 80 - 90 Mw units and two 150 Mw units, all presently burning 0.5% oil. A seventh 150 Mw unit is being planned in order to meet Oahu's increasing electrical demand.

The emissions from the existing facility result in significant levels of sulfur dioxide in the immediate vicinity of the plant and lesser impacts measured in such areas as Makakilo. The additional demand created by urbanization of the Ewa Plain will cause a significant increase in emissions and further impact on ambient air quality. While existing sulfur dioxide levels appear

to be within standards, additional emissions will inevitably cause ambient levels to approach those standards. Total consumption of the allowable pollutant concentrations will create a serious situation in that no additional pollutant emitting sources would be permitted until existing sources reduced their emissions to a level such that ambient concentrations fell below the allowable standards. As noted above, government has the means and responsibility to insure that sources are adequately controlled so that air quality standards are not too rapidly approached and consumed.

10. CONCLUSIONS AND SUGGESTED MITIGATIVE MEASURES

As noted in the previous section, federal CO standards will be complied with; however, some exceedances of the State's 1-hour and 8-hour standards are predicted for 2000 and 2005 based on the traffic projections used. Analysis of meteorological conditions during the a.m. peak traffic hours suggested a frequency of occurrence of these exceedances on the order of 10% or less (38 mornings per year). In addition, this analysis focused on "free-flow" highway segments and not intersections or access ramps. These latter facilities are typically "CO hotspots" and would be expected to have somewhat higher CO concentrations than

"free-flow" sections. The types of measures that could help reduce the predicted adverse impacts include:

- additional highway improvements to increase capacity
- development of a mass transit system
- encouraging car-pooling
- establishment of more jobs in Ewa
- government growth restrictions in Ewa

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TABLES

TABLE 1

SUMMARY OF STATE OF HAWAII AND FEDERAL
AMBIENT AIR QUALITY STANDARDS

POLLUTANT	SAMPLING PERIOD	FEDERAL STANDARDS PRIMARY	FEDERAL STANDARDS SECONDARY	STATE STANDARDS
1. Total Suspended Particulate Matter (TSP)	Annual Geometric Mean	75	60	60
(micrograms per cubic meter)	Maximum Average in Any 24 Hours	260	150	150
2. Sulfur Dioxide (SO2)	Annual Arithmetic Mean	80	—	80
(micrograms per cubic meter)	Maximum Average in Any 24 Hours	365	—	365
3. Nitrogen Dioxide (NO2)	Annual Arithmetic Mean	100		70
(micrograms per cubic meter)				
4. Carbon Monoxide (CO)	Maximum Average in Any 8 Hours	10		5
(milligrams per cubic meter)	Maximum Average in Any 1 Hour	40		10
5. Photochemical Oxidants (as O3)	Maximum Average in Any 1 Hour	240		100
(micrograms per cubic meter)				
6. Lead (Pb)	Maximum Average in Any Calendar Quarter	1.5		1.5
(micrograms per cubic meter)				

SOURCES: State of Hawaii, Title 11, Chapter 59, Air Quality Standards
Title 40, Code of Federal Regulations, Part 50

TABLE 2

AIR MONITORING DATA
CAMPBELL INDUSTRIAL PARK
1971-85

	TSP			SO_2			NO_2		
YEAR	RANGE	MEAN	>AQS	RANGE	MEAN	>AQS	RANGE	MEAN	>AQS
1971	18-471	125	54	<5-16	<5	0	<20-49	29	0
1972	24-155	55	4	<5- 7	<5	0	<20-49	21	0
1973	14-129	50	1	<5-5	<5	0	<20-33	<20	0
1974	23-132	47	1	<5-10	<5	0	<20-40	25	0
1975	13-137	52	1	<5-11	<5	0	< 5-25	11	0
1976	12-101	40	1	<5-7	<5	0	< 5-29	14	0
1977	25-134	54	1	<5-18	<5	0	------	--	-
1978	22-127	48	1	<5-40	<5	0	------	--	-
1979	23-223	76	10	<5-27	<5	0	------	--	-
1980	29-158	53	2	<5-10	<5	0	------	--	-
1981	26-188	51	2	<5-40	<5	0	------	--	-
1982	15- 63	41	0	<5-12	<5	0	------	--	-
1983	28-193	--	2	<5-95	--	1	------	--	-
1984	17-112	50	1	<5-<5	<5	0	------	--	-
1985	24-138	57	3	<5-25	<5	0	------	--	-

NOTES:
1. TSP = total suspended particulates
2. SO2 = sulfur dioxide
3. NO2 = nitrogen dioxide
4. >AQS = number of violations of state air quality standard
5. All concentrations are in micrograms per cubic meter of air.
6. Sampling station was moved from Barbers Point Lighthouse to the Chevron Refinery site due to salt spray from the ocean on 17 March 1972.
7. The samplers were elevated to a rooftop on 7 August 1979.
8. Source: State Department of Health

TABLE 3

Estimates of A.M. Peak-Hour
Carbon Monoxide Concentrations
in the Vicinity of Farrington Highway
1985 - 2005

Segment: Kahe-Honokai Hale

Concentration (mg/m3)

Year/Distance	10m	20m	30m	40m	50m	60m	70m	80m	90m	100m
1985	4.3	3.2	2.6	2.3	2.0	1.6	1.3	0.9	0.7	0.5
1990	3.0	2.3	2.0	1.6	1.4	1.1	0.9	0.7	0.5	0.3
1995	2.2	1.7	1.4	1.1	1.0	0.8	0.7	0.5	0.5	0.3
2000	3.0	2.5	2.3	1.9	1.7	1.5	1.4	1.4	1.4	1.1
2005	3.3	2.7	2.4	2.3	2.0	1.8	1.6	1.5	1.4	1.1

TABLE 4

Estimates of A.M. Peak-Hour
Carbon Monoxide Concentrations
in the Vicinity of Farrington Highway
1985 - 2005

Segment: Honokai Hale-Palailai Interchange

Concentration (mg/m3)

Year/Distance	10m	20m	30m	40m	50m	60m	70m	80m	90m	100m
1985	6.0	4.5	3.8	3.1	2.6	2.2	1.7	1.3	1.0	0.7
1990	5.2	3.9	3.2	2.6	2.3	1.8	1.5	1.0	0.8	0.7
1995	6.0	4.5	3.7	3.0	2.5	2.1	1.7	1.3	1.0	0.7
2000	7.1	5.6	4.7	4.1	3.5	3.1	2.6	2.3	1.9	1.6
2005	8.6	6.8	5.6	4.8	4.2	3.7	3.1	2.5	2.2	1.8

TABLE 5

Estimates of A.M. Peak-Hour
Carbon Monoxide Concentrations
in the Vicinity of the H-1 Freeway
1985 - 2005

Segment: Palailai Interchange-Kunia Interchange

Concentration (mg/m3)

Year/Distance	10m	20m	30m	40m	50m	60m	70m	80m	90m	100m
1985	8.4	6.4	5.2	4.4	3.6	2.9	2.3	1.7	1.3	0.9
1990	6.2	4.8	3.9	3.2	2.8	2.2	1.7	1.3	0.9	0.7
1995	8.9	6.7	5.5	4.6	3.8	3.0	2.4	1.8	1.4	1.0
2000	10.1	7.8	6.5	5.6	4.8	4.0	3.4	2.7	2.3	1.8
2005	12.9	10.0	8.3	7.0	6.0	5.0	4.2	3.3	2.7	2.2

TABLE 6

Estimates of A.M. Peak-Hour
Carbon Monoxide Concentrations
in the Vicinity ofthe H-1 Freeway
(Without Ewa Parkway)
1985 - 2005

Segment: Palailai-Kunia Interchange

Concentration (mg/m3)

Year/Distance	10m	20m	30m	40m	50m	60m	70m	80m	90m	100m
1985	8.4	6.4	5.2	4.4	3.6	2.9	2.3	1.7	1.3	0.9
1990	6.2	4.8	3.9	3.2	2.8	2.2	1.7	1.3	0.9	0.7
1995	8.9	6.7	5.5	4.6	3.8	3.0	2.4	1.8	1.4	1.0
2000	12.4	9.3	7.6	6.3	5.2	4.4	3.3	2.5	1.8	1.3
2005	13.6	10.1	8.3	6.9	5.7	4.6	3.7	2.8	2.1	1.4

TABLE 7

Estimates of A.M. Peak-Hour
Carbon Monoxide Concentrations
in the Vicinity of Farrington Highway
1985 - 2005

Segment: Palailai Interchange-Ft. Weaver Road

Concentration (mg/m3)

Year/Distance	10m	20m	30m	40m	50m	60m	70m	80m	90m	100m
1985	2.0	1.5	1.3	1.0	0.9	0.8	0.6	0.6	0.3	0.3
1990	1.7	1.4	1.0	0.9	0.8	0.7	0.6	0.5	0.3	0.3
1995	1.7	1.3	1.1	0.9	0.8	0.7	0.6	0.5	0.5	0.2
2000	2.4	2.0	1.8	1.7	1.6	1.5	1.4	1.4	1.2	1.1
2005	2.7	2.4	2.0	1.9	1.7	1.6	1.5	1.4	1.2	1.1

TABLE 8

Estimates of A.M. Peak-Hour
Carbon Monoxide Concentrations
in the Vicinity of Farrington Highway
(Without Ewa Parkway)
1985 - 2005

Segment: Palailai Interchange-Ft. Weaver Road

Concentration (mg/m3)

Year/Distance	10m	20m	30m	40m	50m	60m	70m	80m	90m	100m
1985	2.0	1.5	1.3	1.0	0.9	0.8	0.6	0.6	0.3	0.3
1990	1.7	1.4	1.0	0.9	0.8	0.7	0.6	0.5	0.3	0.3
1995	1.7	1.3	1.1	0.9	0.8	0.7	0.6	0.5	0.5	0.2
2000	2.9	2.4	2.0	1.9	1.8	1.6	1.5	1.5	1.4	1.1
2005	3.4	2.7	2.4	2.2	2.0	1.8	1.6	1.5	1.5	1.2

TABLE 9

Estimates of A.M. Peak-Hour
Carbon Monoxide Concentrations
in the Vicinity of Fort Weaver Road
1985 - 2005

Segment: South of Farrington Highway

Concentration (mg/m3)

Year/Distance	10m	20m	30m	40m	50m	60m	70m	80m	90m	100m
1985	4.6	3.3	2.8	2.4	2.0	1.6	1.3	0.9	0.8	0.6
1990	3.9	2.9	2.4	2.1	1.6	1.4	1.0	0.9	0.7	0.5
1995	3.2	2.4	2.0	1.6	1.4	1.1	0.9	0.8	0.6	0.3
2000	2.5	2.2	1.8	1.7	1.6	1.6	1.5	1.2	1.2	1.1
2005	2.9	2.4	2.2	1.9	1.8	1.7	1.6	1.4	1.2	1.1

TABLE 10

Estimates of A.M. Peak-Hour
Carbon Monoxide Concentrations
in the Vicinity of Fort Weaver Road
(Without Ewa Parkway)
1985 - 2005

Segment: South of Farrington Highway

Concentration (mg/m3)

Year/Distance	10m	20m	30m	40m	50m	60m	70m	80m	90m	100m
1985	4.6	3.3	2.8	2.4	2.0	1.6	1.3	0.9	0.8	0.6
1990	3.9	2.9	2.4	2.1	1.6	1.4	1.0	0.9	0.7	0.5
1995	3.2	2.4	2.0	1.6	1.4	1.1	0.9	0.8	0.6	0.3
2000	3.4	2.5	2.1	1.8	1.5	1.3	1.0	0.8	0.6	0.5
2005	4.6	3.3	2.8	2.4	2.0	1.6	1.4	1.0	0.7	0.6

TABLE 11

Estimates of A.M. Peak-Hour
Carbon Monoxide Concentrations
in the Vicinity of Renton Road
1985 - 2005

Segment: Palailai Interchange-Fort Weaver Road

Concentration (mg/m3)

Year/Distance	10m	20m	30m	40m	50m	60m	70m	80m	90m	100m
1985	0.8	0.7	0.6	0.5	0.5	0.3	0.3	0.3	0.2	0.1
1990	0.8	0.6	0.5	0.5	0.3	0.3	0.3	0.2	0.2	0.1
1995	0.7	0.6	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2
2000	2.0	1.8	1.7	1.6	1.5	1.5	1.2	1.2	1.1	1.1
2005	2.7	2.3	2.0	1.8	1.7	1.6	1.5	1.4	1.2	1.1

TABLE 12

Estimates of A.M. Peak-Hour
Carbon Monoxide Concentrations
in the Vicinity of Kalaeloa Boulevard
1985 - 2005

Segment: South of Farrington Highway

Concentration (mg/m3)

Year/Distance	10m	20m	30m	40m	50m	60m	70m	80m	90m	100m
1985	3.3	2.5	2.2	1.8	1.5	1.3	1.0	0.8	0.6	0.5
1990	3.6	2.9	2.3	2.0	1.6	1.4	1.0	0.8	0.7	0.5
1995	4.3	3.3	2.8	2.3	2.0	1.6	1.3	0.9	0.7	0.5
2000	7.0	5.7	4.9	4.2	3.8	3.1	2.6	2.3	1.9	1.6
2005	9.6	7.9	6.7	5.8	4.9	4.1	3.4	2.7	2.3	1.9

F I G U R E S

Figure 1: Farrington Highway

Honokai Hale (A.M. Peak-Hour)

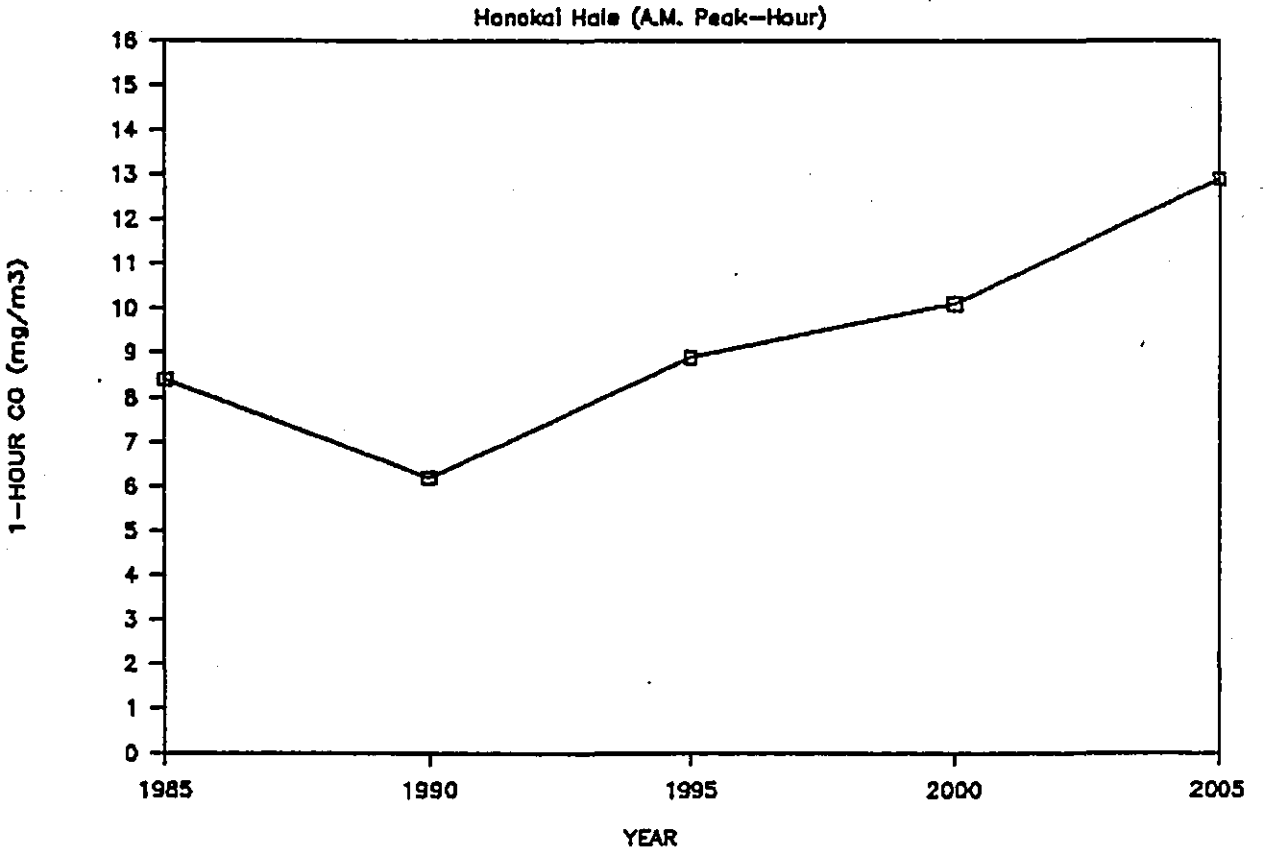


Figure 2: H-1 Freeway

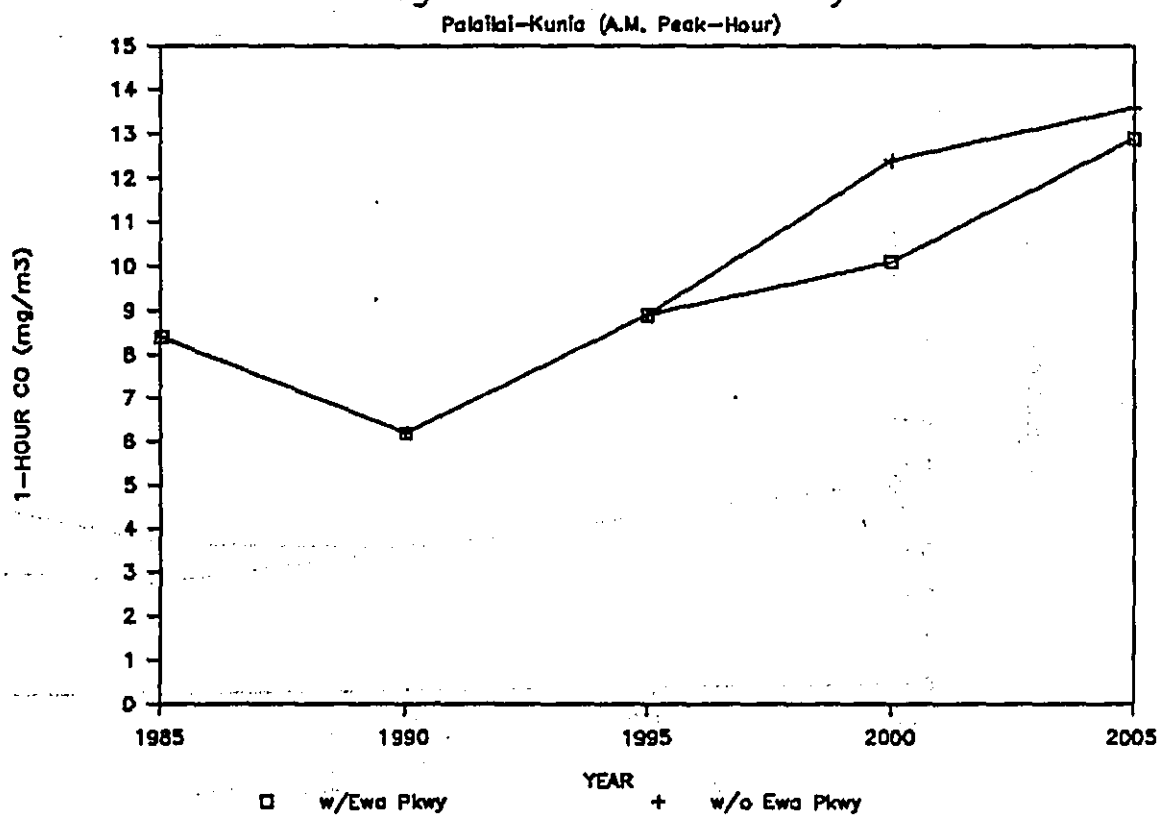


Figure 3: Farrington Highway

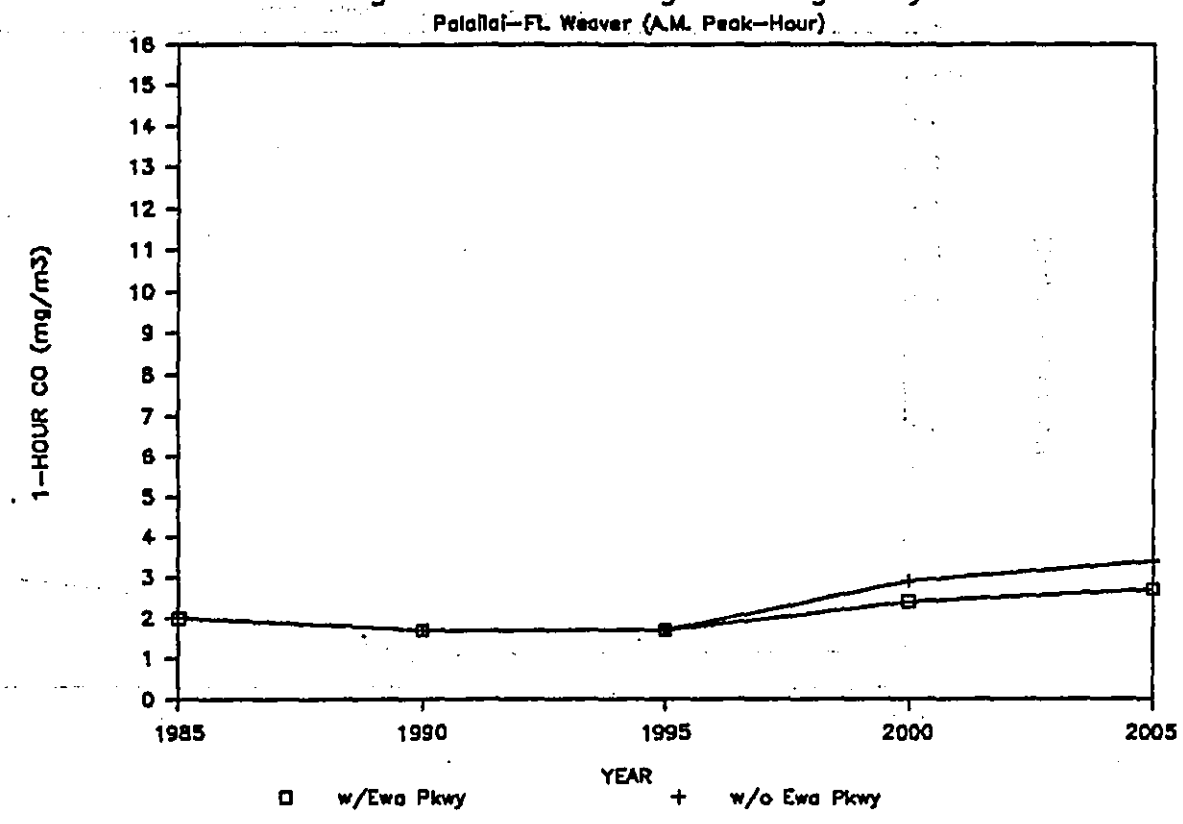


Figure 4: Fort Weaver Road

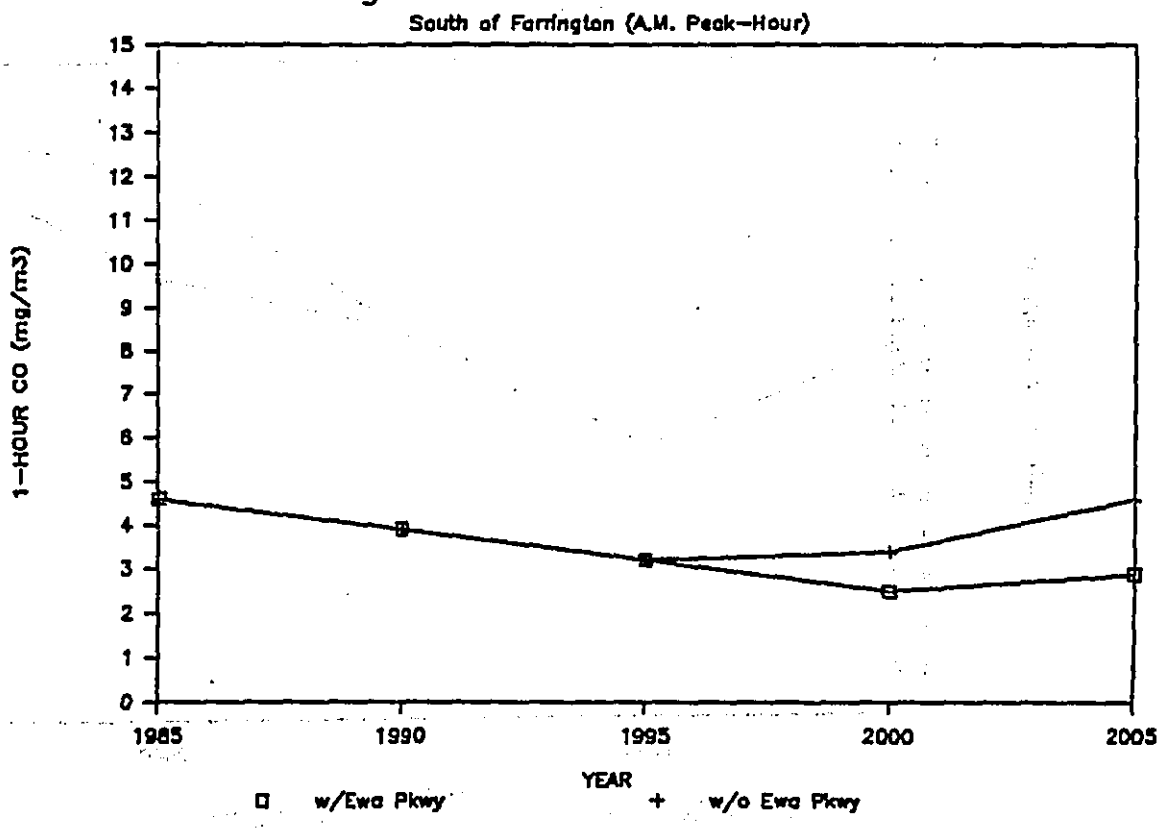


Figure 5: Renton Road

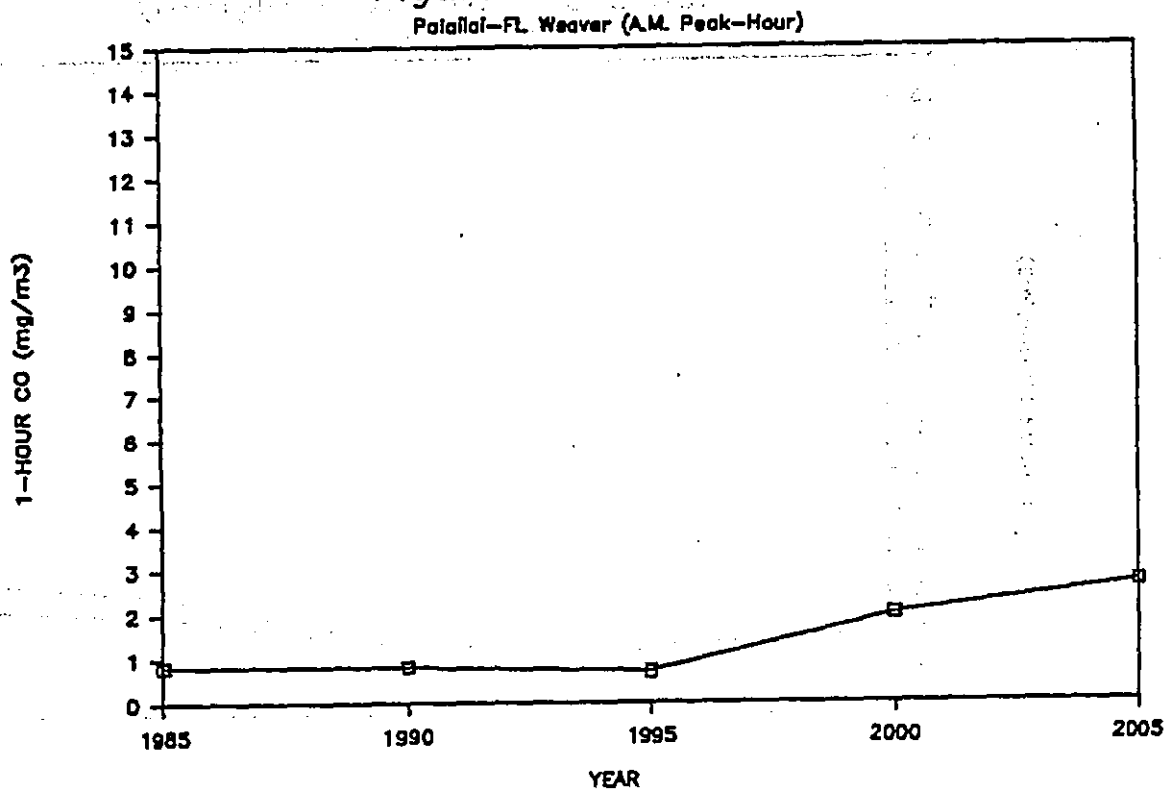


Figure 6: Kalaeloa Boulevard

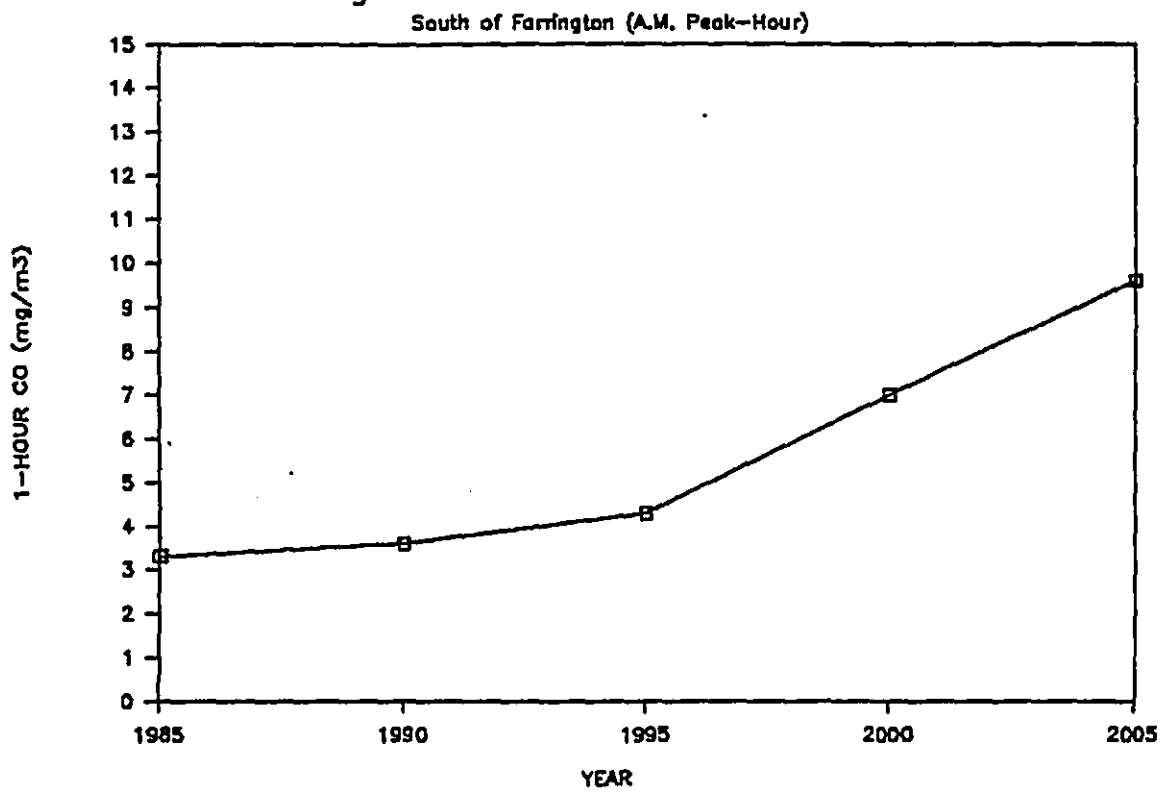
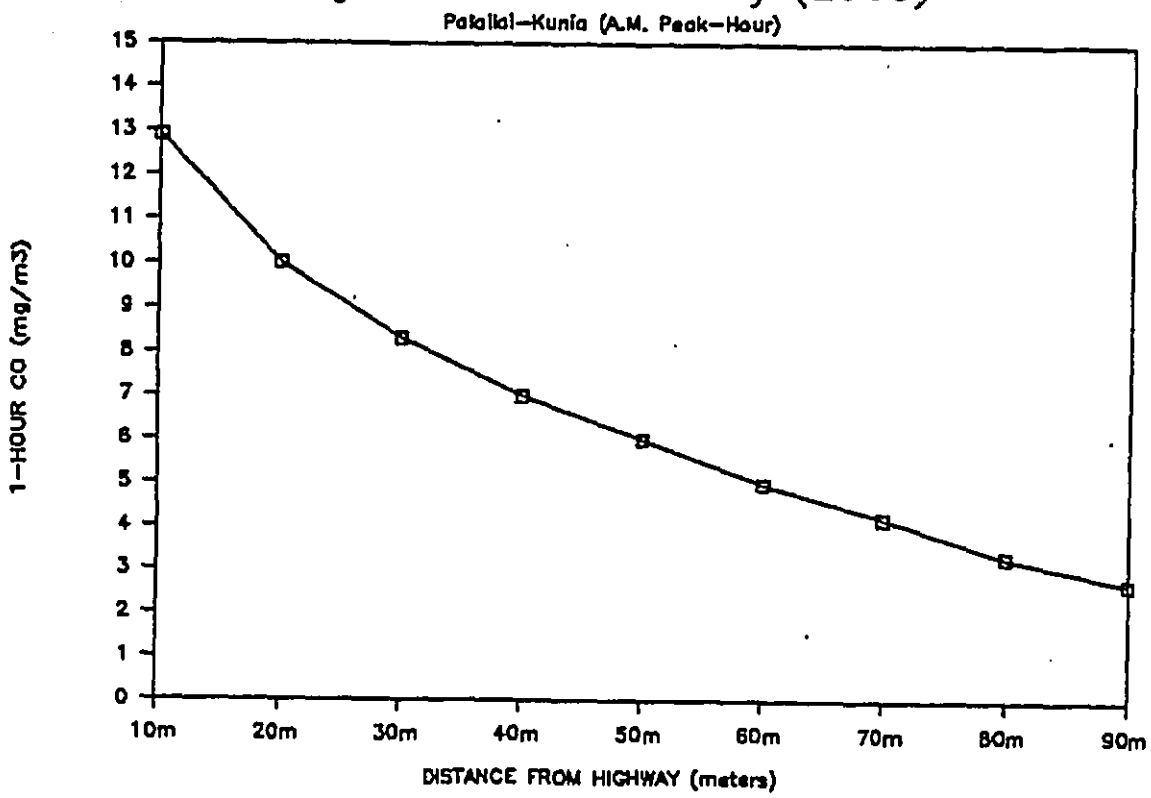


Figure 7: H-1 Freeway (2005)



APPENDIX G

West Oahu Employment Corporation Pamphlet

Region served by
West Oahu Employment Corporation

WOEC
WEST OAHU EMPLOYMENT CORPORATION
92-605 Makakilo Drive • Makakilo, Hawaii 96707 • Phone 672-3520

WOEC
WEST OAHU EMPLOYMENT CORPORATION
92-605 Makakilo Drive Makakilo, Hawaii 96707

THE WEST OAHU EMPLOYMENT CORPORATION

WOEC
WEST OAHU EMPLOYMENT CORPORATION
92-605 Makakilo Drive • Makakilo, Hawaii 96707 • Phone 672-3520

APPENDIX H

Minutes of Community Advisory Committee on the Ewa Secondary Urban Center.

Prepared by the Estate of James Campbell

CORRECTION

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

Region served by
West Oahu Employment Corporation

WOEC
WEST OAHU EMPLOYMENT CORPORATION
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WOEC
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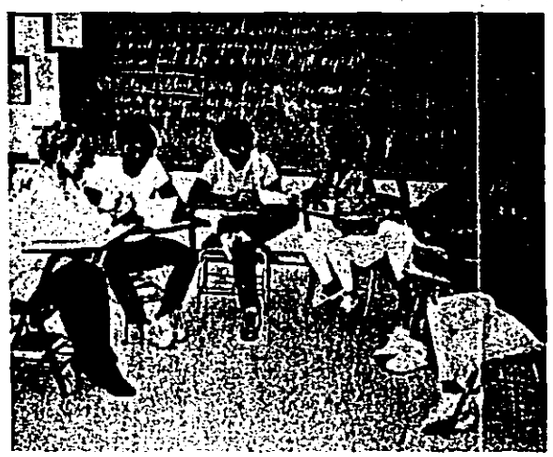
THE WEST OAHU EMPLOYMENT CORPORATION

WOEC
WEST OAHU EMPLOYMENT CORPORATION
92-605 Makakilo Drive • Makakilo, Hawaii 96707 • Phone 672-3520

The West Oahu Employment Corporation (WOEC), a non-profit 501(c)(3) program, was established January 1987 after three years of intensive research and planning. It addresses and provides the means to meet the need to link Leeward Oahu residents to the employment and training opportunities created by the developments in the region.

The overall mission of the West Oahu Employment Corporation is to facilitate the entry of Leeward Oahu residents into jobs newly created by the development on the Ewa Plains, the Makakilo hillside and the Waianae coast by:

- Maximizing job placement services for Leeward Oahu residents.
- Enhancing employment related educational and training opportunities for Leeward Oahu residents.
- Encouraging small business opportunities for Leeward Oahu residents.



- Within this context, the special mission of the West Oahu Employment Corporation is to serve the residents of the communities of Leeward Oahu by facilitating a balanced and comprehensive array of employment and training opportunities through a partnership alliance of the Leeward Oahu Communities, the Developers, and educational and employment training Service Providers. A range of programs and services is intended to meet the varied employment needs of the development and the educational and training needs of community members.

Our major objectives are:

1) to secure a commitment from business, labor and government to make more employment opportunities available in Leeward Oahu for residents of these communities.

2) to establish community education centers to enable us to take new and redirected programs and services direct to the community.

3) to create a wide variety of educational programs and services (emphasizing basic skills, education and vocational training) designed with the help of community groups, business and labor to meet the needs of the resident and industry.

4) to form a network of programs and services, working cooperatively with existing agencies and institutions to make the best use of existing resources and to insure a minimum of duplication of effort.

5) to establish a community scholarship program specially created to insure that residents have the opportunity to further their education at any college or university.

The Corporation Board is composed of nine members who represent the community, the Service Providers and the Developers. Memberships include representatives from the Waianae Coast, Ewa, and Makakilo, the City and County of Honolulu's Office of Human Resources, Alu Like Incorporated, Leeward Community College, The Estate of James Campbell, Finance Realty & Sales and West Beach Estates.

ACCESSIBILITY

The West Oahu Employment Corporation will provide services five days a week form 8:30 a.m. to 5:00 p.m. and has an answering machine for after hours. The office is located at 92-605 Makakilo Drive in Makakilo. The telephone number is 672-3520 or 672-3529.

APPENDIX H

Minutes of Community Advisory Committee on the Ewa Secondary Urban Center.

Prepared by the Estate of James Campbell

DESK COPY

THE ESTATE OF JAMES CAMPBELL

MINUTES OF THE MEETING OF
THE COMMUNITY ADVISORY COMMITTEE
ON THE
EWA SECONDARY URBAN CENTER

May 8, 1986

The first meeting of the Community Advisory Committee was brought to order at 6:38 p.m. by Emogene Martin, Ewa Neighborhood Board Chairperson.

ATTENDANCE: Roy Wickramaratna, Makakilo Comm. Assoc., Ed Dunbar, ENB #23; Harry Benson, ENB #23; Blizz Blizzard, ENB #23; Dave Parsons, ENB #23; John Reinburg, Makakilo; Emogene Martin, ENB #23; George Wynn, ENB #23; Wallace Zoller, Makakilo Comm. Assoc.; Jim Moa, citizen; Joe Pacyao Jr., Makakilo Comm. Assoc.; Frank Talamantes, ENB #23; George Kaeo, Nanakuli; Gabe Kilakalua Jr., Nanakuli; Dick Boddy, WNB #24; Robert Faurot, Makakilo; LCDR Robert J. Clark, USN; Malia Schwartz, ENB #23, David Matteson, Communication Pacific; John Frederick, ENB #23; Jane Ross, ENB #23; Dick Beamer, Ewa Beach Comm. Assoc.; Martha Makaiwi, Honokai/Nanakai Comm. Assoc.; Paul Oshiro, State Rep.; Jim Shon, State Rep.; R.S. Liboy, Sr., Ewa Beach; Mike Crozier, State Rep.; and Glenn Oamilda, ENB #23.

PLANNERS &
ESTATE OFFICERS: Bill Fain, Ron McCoy of Wm. Pereira Associates
Ox Stender, Mike Warren of The Estate of James Campbell
Frank Brandt, Ron Baers of Phillips, Brandt, Reddick, and Associates.

PRESENTATION:

- Mr. Bill Fain did a slide presentation of the development plan to the proposed Ewa Secondary Urban Center. He stated that the planners are embarking on a course to add further definition to the development plan through input on problems, concerns, recommendations, and support from the Community Advisory Committee (CAC).

The presentation was a composition of:

- a study of the history and mythology of the site;
- a look at the city of Honolulu in terms of its growth and the relationship it might have in building the new city;
- and a projection of the new city's growth in population, housing, roads, streets, water, density and etc. twenty to fifty years from now.

A search for a theme and name for the new city is being made. Some of the suggestions made to date are:

Themes: Port/Harbor, Business Center, Industrial City, and Garden City.
Names: Kapolei, La'akona, and Westport.

Maps, sketches, plans, and drawings were put on display for everyone to view.

COMMENTS:

- Mike Warren explained that the purpose of this meeting was a means of getting input from everybody through the various community or organizational leaders present. He stated that the city was only as good as it serves the people and if there are any changes, or needs not being met, they would like to be notified.
- A member in the audience suggested that more materials on the subject project be made available for future reference. Mike Warren responded that packets will be made available and mailed out.
- A concern was voiced regarding road accessibility during an emergency. Because of past experience, it was suggested that the planners should seriously consider into their plans, alternate roads to be used in the event of an emergency.

ANNOUNCEMENT: Frank Brandt announced that the July meeting will be changed from July 10 to July 24 - Ewa Beach Library

H-1

NEXT MEETING: The next meeting will be held Thursday, June 12 at 6:00 p.m. at the Makakilo Recreation Center.

ADJOURNMENT: The meeting adjourned at 7:36 p.m.

Recorded by: Florence Oyape

MINUTES OF THE MEETING OF
THE COMMUNITY ADVISORY COMMITTEE
ON THE
EWA SECONDARY URBAN CENTER

June 12, 1986

CALL TO ORDER: The meeting of the Community Advisory Committee was brought to order at 6:15 p.m. by Michael Warren of The Estate of James Campbell. A recess was called by Frank Brandt at 7:05 p.m. to allow people to attend the Neighborhood Board meeting. The meeting reconvened at 7:35 p.m.

ATTENDANCE: James Vallelunga, Makakilo; Harry Ching, EB Lions; Dick Beamer, Ewa Beach Comm. Assoc.; George Hynn, ENB #23, Roy Wickramaratna, Makakilo Comm. Assoc.; Malia Schwartz, ENB #23, Jim Moa, citizen; Lee Sichter, Office of Patsy Mink; LCDR Hollerbach, NAS Barbers Point; Joe Pacyao, Makakilo Comm. Assoc.; Ed Dunbar, ENB #23; Blizz Blizzard, ENB #23; Tony Bise, Ewa Village; Dale Murray, Makakilo Comm. Assoc.; Mary Louise Murray, Makakilo Comm. Assoc.; Harry Benson, ENB #23; Frank Talamantes, EB Comm. Assoc.; Peter Apo, Legislature; Mike Meriwether, OCOP-Waianae; Yvonne Perry, IX City Council candidate; George Toro, Makakilo; Robert Faurot, Makakilo; Mike Crozier, House of Rep.; L. U. Larimer, Makakilo Lions Club; Jane Ross, ENB #23; Martha Makaiwi, Honokai Hale Comm. Assoc.; John Heatoga, Makakilo Comm. Assoc.; Norm Canon, PCA; Emogene Martin, ENB #23; Mr. & Mrs. John Mullings, Makakilo; Eileen Parsons, Makakilo; Norbert Cordeiro, Makakilo.

PLANNERS & ESTATE OFFICERS: Bill Fain and Ron McCoy of Wm. Pereira Assoc.
Os Stender, Michael Warren, and Chuck Ehrhorn of The Estate of James Campbell.
Frank Brandt and Ron Baers of Phillips, Brandt, Reddick & Associates.

M. Warren offered to hold another meeting for those who have not yet seen the Ewa plan and go over some background information on transportation, water, agriculture, etc. He also commented on the state's and city's interest to build affordable homes in the Makakilo area and emphasized that the Estate was willing to work with the government providing they meet certain criteria and be consistent with Campbell's planned community of mixed housing.

CORRECTION

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SEE FRAME(S) IMMEDIATELY FOLLOWING

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MINUTES OF THE MEETING OF
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EWA SECONDARY URBAN CENTER

June 12, 1986

CALL TO ORDER: The meeting of the Community Advisory Committee was brought to order at 6:15 p.m. by Michael Harren of The Estate of James Campbell. A recess was called by Frank Brandt at 7:05 p.m. to allow people to attend the Neighborhood Board meeting. The meeting reconvened at 7:35 p.m.

ATTENDANCE: James Vallelunga, Makakilo; Harry Ching, EB Lions; Dick Beamer, Ewa Beach Comm. Assoc.; George Hynn, ENB #23, Roy Wickramaratna, Makakilo Comm. Assoc.; Malia Schwartz, ENB #23, Jim Hoa, citizen; Lee Sichter, Office of Patsy Mink; LCDR Hollerbach, NAS Barbers Point; Joe Pacyao, Makakilo Comm. Assoc.; Ed Dunbar, ENB #23; Blizz Blizzard, ENB #23; Tony Bise, Ewa Village; Dale Murray, Makakilo Comm. Assoc.; Mary Louise Murray, Makakilo Comm. Assoc.; Harry Benson, ENB #23; Frank Talamantes, EB Comm. Assoc.; Peter Apo, Legislature; Mike Meriwether, OCOP-Malanae; Yvonne Perry, IX City Council candidate; George Toro, Makakilo; Robert Faurot, Makakilo; Mike Crozier, House of Rep.; L. U. Larimer, Makakilo Lions Club; Jane Ross, ENB #23; Martha Makaiwi, Honokai Hale Comm. Assoc.; John Meatoga, Makakilo Comm. Assoc.; Norm Canon, PCA; Emogene Martin, ENB #23; Mr. & Mrs. John Mullings, Makakilo; Eileen Parsons, Makakilo; Norbert Cordeiro, Makakilo.

PLANNERS & ESTATE OFFICERS: Bill Fain and Ron McCoy of Hm. Pereira Assoc.
Os Stender, Michael Harren, and Chuck Ehrhorn of The Estate of James Campbell.
Frank Brandt and Ron Baers of Phillips, Brandt, Reddick & Associates.

M. Warren offered to hold another meeting for those who have not yet seen the Ewa plan and go over some background information on transportation, water, agriculture, etc. He also commented on the state's and city's interest to build affordable homes in the Makakilo area and emphasized that the Estate was willing to work with the government providing they meet certain criteria and be consistent with Campbell's planned community of mixed housing.

CONCERNS & QUESTIONS FROM THE PUBLIC: Several questions and concerns were voiced by the audience regarding the building of low-income homes in the area. The planners and the Estate officers responded to the following questions:

1. How far along is the Hawaii Housing Authority in comparison to the city:

   The Estate has worked with the HHA for over a year, so in that sense, the HHA is much further along. However, it is the intent of all parties that the project be a cooperative venture.

2. Who has the authority to condemn lands?

   The state (HHA) and city.

3. Since there is so much emphasis on the building of low-income housing, how will it work with mixed housing? Will there be a ghetto effect? Will Campbell and the state build separately?

   HHA is not looking at a ghetto approach, but into a new concept of building a high percentage of market rate housing mixed with affordable homes. They are not looking at low-income, but at a mixed housing, both in terms of income and housing type. Campbell Estate will not be involved in the building. Building will be "let out" to various builders.

4. With respect to HHA's proposal to a mix-use housing, what about the city? Would the state and city compete for locations?

   To date, the city has only shown an interest in the land but have not yet made clear as to what type of housing they intend to build. A black and white plan was drawn by Wm. Pereira and Associates and given to the state and city showing how an integrated community can be created. The state is to build on the mauka parcel of land and the city to take the makai part. They can joint venture or go separately on the project.

5. Can the Estate do something with the state and city to avoid a hodge-podge, "Salt Lake" type of development?

   Yes, the Estate has set conditions, standards, and guidelines.

6. Can the Neighborhood Board be of help by approaching the city?

   A possible answer would be to develop a document of standards and guidelines which would be supported by the Neighborhood Board and the Community Association and make it a part of the conveyance to the project. The city and state then adopts the document as part of their contract.

7. Who will enforce these guidelines?

   After some discussion, it seemed like it would be a responsibility of the Community Association.

8. What about police protection, ambulance services, schools, hospitals, parks, fire protection, etc?

   The Estate is working with the city to provide land for public facilities and including these concerns in their plans.

Jim Hoa, a resident of Makakilo, commented that the competition to build residential housing between the city and state is a very healthy one which would help move the project along. He felt that it would be appropriate for this committee to incorporate the idea of a mix-use concept, regardless of who the developer might be, versus a project development for a specific group. In focusing on the overall plan, he stated that the housing would bring new people into the area who needed housing, which was okay,but at the same time in view of the present "bursting-at-the-seams" population now in the Makakilo area, the need for park spaces, a shopping enter, hospitals, schools, etc., are not being met. He stated that at the last meeting, these concerns were voiced and what this indicates is that community needs must be addressed first so there will not be any resistance by the community to the whole process of developing a self-contained community.

Bill Fain brought everyone up-to-date on what was done during the past month. He also did a presentation on the urban design of the Ewa City Center by going through the illustrations and sketches of the "Civic Center," "Main Street," "The Village Green," "Urban Parks," "Comparative Walking Distances," bicycle paths, library site, and amphitheater.

ANNOUNCEMENTS: Frank Brandt announced that the July meeting will be changed from July 24 to July 23 at the Makakilo Recreation Center. The meeting will start at 7:00 p.m.

ADJOURNMENT: The meeting was adjourned at 8:20 p.m.

RECORDED BY: Florence Oyape

bie:0133m
7/2/86

MINUTES OF THE MEETING OF
THE COMMUNITY ADVISORY COMMITTEE
ON THE
EWA SECONDARY URBAN CENTER

July 23, 1986

CALL TO ORDER: The meeting of the Community Advisory Committee was brought to order at 7:15 p.m. by Michael Warren of The Estate of James Campbell.

ATTENDANCE: John Frederick, ENB #23; Malia Schwartz, NB #23; Paige Barber, Barber & Assoc.; Dick Beamer, ENB #23; David & Gerris Parsons, ENB #23; Robert Faurot, Makakilo; Roy Wickramaratna, Makakilo Comm. Assoc.; Frank Talamantes, ENB #23; Glenn Oamilda, ENB #23; Tony Bise, Ewa Village; James Vallelunga, Makakilo; Blizz Blizzard, ENB #23; Emogene Martin, ENB #23; Lt. Dennis Malone, USN; Wallace Zoller, Makakilo; Jim Moa, citizen; Joe Pacyao, Jr., Makakilo; John Hammond, Christ Temple Church; Ed Dunbar, ENB #23; Lee Sichter, Office of Patsy Mink; and Harry Benson, ENB #23.

GUESTS: Roy & Mary Matsumoto, Makakilo; Dale & Mary Murray, Makakilo; John Mullings, Makakilo; Yvonne Perry, City Council Candidate; Merwyn Jones, City Council Candidate; Bob Takushi, Carlsmith; Al Ontiveros, citizen; and Norbert Cordeiro, Makakilo.

PLANNERS & ESTATE OFFICERS: Bill Fain and Ron McCoy of Wm. Pereira Assoc.
Michael Warren, and Chuck Ehrhorn of The Estate of James Campbell.
Frank Brandt and Ron Baers of Phillips, Brandt, Reddick & Associates.

M. Warren stated that he will try to get city and state (HHA) representatives to attend the next meeting to talk about and answer any questions from the public regarding their housing project in the new city.

B. Fain did a recap of last month's presentation explaining the changes that were made to the plan. With the help of an excellent scale model of the city, Bill was able to point out the many prominent features and give the audience a better vision of the new city. Numerous sketches and drawings of the Ewa Town Center were on display for everyone's viewing. After the meeting, Bill took those interested through the sketches and gave a more detailed explanation.

CONCERNS FROM THE PUBLIC: The following concerns were discussed at the meeting.

1. Type of Parks: There would be both active and passive types of parks in Kapolei. The active park will be similar to that of Kapiolani Park and would cover a land area of 89 acres. A regional park will be located close to the city center and have a naturalistic type of environment to serve the people in the business district. Activities will be passive in nature.

   Parking locations to service the park area have already been identified. A suggestion to build underground parking was made as a means of preserving open space. Another idea was to have joint use of public parking during weekends and after work hours.

2. Farmers Market: This was a sensitive issue for some. Jim Hoa felt that the market should be for the local farmers and their products only. He suggested that the planners consider designing structures for the farmers suitable to the environment.

   It was generally accepted that the Farmers Market would not be allowed by the supermarket if located close by; therefore, a location more removed is desirable.

3. Supermarket: This would be the first priority in the building of the shopping area. Zoning will be done during the later part of this summer and work should commence late 1987, when a detailed design and pre-leasing has been completed. Although no agreement has been made yet, Safeway, as a propsective tenant, is considering doing a "super store" type of a market.

4. High School: The location for a high school has been identified, but no definite answer at this time as to when it will be built.

5. Effects of Waimanalo Dump: The Waimanalo situation is something the city is handling. The Estate's only concern is that the garbage be handled properly should it be put there.

6. Storm Drainage: Drainage is handled through:

   a. Run-off into ocean;

   b. Water settling into a series of ponds and eventually seeping into the coral; and,

   c. Hookup with existing drainage along JCIP.

7. Type of Water System: A dual water system will be used for the parks and residential areas. The method of distribution has not been established, but the economics of conserving potable water will be taken into consideration.

COMMENTS: J. Frederick inquired whether one of the possible functions of this committee was to bring pressure on the Planning Commission and to make contact with the proper people on the political level as a means of helping to get the retail and housing development started sooner. M. Warren responded by explaining the process and status that has transpired with regards to the planning and zoning approvals. He also thought that it might be helpful to approach the politicians (legislators and council) and to attend the hearing when it comes up.

J. Frederick expressed a desire to draft a letter to the City Council showing support to start construction on Phase I of the development which will include the retail stores, service station, and office area. Phase I is bounded by Farrington Highway and H-1 and covering 29 acres. By a show of hands, the majority of the Neighborhood Board members present were in favor of drafting a letter.

J. Hoa commented that the community has no qualms with regards to economic growth just as long as it benefits the residents in terms of jobs and business development opportunities. He wondered if the Estate had some kind of long-term commitment to the community with respect to that. Warren said yes and that the Estate and developers in Ewa are supporting an employment program to ensure such opportunities. Paige Barber will give us an update on this at our next meeting.

ADJOURNMENT: The meeting was adjourned at 8:30 p.m.

SUBMITTED BY: Florence Oyape

ble:0133m
8/15/86

MINUTES OF THE MEETING OF
THE COMMUNITY ADVISORY COMMITTEE
ON THE
EWA SECONDARY URBAN CENTER

September 3, 1986

CALL TO ORDER: The meeting of the Community Advisory Committee was brought to order at 7:23 p.m. by Michael Warren of The Estate of James Campbell.

ATTENDANCE: Dick Beamer, ENB #23; Clarence Blizzard, ENB #23; Mike Crozier, State Rep.; Ed Dunbar, ENB #23; John Frederick, ENB #23; Gabe Kilakalua, Nanakuli; Emogene Martin, ENB #23; Lee Sichter, Office of Patsy Mink; Malia Schwartz, ENB #23; Roy Wickramaratna, Makakilo Comm. Assoc.; Lt. Malone, USN.

OTHERS: L. Larimer, Makakilo; Richard Hirata, HHA; Lloyd Haraguchi, HHA; Bob Ozaki, Amfac; Paige Barber, Paige Barber & Associates.

PLANNERS & ESTATE OFFICERS: Ron Baers of Phillips, Brandt, Reddick & Associates. O. K. Stender, Michael Warren, Herman Clark, of The Estate of James Campbell.

1. Hawaii Housing Authority

Richard Hirata gave a brief background on how HHA became involved in the Ewa Secondary Urban Center to build affordable housing units for lower-income and gap group families and for the elderly and handicapped persons. HHA intends to build a 60/40 mixed housing development on 500 acres of Campbell Estate land--60% of the units will be sold and/or rented at affordable levels and the remaining 40% would be designed to sell in the open market at competitive prices. Implementation of the proposed development would be approximately two years from now. HHA is also working with the City and County on the housing program.

Concerns with respect to money for the development, flight patterns (crash zones and noise zones), and air traffic from Barbers Point Naval Air Station (BPNAS) were discussed.

A handout on "An Affordable Housing Development Concept" was distributed.

Lt. Malone stated there are 110,000 annual air operations at BPNAS. In response to the noise question and residential development, the HHA would stay out of the AICUZ accident zone and use 65 Ldn as the maximum noise zone. O. K. Stender pointed out that the Navy may need to look at their operations and perhaps revise them to be compatible with the new community at the Secondary Urban Center.

2. Development Plan Proposals

Mike Warren discussed and distributed a copy of a letter to the city administration from Campbell Estate in response to the City and County of Honolulu Department of General Planning amendments to the Ewa Development Plan Land Use Map and Public Facilities Map. Mike commented on some of the major proposed changes and advised the audience to attend the next Neighborhood Board meeting if there were any questions or concerns that needed to be answered.

3. Employment Training

Paige Barber brought everyone up to date on the job training program which they are designing to meet future employment needs in the Leeward area. In order to prepare the people in the community to fill the many job opportunities that will become available due to the development of West Beach and the Secondary Urban Center, an implementation plan is being designed in which various employment agencies will be linked together in a partnership arrangement. So far, this arrangement has been discussed with Leeward Community College, Alu Like, Inc., Kamehameha Schools, and the Department of Education.

ADJOURNMENT

The meeting adjourned at 8:00 p.m.

Submitted by: Florence Oyape

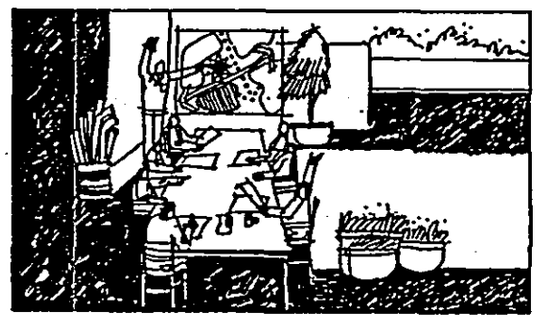
DB/jo:0140m

APPENDIX I

Ewa Secondary Urban Center:
Workshops on Community Facility Needs and Solutions.

Prepared for the Secondary Urban Center,
Community Advisory Committee.

Philips Brandt Reddick & Assoc. (Hawaii), Inc.
April 1987



EWA SECONDARY URBAN CENTER

Workshops on Community Facility Needs and Solutions

PREPARED FOR:
THE SECONDARY URBAN CENTER COMMUNITY ADVISORY COMMITTEE

PREPARED BY:
PHILLIPS BRANDT REDDICK & ASSOC. (HAWAII), INC.

APRIL 1987

Table of Contents

Section		Page No.
I.	METHODOLOGY	I- 1
II.	NEEDS WORKSHOP	II- 1
	A. Governmental Services	II- 1
	B. Education	II- 4
	C. Recreation/Culture/Art	II- 9
III.	SOLUTIONS WORKSHOP	III- 1
	A. Governmental Services	III- 1
	B. Education	III- 3
	C. Recreation/Culture/Art	III- 5
IV.	AGENCIES AND INDIVIDUALS CONSULTED	IV- 1

List of Tables

Table No.	Title	Page No.
1	Existing School (K-12) Capacity Levels in the Ewa District.	II- 7
2	Proposed City and County Recreation Park and Facility Standards	II-11

List of Figures

Figure No.	Title	Follows Page No.
1	Governmental Services.	II- 1
2	Educational Facilities	II- 4
3	Recreational Facilities.	II- 9

I. METHODOLOGY

The purpose of the community needs workshops is to define issues and needs for community services and facilities. The process is not intended to make final decisions but rather to offer some intensive and creative group thinking that may lead to solutions or action steps towards particular needs. The workshops focused discussions in three categories of community concern:

1. Governmental Services; including programs and facilities for transportation, police and fire protection, medical and emergency rescue, civil defense and governmental offices.

2. Education; including programs and facilities for child care, preschool, secondary school (kindergarten through high school), higher education and continuing education.

3. Recreation/Culture/Art; including programs and facilities for all forms of recreation (active, passive, indoor, outdoors), and all forms of culture and art provided by public agencies and private organizations.

The Community Advisory Committee members participated in one of the three categories, based on their interest and knowledge of the topic. Workshops were divided into two parts; Part I, January 29, 1987, focused on a brain storming session to identify and rank issues and needs; Part II, February 18, 1987, focused on proposals to address the most critical needs.

Consistent procedures were followed during both workshops for each category; Governmental Services, Education, Recreation/Culture/Art. The procedures are described in the following steps.

1. Brainstorm a list of ideas and suggestions relating to community needs and possible solutions.

   - list all ideas
   - do not discuss or comment on the ideas

2. Discuss the list which was brainstormed. Describe reasons for listing particular items, their importance, and clarify their meaning if necessary.

3. Organize the list. Each person indicates the 5 items on the brainstorm list which is of most importance to them.

4. Record and prioritize. After everyone has checked 5 items, the entire list is prioritized by the most checks (as the most important) to the least checks (as the least important).

5. Report the results. The selected group recorder is required to describe the list and summarize the group's findings to the Committee-of-the-Whole for revisions and additions.

Utilization of this methodology allowed the Community Advisory Committee members to identify a wide variety of needs and solutions in a very short period of time (about 30 minutes).

II. NEEDS WORKSHOP

The needs workshop consisted of three simultaneous meetings which focused on discussions in the following areas; Governmental Services, Education and Recreation/Culture/Art. The goal was to identify and prioritize needs in each of the three areas. Response to the needs list was achieved by examining & researching the state, and the city and county's long range plans for the Ewa District.

The needs identified for each area of concern are listed in priority order below. Background information and discussion follows each need in terms of current agency plans to accommodate each need.

A. Governmental Services

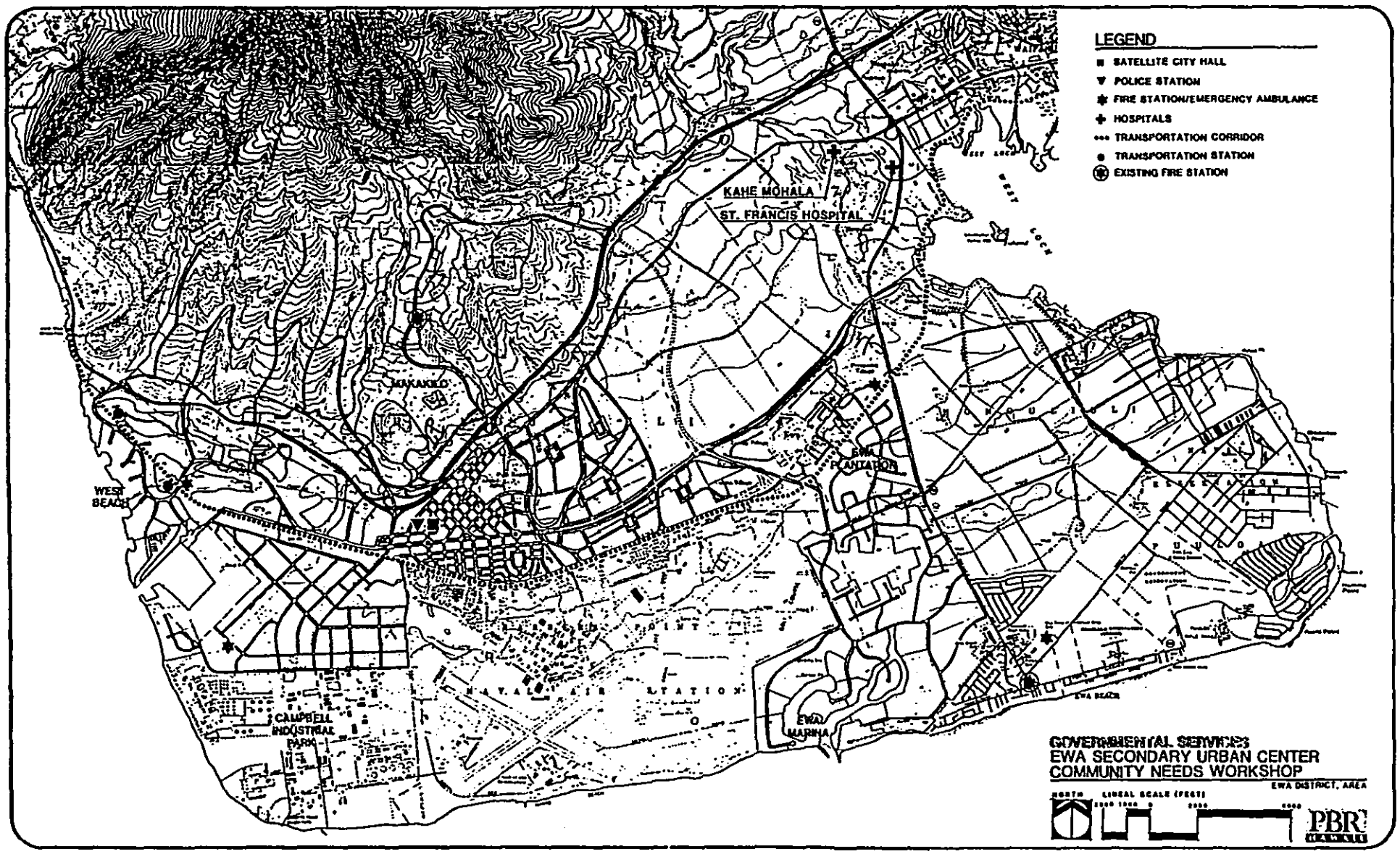
The following Community Advisory Committee members participated in discussions: Dick Beamer, Dave Parsons, Winona Spillner and Francis Hekekia. (Refer to Figure 1 for proposed governmental services).

1. Police Protection: need for a station or substation in the Ewa District.

   Currently existing police facilities within the Ewa service district are located in Waianae and Pearl City. The Honolulu Police Department is supportive of a proposed police facility in Ewa which is indicated in the Ewa Development Plan Public Facilities amendments, dated December 1986. Decisions have not been made as to the type of facility, full station or substation. Upon construction of a new facility, the Police Department would revise service districts, with Waianae and Ewa as separate districts. Campbell Estate is offering to provide an 80 acre site in the Kapolei Town Center for public facility purposes. The Police Department stated that the number of officers within a particular beat is not dependent upon the presence or absence of a local facility. The reasons for siting a station include improved community relations and improved supervision of beat officers and travel times between the facility and beat.

2. Health Care Facilities: need for ambulance, emergency clinic and fire prevention service.

   a. Public Facilities: Existing emergency ambulance service located in Waipahu provides an eleven minute response time. The Department of Health


LEGEND
SATELLITE CITY HALL
POLICE STATION
FIRE STATION/EMERGENCY AMBULANCE
HOSPITALS
TRANSPORTATION CORRIDOR
TRANSPORTATION STATION
EXISTING FIRE STATION
KAHE MOHALA
ST. FRANCIS HOSPITAL
MAKAKILO
WEST BEACH
EWA PLANTATION
NAVAL AIR STATION
CAMPBELL INDUSTRIAL PARK
EWA MARINA
EWA BEACH
GOVERNMENTAL SERVICES
EWA SECONDARY URBAN CENTER
COMMUNITY NEEDS WORKSHOP
EWA DISTRICT, AREA
NORTH
LINEAL SCALE (FEET)
PBR

Ambulance Services Office plans to locate facilities in conjunction with existing and proposed fire stations. Presently, existing fire stations in Ewa Beach and Makakilo have no emergency ambulance service. The Ewa Development Plan Public Facilities Map indicates four proposed fire stations to be located in the vicinity of Ewa Beach, Ewa, West Beach and Campbell Industrial Park. The exact locations within each town is undetermined and the construction is set for greater than six years.

b. Private Facilities: Existing and planned hospital facilities are located in the Ewa District on the corner of Fort Weaver Road and Farrington Highway. Kahe Mohala Hospital provides psychiatric services and Saint Francis Hospital plans a community hospital, currently under construction. It will also provide emergency ambulance service.

3. Public Transportation Services: need for long range plans as well as an internal system.

a. Long Range Plans: The City and County Department of Transportation Services intends to expand facilities in the Ewa District. The Ewa Development Plan Public Facilities Map indicates a proposed transportation corridor along the old Dillingham Railroad right-of-way and two transit stations within the West Beach Resort project.

The proposed Honolulu Rapid Transit System intends to service the Ewa District and other outlying areas after its initial phase is constructed. Service will be extended from Pearl City to the Ewa District as a second phase of rail transit development. No alternative routes have been selected by the Rapid Transit Division in the Ewa District, but the existing railroad right-of-way is viewed as the most likely route since it would minimize land acquisition costs.

b. Internal System: The existing public bus system plans to expand its service in relation to the actual construction and growth of the Ewa District. The bus system routes also need to be planned to provide an effective intra-community transit service, fully coordinated with the regional bus and rail systems.

4. Secondary City Hall/Auxiliary State Offices: need to have offices located within the Ewa District.

a. Secondary City Hall: Presently, the existing Satellite City Hall in Ewa is closed. The City and County of Honolulu has established a mobile unit replacing the stationary satellite office which visits various outlying towns including Ewa Beach on a weekly schedule. The mobile unit service is planned to continue until population growth and need would support a full-time office in the Ewa District. A site for a satellite has been identified in the Kapolei Plan.

b. Auxiliary State Offices: The state has plans to expand Capitol District office space dramatically over the next ten years. According to the Lt. Governors office, decentralization of Capitol District offices to the Ewa District is planned, in response to projected growth in the Leeward area. Timing and location of these facilities is unknown at this time.

5. Civil Defense Services: need to expand the capabilities.

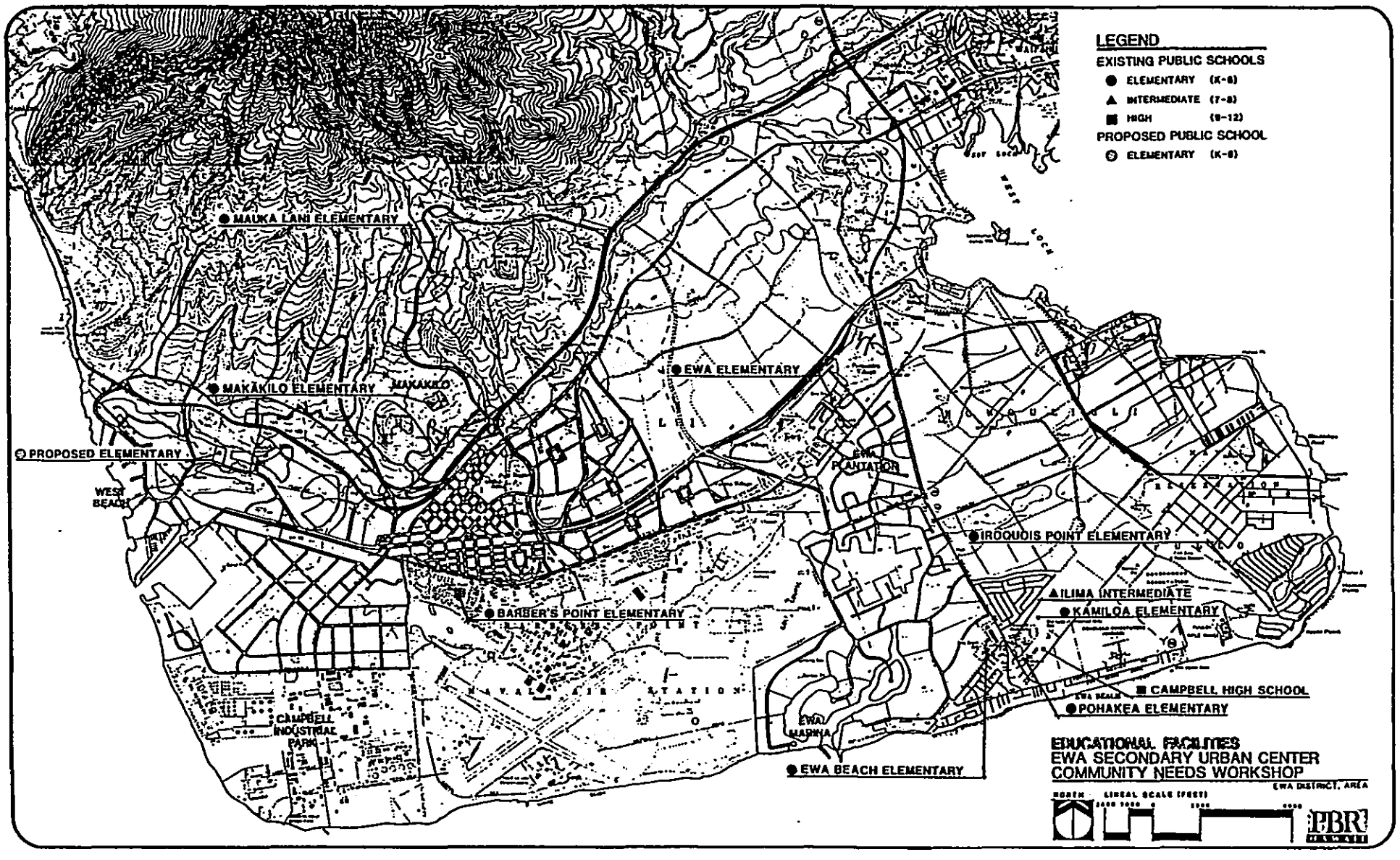
City and County of Honolulu Civil Defense Agency has no future expansion plans other than devising alternative evacuation routes as development increases in the Ewa District. Discussions with the Civil Defense officer in charge of the Ewa District reveal the need for maintaining communications by attention alert signals, radio emergency broadcasts and national weather forecasts. Communication is viewed as the primary tool available to inform the public and reduce hazards due to tsunamis, hurricanes and flash floods.

B. <u>Education</u>

The following Community Advisory Committee members participated in discussions: Glenn Oamilda, Ed Dunbar, George Kaeo, Eugene Martin and Malia Schwartz. (Refer to Figure 2 for existing and proposed educational facilities).

1. Provide for all levels of education:

The Department of Education Facilities Branch acknowledges that all levels of education are currently provided for with the exception of a college. One elementary school site has been set aside at West Beach Resort to meet future enrollment increases in this elementary school service area.


LEGEND
EXISTING PUBLIC SCHOOLS
ELEMENTARY (K-6)
INTERMEDIATE (7-8)
HIGH (9-12)
PROPOSED PUBLIC SCHOOL
ELEMENTARY (K-6)
MAUKA LANI ELEMENTARY
MAKAKILO ELEMENTARY
MAKAKILO
PROPOSED ELEMENTARY
WEST BEACH
EWA ELEMENTARY
EWA PLANTATION
IROQUOIS POINT ELEMENTARY
ILIMA INTERMEDIATE
KAMILOA ELEMENTARY
BARBER'S POINT ELEMENTARY
CAMPBELL HIGH SCHOOL
POHAKEA ELEMENTARY
CAMPBELL INDUSTRIAL PARK
EWA MARINA
EWA BEACH ELEMENTARY
EDUCATIONAL FACILITIES
EWA SECONDARY URBAN CENTER
COMMUNITY NEEDS WORKSHOP
EWA DISTRICT, AREA
NORTH
LINEAL SCALE (FEET)
PBR

2a. Siting of Schools: need for demographics and surrounding land characteristics to be carefully considered.

The Department of Education Facilities Branch sites schools by examining many factors including demographic projections and surrounding land uses. The Department of Education focuses attention predominantly on six year population projections generated from the State of Hawaii Information System Services Branch. According to the Facilities Branch, existing schools in the Ewa District indicate expansion room based on maximum design capacity and present 1986-1987 enrollments. See Table 1, Existing School (K-12) Capacity Levels in the Ewa District. It is the Department's intent to utilize the existing facilities to their designed capacities before constructing new facilities. As indicated by comparing current enrollment to design capacity, most schools have between 20% and 60% of their capacity available to accommodate future growth. However, this could be easily absorbed in a relatively short period of time once residential expansion increases.

b. Curriculum of Schools: create equal emphasis between academic and vocational courses.

- within vocational discipline a greater emphasis on agriculture and aquaculture programs.

- sports programs should take advantage of water activities.

- food services programs should be provided at secondary schools.

The above programs are desirable and reveal improvements needed within existing school curriculums. Existing school facilities may need to be changed to accommodate curriculum changes.

3a. Siting of Schools in relation to Community Land Uses: i.e., business adjacent to commercial areas, vocational adjacent to industrial areas, university adjacent to residential areas or prominent locations.

b. Architectural design needs more imagination.

The Department of Education Facilities Branch examines existing land uses when siting a school, in terms of the school being a compatible land use in relation to surrounding uses. Emphasis has been toward the school site to be within close proximity to residential areas and not to specific commercial or industrial sites.

Architectural design quality for most public schools has been obviously ignored in deference to functionality and cost factors. Imaginative design appears to be limited by State policies on funding for the design and construction of school facilities.

TABLE 1

EXISTING SCHOOL (K-12) CAPACITY

LEVELS IN THE EWA DISTRICT

School Name	Grades	Number of Class Rooms(1)	Designed Capacity(2)	86-87 Enrollment(3)	Future Expansion
Barber's Point	K-6	42	1,050	380	670
Campbell High	9-12	97	2,425	1,900	525
Ewa	K-6	20	500	356	144
Ewa Beach	K-6	33	825	484	341
Ilima Inter.	7-8	59	1,475	923	552
Iroquois Point	K-6	36	900	975	25 *
Kaimiloa	K-6	16	400	432	100 *
Makakilo	K-6	30	750	456	300
Mauka Lani	K-6	16	400	330	70
Pohakea	K-6	30	750	585	165

Note: (1) Room numbers based on May 1983 data, D.O.E. Facilities Branch.

(2) Capacity criteria used by D.O.E. Facilities Branch. (Number of Classrooms) x (25) = Designed Capacity

(3) Enrollment Projections of the Public Schools in Hawaii 1986-1991, D.O.E Information Systems Branch.

* Indicates additional portable classroom units installed to accommodate existing enrollment and to accommodate future expansion.

4a. Curriculum/Expanded Facility Functions

- need for early education program: parental participation with child's education.

- need for school support center: services for people who need additional aid.

- need for night school: adult/continuing education.

The above program needs reveal the desire to improve existing school curriculum and specialized supporting services. Existing facilities may also need to be expanded or modified in conjunction with curriculum changes.

b. Transportation: need to transport students to the schools.

The Bus system intends to continue services within the Ewa District and will expand to accommodate the new growth patterns. School bus service would also require expansion as the student population increases.

5a. Curriculum

- need for arts courses
- Hawaiian culture emphasis possibly relating to Lanikuhonua.
- need for drug abuse prevention programs

The above needs indicate a desire to expand the existing school curriculum beyond present programs. Existing school facilities may also require new facilities to accommodate these needed programs.

b. School Design

- need for adequate playground for after school use.

Schools are presently designed with standards to provide for adjacent playgrounds, usually four acres in size. However, there is a desire to increase the size of playgrounds and insure that playground sites are appropriate for a variety of recreational activities.

c. Community College

- need for vocational education.

The Leeward Community College, an open access educational facility, located in Waipahu, allows people 18

years and over to obtain an associate degree in a variety of disciplines, including vocational training in various fields.

According to the University of Hawaii at Manoa Facilities Planning Office, the Board of Regents has not ruled out the possibility of future campus expansion in Ewa. The Acting Assistant Dean of Instruction of Leeward Community College acknowledged that West Oahu Chancellor Edward Kormondy will be submitting recommendations to the President of the University of Hawaii, directed towards the future status of West Oahu College residing on Leeward's campus. It is believed that several recommendations will be made including the relocation of the college to a more accessible location.

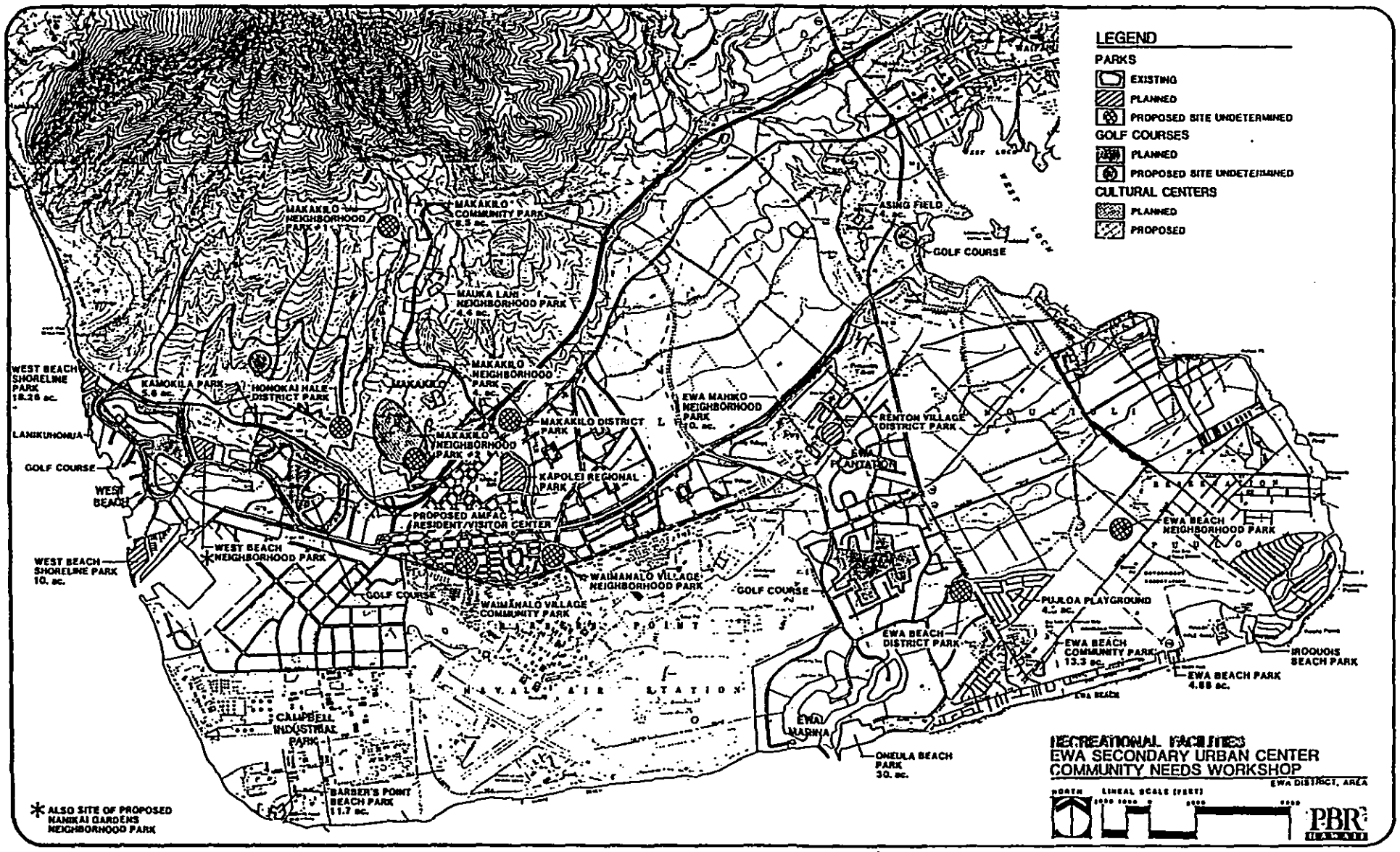
C. Recreation/Culture/Art

The following Community Advisory Committee members participated in discussions: Tony Bise, Jim Moa, Joe Pacyno Jr., James Vallelunga, Roy Wickramaratna and Wallace Zollen. (Refer to Figure 3 for existing, planned, and proposed recreational facilities).

1a. Need for active park areas: swimming pool, gymnasium, softball, tennis, soccer, basketball, volleyball, handball and racquetball.

The active park facilities noted above can be accommodated in a large regional park. The City and County Department of Parks and Recreation standards define which sports facilities should be incorporated within various park classifications. In summary, parks are classified as mini parks, which are the smallest, to district and regional parks, which are the largest. Specific criteria includes required area per 1,000 population, service area, site size, school relationship and facilities (refer to Table 2, Proposed City and County Recreation Park and Facility Standards).

The planned Kapolei Regional Park will have the greatest potential to incorporate facilities such as pools, gymnasiums, soccer fields and tennis courts due to its large size. Smaller neighborhood and community parks such as the proposed Ewa Beach Community Park will accommodate fewer facilities and focus on passive recreation areas.


LEGEND
PARKS
EXISTING
PLANNED
PROPOSED SITE UNDETERMINED
GOLF COURSES
PLANNED
PROPOSED SITE UNDETERMINED
CULTURAL CENTERS
PLANNED
PROPOSED
MAKAKILO NEIGHBORHOOD PARK #1
MAKAKILO COMMUNITY PARK 8.5 ac.
MAUKA LANI NEIGHBORHOOD PARK 4.4 ac.
MAKAKILO NEIGHBORHOOD PARK 4. ac.
MAKAKILO NEIGHBORHOOD PARK #2
MAKAKILO DISTRICT PARK
KAPOLEI REGIONAL PARK
PROPOSED AMFAC RESIDENT/VISITOR CENTER
WAIMANALO VILLAGE NEIGHBORHOOD PARK
WAIMANALO VILLAGE COMMUNITY PARK
EWA MAHIKO NEIGHBORHOOD PARK 10. ac.
ASING FIELD 4. ac.
GOLF COURSE
RENTON VILLAGE DISTRICT PARK
EWA PLANTATION
EWA BEACH NEIGHBORHOOD PARK
PUULOA PLAYGROUND 4.2 ac.
EWA BEACH DISTRICT PARK
EWA BEACH COMMUNITY PARK 13.3 ac.
EWA BEACH PARK 4.88 ac.
IROQUOIS BEACH PARK
EWA BEACH
ONEULA BEACH PARK 30. ac.
EWA MARINA
WEST BEACH SHORELINE PARK 18.26 ac.
KAMOKILA PARK 5.6 ac.
HONOKAI HALE DISTRICT PARK
LANIKUHONUA
GOLF COURSE
WEST BEACH
WEST BEACH NEIGHBORHOOD PARK
WEST BEACH SHORELINE PARK 10. ac.
CAMPBELL INDUSTRIAL PARK
BARBER'S POINT BEACH PARK 11.7 ac.
NAVAL AIR STATION
* ALSO SITE OF PROPOSED NANIKAI GARDENS NEIGHBORHOOD PARK
RECREATIONAL FACILITIES
EWA SECONDARY URBAN CENTER
COMMUNITY NEEDS WORKSHOP
EWA DISTRICT, AREA
NORTH
LINEAL SCALE (FEET)
PBR HAWAII

b. Cultural Centers: arts and craft center and a hobby center.

Campbell Estate has planned a non-profit Hawaiian Cultural Center, Lanikuhonua, located adjacent to the West Beach Resort area. The intent of the cultural facility is to foster research, experimentation and teaching of Hawaiian culture. Local school groups and visitors would be encouraged to visit the site and to participate in scheduled workshops on various culture and arts activities. Public gatherings would also take place on the occasion of major performances and exhibitions.

Specific activities include: Research/Documentation, Performing Arts Training (hula, chant, drama, etc.), Material Arts and Crafts (weaving, carving, fiber arts), Ocean Skills Training, and Subsistence Skills.

Presently the community entertainment area has been completed and is fully functional allowing hula shows and gatherings to take place. The crafts and educational facilities are currently in the planning and design phase.

Amfac Hawaii, Inc. is proposing to construct a major resident/visitor entertainment attraction center encompassing 108 acres located between Puu Palailai and the H-1 Freeway/Palailai Interchange. Central elements of the project include the "park" site, plant nursery and a future commercial site. The project intends to expose residents and visitors to life styles of the Pacific and Asian Basins by exhibits, performances, multi-media events, and ethnic foods and merchandise. Major park elements include: international exhibitions, a lagoon system, employee/visitor parking, administration building, and support/maintenance facilities.

2a. Central Library: the need to have a main library.

The Ewa Beach Community - School Library is the only library in the Ewa District. The facility is sufficient for the current population but will need expansion to accommodate projected growth. The Department of Education does not plan additional library facilities in Ewa at the present time.

b. Museum: need to have a museum within the area.

Presently no museum is proposed in the Ewa District. Construction and operation of such a facility would most likely be initiated by the private sector, such as a

TABLE 2

PROPOSED CITY AND COUNTY RECREATION PARK AND FACILITY STANDARDS

	MINI PARKS	NEIGHBORHOOD PARKS	COMMUNITY PARKS	DISTRICT PARKS	OTHER: URBAN PARKS AND SQUARES	CITY AND COUNTY ISLAND WIDE PARKS	LINKAGES
MINIMUM AREA REQUIRED FOR 1,000 POPULATION	← 2 acres (350 sq. ft. dwelling unit)* →				— (10% of Maximum Floor Area for Business Districts)	8 acres	BIKEWAYS, PEDESTRIAN WAYS, STREAM/GREENBELT TRAILS, TRANSPORTATION SERVICES
SERVICE AREA POPULATION	—	approximately 3,000	approximately 10,000	approximately 25,000	—	PARK TYPES Regional Parks Large recreation complexes Camping and vacationing (beach, inland or urban sites) Beach Parks Day use parks primarily for swimming, sunbathing, and picnicking Zoos and Botanic Gardens Golf Courses (Public, Semi-Public) 18 holes/100,000 Nature Parks and Reserves Significant natural areas under control of the C & C of Honolulu and including urban stream greenbelts	
AVERAGE SITE SIZE		4-6 acres	10 acres	15-20 acres	—		
SERVICE AREA	½ mile*	½ mile*	1 mile*	2 miles*	—		
SCHOOL RELATIONSHIP		Joint Use With^ Elementary School	Possible Joint Use With Schools	Possible Joint Use With Schools	—		
BASIC FACILITIES (CAN BE ADJUSTED TO MEET PARTICULAR COMMUNITY NEEDS)	LANDSCAPING Benches, Tables	Children's Play Area 2 Basketball Courts 2 Volleyball Courts 1-2 Softball Fields Comfort Station	Children's Play Area 3-4 Basketball Cts. 3-4 Volleyball Cts. 1-2 Softball Fields Comfort Station/ Recreation Bldg.	Children's Play Area 3-4 Basketball Cts 3-4 Volleyball Cts 2 Softball Fields 1 Baseball Field 1 Soccer/Football Field 4-6 Tennis Courts Gym/Rec Bldg. Complex 1-25 yd or 25m pool	Landscaping and Landscape Features		
ADDITIONAL DESIRABLE FACILITIES	Children's Play Area	Shelter Passive Area	Passive Area 1 Baseball Field	Passive Area Jogging Trail Archery	Comfort Station —	*Park Dedication Ordinance, 1976 ^Joint Use Agreement between City & State, 1966	
RECREATION STAFF REQUIREMENTS	—	0	1 Rec. Director	1 Rec. Director 1 Gym Complex Director 1 Pool Supervisor	—		

SOURCE: DEPARTMENT OF PARKS AND RECREATION, 1977.

non-profit organization established for that purpose. Possible sites for a museum would include Lanikuhonua or the Kapolei Regional Park due to convenient access and compatibility with surrounding land uses.

3. Public Golf Course: need to have a publicly operated golf course.

No public golf courses exist in the Ewa District. The City and County Department of Housing and Community Development has indicated a proposed golf course in conjunction with a residential development between Fort Weaver Road and West Loch of Pearl Harbor. The Ewa Development Plan Land Use Map is currently being amended to include this proposal.

Golf courses being planned by the private sector in Ewa include the following: two 18-hole courses at West Beach; one 18-hole course at Makakilo; and one 18-hole course at Ewa Marina. These courses would be available for public play on a daily fee basis.

4. Zoo/Botanical Gardens: need to provide for these facilities.

- equestrian riding trails
- jogging path
- bikeways

Accommodation of such needs could be incorporated within a regional park. The planned Kapolei Regional Park has the capabilities to incorporate such needs, due to its size. It should be noted that the zoo would most likely be a children's zoo and not a full scale zoo.

5. Sports Arena/Sports Stadium

Presently, there are no plans for spectator sports facilities. Development of such facilities would probably require private sector initiative or be associated with a new institution such as a college.

6. Passive Recreation Areas: the need for beach and mountain picnic areas.

The passive recreation needs are easily accommodated within any of the existing, planned, and proposed parks indicated on Figure 3. According to the City and County Recreation Park and Facility Standards, Table 2, benches and tables for picnic purposes are a basic facility to be incorporated in all parks.

7. Amphitheater

An amphitheater is included in the Kapolei Town Plan at the old quarry site mauka of Interstate Highway H-1.

8a. Bowling Alleys

Private facilities within commercial areas of Ewa Town Center.

b. Movie Theaters

Private facilities within commercial areas of Ewa Town Center.

III. SOLUTIONS WORKSHOP

The solutions workshop consisted of three simultaneous small group sessions which focused on resolving the findings of the needs workshop and proposing specific solutions to the previously identified needs and priorities. The three areas, Governmental Services, Education, and Recreation/Culture/Art were addressed by developing a prioritized list of solutions for each need category.

The solutions for each need category are listed and prioritized below. Each solution is discussed to indicate its relationships to the need category it addresses.

A. Governmental Services

The following Community Advisory Committee members participated in discussions; Dick Beamer, Dave Parsons, Winona Spillner, Norbert Cordeiro, Gabe Kilakalua Jr., and Francis Hekekia.

1. Police Protection

The advisory committee members support the location of the proposed police facility on the Ewa Development Plan Public Facilities Map. The Committee recommends that the proposed facility be a full size police station in order to accommodate expected growth in Ewa, and maintain close community relations.

The decision for a fully operational police station located in the Ewa Town Center completely satisfies the identified need. Desire for a full station vs. a substation should be conveyed to the Chief of Police as a means to further implement this solution.

2. Health Care Facilities

The existing Ewa Development Plan Public Facilities Map reveals that no ambulance service is proposed for new growth areas. The committee recommends that siting of emergency ambulance service be reassessed in terms of future needs and that this service be co-located with the proposed police station in the Ewa Town Center.

The decision for reassessment of the emergency ambulance service will resolve the problem of service area deficiencies in the planned town center and Makakilo. If the additional sites are added to the Ewa Development Plan Public Facilities Map, the identified need for adequate emergency ambulance service will be fulfilled.

3. Public Transportation

a. Long Range:

1) Light Rail Mass Transit - the committee recommends to continue supporting phase two development of a transit line extending to West Beach. In addition, transit stations with parking facilities should not only be located at West Beach, but also at the proposed Ewa Town Center and at the Fort Weaver Road intersection.

2) Water Transportation - the committee recommends that more evaluation of viable alternatives is needed.

The following solutions satisfy the transportation needs and suggest refinement by requesting additional transit stations and parking facilities.

b. Short Range:

An internal "wiki-wiki" type shuttle service should be developed to link the main shopping areas and the transit terminals. The existing bus service should be used in conjunction with other modes of transportation.

The decision to promote an internal transportation system will alleviate the increased demand for more frequent and localized service. No plans have been revealed to implement such a system. The existing bus system intends to accommodate the expanded growth and needs as actual construction and population increases take place within the District. These solutions, upon implementation, will satisfy the identified need.

4. Secondary City Hall/Auxiliary State Offices

The advisory committee supports the location of a civic center in the Ewa Town Center to house various government services. It is further recommended that a secondary City Hall provide a full range of services similar to the existing downtown Honolulu complex. Planned auxiliary state offices should be located in the proposed civic center in conjunction with other government services.

The solution reinforces the identified needs by requiring full operating offices to be located in close proximity to each other and within the town center.

5. Civil Defense Services

a. The committee recommends that a civil defense communication center be located in the new Ewa Town Center. Additionally, evacuation routes, shelters and other needs should be included in all phases of development in Ewa.

b. Emergency rescue services and a helipad should be developed in the Ewa District to provide immediate response to land and water accidents.

The decision to locate a civil defense communication center, shelters and an emergency rescue facility with a helipad surpasses the identified need. Development of these services would ensure increased measures of safety for existing and new communities in the Ewa District.

B. Education

The following Community Advisory Committee members participated in discussions; Glenn Oamilda, Frank Tolomantes, Ed Dunbar, Jim Moa, Jane Ross and Malia Schwartz, and Emogene Martin.

1. a. Sites for all schools, elementary, intermediate, high school and higher education should be set aside in the second city.

b. Sites should be relatively level.

c. Sites should have room for expansion.

The recommendation enforces the need to provide for all levels of education. Additional recommendations include important criteria in school site selection which should be communicated to the Department of Education Facilities Branch.

2. a. Move West Oahu College to the second city in the most accessible location in the region.

b. Require West Oahu College to be a four year facility.

Desire to relocate the West Oahu College campus to the second city addresses the need for an upper level educational facility. Recommendations to expand the existing program from two to four years would build upon existing resources and address future needs.

3. Locate high technology and adult education programs at the Campbell Industrial Park.

This solution refers to locating educational programs adjacent to compatible land uses which will enhance the particular courses being taught. Careful planning is needed between developers and the educational institutions responsible for devising the various courses in order to address this need.

4. a. Provide adequate space for resource teachers.

b. All schools should have facilities for arts including a stage.

c. All schools should be architecturally pleasing and functional.

Recommendations respond to needs indicating important criteria which should be emphasized in the physical design of school facilities. The criteria should be utilized in the construction of all new schools in the Ewa District. Currently, only one school is to be constructed and no plans have been unveiled as to the nature of the design. Space criteria for resource teachers is an additional solution which was never addressed in the identified needs list.

5a. School site should be located within walking and biking distance from residences.

This recommendation deals with school siting in accessible areas and allowing the service radius to be within close proximity to residential areas. The service areas vary in accordance with the type of school. An elementary school generally has a service area of one quarter to one half mile. In comparison, a high school's service area is larger, one mile and greater.

b. Provide water sports at West Beach Marina such as canoe clubs, sailing, and scuba diving for high school and college students as well as residents.

Recommendations to develop and promote water sports satisfies the identified needs. Changes in existing curriculum offerings will achieve these desired programs.

c. Set aside sites for day care centers.

This solution indicates that there is no child care facility and provision for such a facility is needed and required.

6. All high schools and colleges are to provide adult education programs.

Provisions of adult education programs will achieve the identified need. Furthermore, the recommendation designates high schools and colleges as the particular locations for these programs.

7. a. Provide sites for private schools.
   b. Provide adequate parking for the college facility.
   c. Provide a swimming pool at the high school.

These solutions relate to siting and standards of school facilities which were not identified in the original needs list. Future planning and design of schools should address these issues.

   d. Develop an aquaculture facility at the harbor.

Creating such a facility would promote aquaculture programs which were an identified need.

   e. Develop a small business incubator program to promote "local" business opportunities to serve growth.

This recommendation is a response to a need which was not identified previously. Presently, the Department of Planning and Economic Development harbors a small business incubator program. An extension service could be moved to a facility in Ewa to foster the success and expansion of small businesses to serve future growth.

C. <u>Recreation/Culture/Art</u>

The following Community Advisory Committee members participated in discussions; Harry Ching, L.O. Larimer, James Vallelunga, Roy Wickramaratra and Wallace Zollen.

1a. Provide active recreation and culture facilities at the planned Kapolei Regional Park. The additional 65 acres surrounding the existing 15.6 acres park should be purchased. The proposed Makakilo District park should be deleted from the Ewa Development Plan Public Facilities Map and combined with the regional park, since the same location could satisfy both needs.

Recommendations to develop Kapolei Regional Park would achieve the majority of the identified needs. A park of this size can accommodate swimming pools, gymnasiums, softball and soccer fields, as well as, tennis, handball, racquetball, volleyball and basketball courts. Additionally, cultural

facilities promoting arts, crafts and hobbies can be included.

b. Transfer Ewa Beach and Ewa proposed park funds to Kapolei Regional Park since these areas will not be developed as rapidly.

The solution to transfer funds will expedite the development of Kapolei Regional Park and satisfy the immediate need to provide a wide variety of facilities.

2. Locate a central library and a museum adjacent to Kapolei Regional Park.

This solution addresses the siting issue for these facilities. The State of Hawaii Library Department will need to be persuaded to construct a new facility instead of expanding the original structure in Ewa Beach. This solution also recommends that the museum be linked to the library and the regional park area, which would be central to all Ewa communities.

3. Develop a public golf course in Ewa which provides affordable golfing opportunities.

This solution achieves the desire to improve access to golf facilities. Privately developed golf courses are currently proposed; however, access may be limited due to higher fees.

IV. AGENCIES AND INDIVIDUALS CONSULTED

The following is a partial list of individuals and/or agencies consulted in the preparation of the workshops on community facility needs and solutions.

STATE OF HAWAII

Department of Education

- o Facilities Branch
  - Wallace Okamura
  - Tom Nakai
- o Information System Services Branch
  - Edward Matsushige

Department of Land and Natural Resources

- o State Parks Division
  - Dan Quinn

Department of Planning and Economic Development

- o Research and Economic Analysis Division
  - Bob Stanfield

CITY AND COUNTY OF HONOLULU

Civil Defense Agency

- Gabe Kilakalua

Department of General Planning

- o Community Planning Branch
  - Walter Lee

Department of Health

- o Emergency Ambulance Services
  - Walter Nishimuka

Mayor's Office

- o Satellite City Halls
  - Gael Mustapaha
  - Dennis Taga

Department of Parks and Recreation

- o Advanced Planning Branch
  - Steve Salis

Police Department

- Chief Douglas Gibb
- Brandon Stone
- Ralph Yee

Department of Transportation

- o The Bus
  - Al Morimoto
- o Rapid Transit Division
  - James Ball
  - Michael Schavas

EDUCATIONAL INSTITUTIONS

Leeward Community College

- o Director of Administrative Services
  - Mike Unebasami
- o Acting Assistant Dean of Instruction
  - Lucy Gay

University of Hawaii

- o Facilities Planning Office
  - Walter Muraoka
- o Urban and Regional Planning
  - Peter Flashabart

APPENDIX J

Traffic Impact Studies

1) Parsons Brinckerhoff Quade & Douglas, Inc. September 1986.

2) Engineering Concepts, Inc. and Pacific Planning and Engineering, Inc. October 1987.

3) ECI and PP & EI, November 1987.

Parsons Brinckerhoff Quade & Douglas, Inc.
September 1986.

DRAFT

TRAFFIC IMPACT STUDY

EWA TOWN CENTER

EWA, HAWAII

Prepared for:

THE ESTATE OF JAMES CAMPBELL

SEPTEMBER 1986

Prepared by:

PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

TABLE OF CONTENTS

	Page
EXISTING CONDITIONS	3
FUTURE CONDITIONS	5
PROPOSED PROJECT	7
FUTURE CONDITIONS WITH PROPOSED PROJECT	10
CONCLUSIONS AND RECOMMENDATIONS	26
TECHNICAL APPENDIX	A-1

LIST OF TABLES

Table		Page
1	EXISTING TRAFFIC VOLUMES	4
2	STATE PREDICTION, (TRAFFIC VOLUMES EAST OF WAIAWA INTERCHANGE	6
3	PLANNING PARAMETERS, EWA TOWN CENTER	8
4	TRIP GENERATION FACTORS, EWA TOWN CENTER	8
5	TRIP DISTRIBUTION, EWA TOWN CENTER	11
6	TRAFFIC VOLUMES, SCREENLINE M (MAKAKILO)	12
7	TRAFFIC VOLUMES, INDUSTRIAL PARK/HARBOR	13
8	YEAR 2005 TRIP TABLE	15
9	TRAFFIC VOLUMES, SCREENLINE 3 (KAHE)	16
10	TRAFFIC DEMAND, EWA PARKWAY	18
11	TRAFFIC VOLUMES, SCREENLINE 2A (KUNIA)	19
12	TRAFFIC VOLUMES, SCREENLINE 2B (FORT WEAVER ROAD)	20
13	TRAFFIC VOLUMES (WITHOUT EWA PARKWAY)	21
14	TRAFFIC VOLUMES, SCREENLINE 1 (WAIAWA - KUALOA)	23
15	COMPARISON OF PREDICTIONS (HALI 2000)	24
16	COMPARISON OF PREDICTIONS (STATE HIGHWAYS DIVISION)	25

LIST OF FIGURES

Figure		Page
1	LOCATION MAP	2

TRAFFIC IMPACT STUDY
EWA TOWN CENTER

The Estate of James Campbell is developing a master plan for a new town center in Ewa. This report summarizes the findings of a traffic study for the proposed Ewa Town Center.

The proposed town center will be located on the Ewa Plain of Oahu, between the existing Barbers Point Naval Air Station (NAS) and Makakilo (Figure 1). A city center, which would include light industrial uses, general and government offices, civic center activities, and retail areas, is planned for the area between Fort Barrette Road (NAS Barbers Point access road) and Kalaeloa Boulevard (Campbell Industrial Park access road). A college campus and related activities are proposed west of Kalaeloa Boulevard. Residential areas, which would include parks, schools, and neighborhood retail activities, will be located in areas east of Fort Barrette Road and between the city center and NAS Barbers Point.

The master plan for the Ewa Town Center indicates that full development will occur beyond fifty years. As part of Campbell Estate's planning, projections of population and employment in Ewa were made in five-year increments to year 2005. The traffic study evaluated conditions to year 2005.

In this traffic study, twelve subareas, or analysis zones, were used in a mathematical model to predict future traffic volumes. Several screenlines were used in the analysis; these screenlines follow the boundaries of the analysis zones. The nine Ewa analysis zones were consolidated into two major zones to facilitate the evaluation of the findings. The attached Technical Appendix describes the mathematical model and defines the zones.

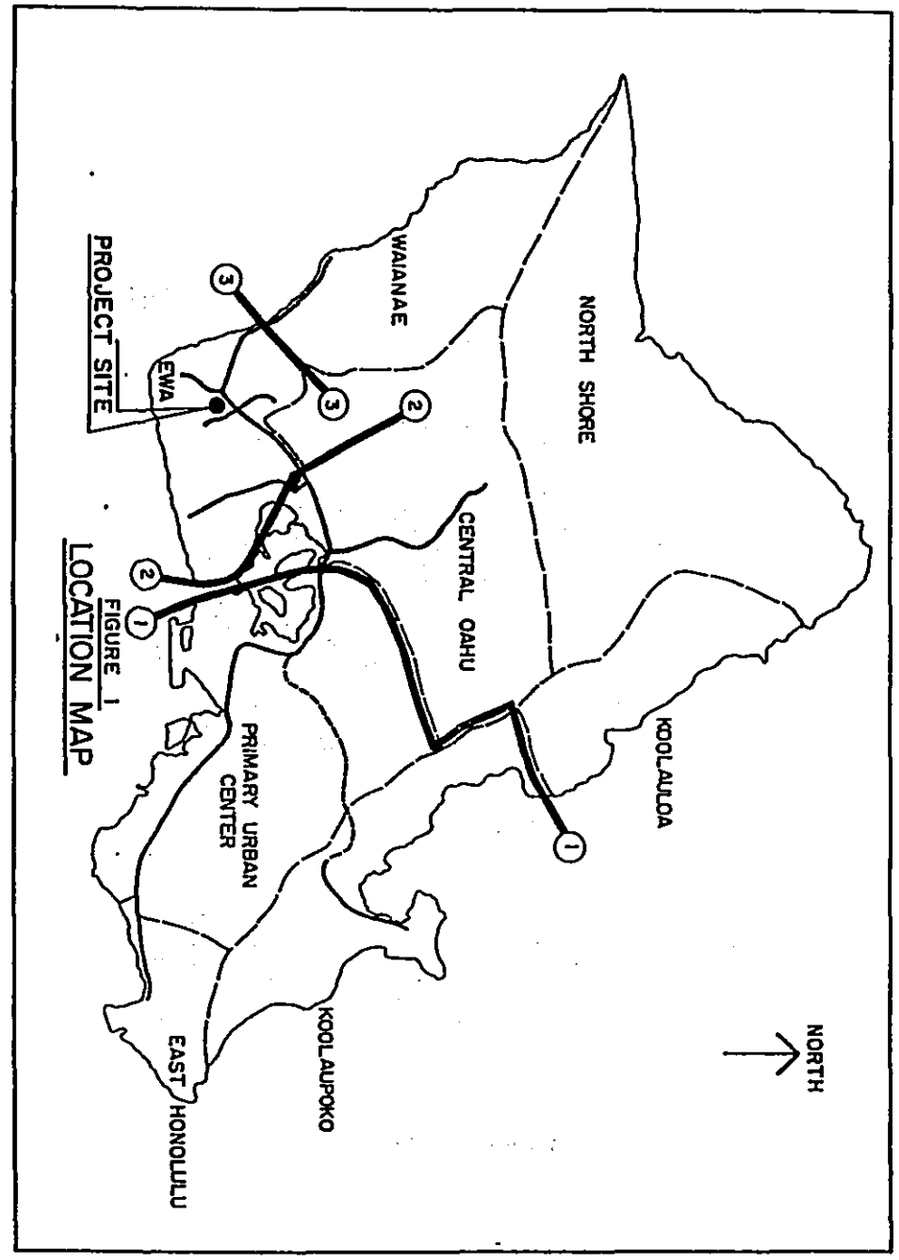


FIGURE 1
LOCATION MAP

EXISTING CONDITIONS

The area proposed for the Ewa Town Center is presently either vacant or in sugar cane production. A network of private cane haul roads runs through the area and connects to Waipahu. Traffic generated by the existing activities onto public roadways consists of agricultural vehicles and peak hour contribution is negligible.

Within and around the Secondary Urban Center, existing roadways operate well during peak periods, with traffic volumes ranging up to approximately 50% of capacities. Traffic on Makakilo Drive exhibits the typical pattern of a residential area, i.e. high directional splits reflecting the home-to-work and work-to-home commuting. To the west, volumes on Farrington Highway at Keananoio Bridge near Kahe Point show a similar pattern, although not as pronounced because of the greater variety of activities along the Waianae Coast.

To the east, however, peak hour traffic volumes are evenly distributed between the eastbound and westbound directions. The major employment areas at Campbell Industrial Park and NAS Barbers Point attract traffic in the morning which balances the eastbound commute traffic produced in residential areas.

In the area served by Fort Weaver Road, existing traffic conditions north of Renton Road, where Fort Weaver Road was recently widened to four lanes, are good, with peak hour volumes approximately one-third of capacity. In the segment south of Renton Road, however, peak hour traffic demands approach the capacity of the existing two-lane highway.

Existing travel between the Secondary Urban Center and the Fort Weaver area, such as for school trips from Makakilo to Campbell High School in Ewa Beach, use the H-1 Freeway to Kunia Road and Fort Weaver Road. While no origin-destination surveys were done in this study, the simple model (which does not specifically account for school trips) predicted volumes of approximately 200 vehicles per hour traveling between these zones during peak hours.

The major traffic concern of residents in Leeward Oahu who work in Honolulu is the adequacy of the highway system between Waiawa Interchange and Aiea. Existing traffic counts taken near Waiawa Interchange show near-capacity volumes during peak hours.

The above discussion of traffic volumes is based on traffic counts taken by the State Department of Transportation. These counts were used with population and employment data to calibrate, or adjust, the mathematical model to adequately predict travel patterns. The count data are shown in Table 1.

Table 1
EXISTING TRAFFIC VOLUMES

Direction (relative to downtown Honolulu)	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
H-1, east of Waiawa Interchange	6,784	2,911	3,917	7,317
Farrington Highway, east of Waiawa Rd.	1,265	1,132	1,242	1,608
Kamehameha Highway, H-1 on-ramp	0	383	0	394
Kamehameha Highway, H-2 on-ramp	0	263	0	296
Kamehameha Highway, Kualoa	279	179	307	415
Total, Screenline 1	8,328	4,868	5,466	10,030
H-1, west of Kunia Interchange	1,777	1,862	1,690	1,775
Farrington Highway, west of Fort Weaver Rd.	361	277	355	271
Fort Weaver Road, South of Farrington Hwy.	1,210	378	727	931
Total, Screenline 2	3,348	2,517	2,772	2,977
Farrington Highway at Keananoio Bridge	1,287	668	732	1,310
Total, Screenline 3	1,287	668	732	1,310
Makakilo Drive, north of H-1	1,039	219	421	916
Total, Screenline M	1,039	219	421	916

Source: State of Hawaii, Department of Transportation, Highways Division. Various traffic counts taken in 1985.

FUTURE CONDITIONS

Proposed improvements to the highway system serving Leeward Oahu include the following:

- o H-1, Waiawa to Halawa Interchanges, widening to ten lanes (expected completion, 1987)
- o H-1, Palailai to Kunia Interchanges, widening to six lanes (expected completion, 1988)
- o Fort Weaver Road, Ewa Beach to Renton Road, widening to four lanes
- o H-1, new interchange at Paiwa Street in Waipahu

In addition, increased bus service is expected as the City expands its bus fleet. The State Department of Transportation has indicated that a high-occupancy vehicle (HOV) program will be developed to reduce peak-hour traffic demands.

Traffic Conditions

Future traffic conditions without specific consideration of the Ewa Town Center were evaluated in other studies. These other studies were based on City land use plans and projections of population and employment, or on extrapolations of past traffic counts. These studies all indicate increasing traffic demands from Central and Leeward Oahu toward downtown Honolulu.

The Hali 2000 Study by the Oahu Metropolitan Planning Organization was based on land use data. A sophisticated computer model was used in Hali 2000 to predict traffic volumes in all areas of Oahu for several transportation alternatives. The Hali 2000 Study used 1980 traffic counts and predicted traffic volumes for year 2000. Morning peak hour, peak direction (inbound to Honolulu) traffic volume across their Kalauao and Kualoa screenlines with the "committed system" was predicted to increase by 39%. The Hali 2000 Kalauao screenline is approximately three miles east (toward Honolulu) of Waiawa Interchange.

Hali 2000 also predicted a 90% increase across a Waikele screenline, which is located east of Kunia Road. At Kahe Point, eastbound morning peak hour traffic was predicted to increase 57% to 2,200 vehicles per hour in year 2000.

The State Department of Transportation predicts an increase of 61% in morning peak hour traffic demand, inbound to Honolulu, east of Waiawa Interchange from 1985 to 2008. The predictions from traffic assignment TA 85-17, prepared in 1985, are shown in Table 2.

Traffic studies prepared for the Ewa Marina and Ewa Plantations projects show that additional widening of Fort Weaver Road beyond four lanes may be needed. These studies assumed full development of the projects with trip distributions similar to existing. Traffic reports for other developments in Central and Leeward Oahu also assumed full development within their study horizons, which were typically less than twenty years.

Table 2
STATE PREDICTION
(Traffic Volumes east of Waiawa Interchange)

Direction (relative to downtown Honolulu)	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
Year 2008				
H-1	10,892	4,194	6,375	9,118
Farrington Highway, east of Waiawa Road	2,052	452	1,471	1,714
Kamehameha Highway, (H-1 on-ramp)	0	358	0	554
Kamehameha Highway, (H-2 on-ramp)	0	219	0	454
Total	12,944	5,223	7,846	11,840

* Source: State of Hawaii, Department of Transportation, Highways Division. TA 85-17

PROPOSED PROJECT

The proposed project is a new Ewa Town Center surrounded by residential, industrial, resort, and military uses. Existing residential uses in Makakilo and Honokai Hale, existing industrial uses in Campbell Industrial Park, and the existing military activity at NAS Barbers Point are expected to continue. Additional development in the area includes more residential units in Makakilo, the expansion of the industrial park and the growth of activity at the deep draft harbor, and development of the West Beach resort.

The Ewa Town Center consists of a city center and additional new residential development adjoining the city center. The city center will be located in the area west of Fort Barrette Road and between the H-1 Freeway and Waimanalo Road, an existing cane haul road. The city center will be developed around Fort Barrette (Kapolei), starting near H-1 and proceeding in a counter-clockwise direction.

The proposed Makakilo Shopping Center, located in the triangle formed by H-1, Farrington Highway, and Makakilo Drive, would be the first project. The master plan proposes to realign Farrington Highway between Fort Barrette Road and Kalaeloa Boulevard so that it is almost parallel to H-1. The existing bridge over H-1, however, would remain to provide access into the city center.

Light industrial uses are proposed in the area between H-1 and the realigned Farrington Highway. Government and general office spaces are proposed along Farrington Highway. A civic center and several retail villages will be located south of Farrington Highway. A college campus with supporting uses is included in the plan west of Kalaeloa Boulevard. Residential areas will be developed between the city center and NAS Barbers Point and east of Fort Barrette Road. Residential development is expected to begin near Makakilo Drive and proceed clockwise around Kapolei.

As part of the master plan, population and employment levels within the Ewa Town Center were predicted in five-year increments to year 2005 (Table 3). Total floor areas, in terms of square feet of gross leasable area, for the various employment uses were also predicted. The floor areas were used to develop trip attraction rates for employment within the Ewa Town Center. Trip generation rates used for the Ewa Town Center are shown in Table 4.

Table 3

PLANNING PARAMETERS
Ewa Town Center

Year	Population	Employment
1990	265	700
1995	2,459	2,000
2000	5,684	6,000
2005	8,909	11,000

Source: The Estate of James Campbell

Table 4
TRIP GENERATION FACTORS
Ewa Town Center

	AM Peak Hour		PM Peak Hour	
Direction (relative to Ewa Town Center)	In	Out	In	Out
Population (vehicle trips/hour per person)	0.07	0.17	0.20	0.13
Employment (vehicle trips/hour per job)				
Year 1990	0.45	0.18	0.46	0.74
Year 1995	0.57	0.14	0.32	0.67
Year 2000	0.43	0.11	0.28	0.55
Year 2005	0.42	0.12	0.32	0.57

Predictions of population and employment in other areas in Ewa were also obtained from Campbell Estate. These predictions indicate slower rates of growth in Ewa Marina and Ewa Villages than those shown in the earlier traffic reports. Steady, but less optimistic, growth rates were also predicted for Makakilo and West Beach. Population and employment in Ewa Beach, Honokai Hale, and NAS Barbers Point were expected to remain at existing levels.

Population and employment goals for Oahu have been established by State and City planners. These goals include targets for each of eight Development Plan areas on Oahu. Compared to the predictions obtained from Campbell Estate, the government estimates for the Ewa Development Plan area are higher for population and lower for employment. In this study, total Oahu population and total Oahu employment from the government estimates were used; population and employment in areas other than Ewa were adjusted accordingly. In year 2005, these adjustments resulted in a 2.3% increase in population and a 2.8% decrease in employment in the other areas of Oahu.

FUTURE CONDITIONS WITH PROPOSED PROJECT

The proposed project will increase traffic volumes in the Ewa Plain and alter travel patterns on Oahu by providing a city center in which major economic activity would occur. The increased employment provides many people the opportunity to live and work in Leeward Oahu and to not travel during peak hours in the congested corridors leading into downtown Honolulu.

This report presents trip distribution findings from the model for the Ewa Town Center. Because of the magnitude of the proposed project and its expected effects on travel patterns, analyses of specific intersections were not attempted in this study. Rather, the analyses focused on regional traffic impacts and general evaluations of corridor capacities.

Ewa Town Center

Traffic conditions in the proposed town center are expected to be similar to existing local traffic conditions in outlying business areas with similar densities, such as Waipahu, Kailua, or Kaimuki. Recommendations incorporated into the Ewa Town Center master plan include off-street lots for parking, wide sidewalks, and a bikeway network.

The predictions of population and employment at the Ewa Town Center indicate that travel patterns to and from the project will be changing as the Town Center develops. Internal trips, or trips which begin and end within the Town Center, could be expected to increase. The model confirms these expectations; the distributions of trips generated in the Town Center for each year analyzed are shown in Table 5.

Makakilo

Within the Secondary Urban Center, the model predicted peak hour traffic volumes into and out of Makakilo, which is presently served by only one access road. Screenline M across Makakilo Drive just north of the H-1 Freeway would show these volumes. Capacities across this screenline were estimated to be 2,100 vehicles per hour (700 per lane). As shown in Table 6, adequate traffic service could be provided beyond the year 2000, with near-capacity conditions occurring in peak directions in year 2005 peak hours.

Campbell Industrial Park

The capacity of Kalaeloa Boulevard is estimated to be 2,200 vehicles per hour (1,100 per lane). Traffic volumes from the model into and out of the industrial park and deep-draft harbor are shown in Table 7. These volumes indicate that a second access road into the industrial park will be needed in 1995.

Table 5
TRIP DISTRIBUTION
Ewa Town Center

Year	Direction *	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
1990	Waianae	10%	11%	10%	10%
	Campbell Industrial Park	4	15	14	3
	Internal to Town Center	7	14	31	21
	Makakilo	17	8	10	25
	NAS Barbers Point	4	11	12	6
	Fort Weaver	4	3	2	3
	Honolulu	55	38	21	31
1995	Waianae	10	13	10	9
	Campbell Industrial Park	5	13	12	3
	Internal to Town Center	19	35	45	30
	Makakilo	15	6	7	18
	NAS Barbers Point	3	7	7	4
	Fort Weaver	4	2	1	3
	Honolulu	44	24	18	33
2000	Waianae	10	10	12	6
	Campbell Industrial Park	5	11	10	2
	Internal to Town Center	29	52	57	40
	Makakilo	14	4	6	12
	NAS Barbers Point	2	4	5	2
	Fort Weaver	6	2	2	3
	Honolulu	34	15	8	34
2005	Waianae	11	7	7	5
	Campbell Industrial Park	5	10	10	2
	Internal to Town Center	35	64	65	47
	Makakilo	13	3	5	9
	NAS Barbers Point	2	3	4	2
	Fort Weaver	6	2	2	2
	Honolulu	29	11	7	34

Note: Perrcentages may not total to 100% due to rounding.
* "Waianae" also includes West Beach and Honokai Hale
"Campbell Industrial Park" also includes deep draft harbor
"Fort Weaver" includes Ewa Beach, Ewa Marina, and Ewa Villages
"Honolulu" also includes Central Oahu, North Shore, and Windward Oahu.

Table 6
TRAFFIC VOLUMES
Screenline M (Makakilo)
(Vehicles per hour)

Model projections except as noted: Year	AM Peak Hour South-bound	AM Peak Hour North-bound	PM Peak Hour South-bound	PM Peak Hour North-bound
1985 (field count)	1,039	219	421	916
1985	1,045	225	440	937
1990	1,250	271	511	1,130
1995	1,503	369	626	1,369
2000	1,759	463	785	1,652
2005	1,988*	564	962	1,930*
estimated capacity	2,100	2,100	2,100	2,100

* volume/capacity exceeds 0.85, indicating possible poor level of service

Table 7
TRAFFIC VOLUMES
Industrial Park/Harbor
(Vehicles per hour)

Model projections except as noted:	AM Peak Hour		PM Peak Hour	
Year	In-bound	Out-bound	In-bound	Out-bound
1985	1,057	257	153	813
1990	1,453	333	182	1,107
1995	2,050*	449	250	1,568
2000	2,653*	572	322	2,038*
2005	3,260*	697	395	2,508*
estimated capacity	2,200	2,200	2,200	2,200

* volume/capacity exceeds 0.85, indicating possible poor level of service

Major Zones

Further evaluation of the traffic predictions from the simplified model used in this study was done with larger zonal areas. Five major zones were defined. The "Secondary Urban Center" includes the Ewa Town Center, Makakilo, NAS Barbers Point, Campbell Industrial Park, Honokai Hale, and West Beach. The "Fort Weaver" major zone includes Ewa Beach, Ewa Marina, and Ewa Villages. The "Central Oahu" major zone includes Development Plan areas Central Oahu, North Shore, and Koolauloa. The "Honolulu" zone consists of the Primary Urban Center, East Honolulu, and Koolaupoko Development Plan areas; the "Waianae" major zone is the Waianae Development Plan area.

Travel demands between zones in each analysis year are shown in the trip tables in the Appendix (Tables A-6 through A-10). Table A-10, the 2005 trip table, is reproduced herein as Table 8.

West of Secondary Urban Center

Between the Secondary Urban Center and Waianae (Screenline 3), travel demands are projected to increase. Farrington Highway, a four-lane divided arterial, provides the only improved ground transportation link into Waianae. The capacity at the boundary is estimated to be 3,200 vehicles per hour (1,600 per lane). Table 9 shows the projected increases; near-capacity conditions are expected during only the afternoon peak hour in year 2005.

Access to activities within the Secondary Urban Center would be by way of interchanges to H-1 and at intersections or interchanges to Farrington Highway. Peak hourly volumes of 1,005 vehicles per hour (vph) in from Waianae and 709 vph out to Waianae are projected for the Secondary Urban Center (Table 8). Single-lane ramps (estimated capacity of 1,200 vph) in the Waianae direction, at existing or proposed interchanges to Campbell Industrial Park and West Beach, will adequately serve these traffic demands.

East of Secondary Urban Center

In the easterly direction from the Secondary Urban Center, traffic volumes are much higher. Traffic demands between the Secondary Urban Center and the Fort Weaver area are expected to increase as both areas develop. The Ewa Town Center master plan shows an "Ewa Parkway" connecting the Town Center to Ewa Villages and Ewa Marina.

Without the Ewa Parkway, travel between the two zones would use H-1 and Fort Weaver Road. The critical location on the existing highway network for these movements is at Kunia Interchange; specifically, the interchange's capacity to serve westbound (Fort Weaver to Secondary Urban Center) traffic is limited to approximately 470 vehicles per hour (one-third of 1,400) by the existing left turn configuration. Based on model predictions, the left turn demand will exceed capacity in 1998.

TABLE 8

YEAR 2005 TRIP TABLE
(Vehicles per hour)

		From					
		Secondary Urban Center	Fort Weaver	Waianae	Central Oahu	Honolulu	TOTAL
AM Peak Hour							
TO:	SUC	6,924	866	1,005	1,971	4,163	14,929
	Fort Weaver	194	2,876	72	323	85	3,550
	Waianae	252	74	4,586	252	124	5,288
	Central Oahu	463	394	336	25,867	3,934	30,994
	Honolulu	900	822	770	6,781	171,406	180,679
	TOTAL	8,733	5,032	6,769	35,194	179,712	235,440
PM Peak Hour							
TO:	SUC	10,748	259	261	547	905	12,720
	Fort Weaver	533	3,410	57	396	696	5,092
	Waianae	709	82	5,097	487	1,777	8,152
	Central Oahu	1,264	373	338	34,666	10,432	47,073
	Honolulu	4,102	428	299	4,382	239,044	248,255
	TOTAL	17,356	4,552	6,052	40,478	252,854	321,292

Table 9
TRAFFIC VOLUMES
Screenline 3 (Kahe)
(Vehicles per hour)

Model projections except as noted:	AM Peak Hour		PM Peak Hour	
Year	East-bound	West-bound	East-bound	West-bound
1985 (field count)	1,287	668	732	1,310
1985	1,292	663	753	1,325
1990	1,435	745	818	1,451
1995	1,682	782	835	2,128
2000	1,921	776	914	2,440
2005	2,183	702	955	3,055*
estimated capacity	3,200	3,200	3,200	3,200

* volume/capacity exceeds 0.85, indicating possible poor level of service

The Ewa Parkway is planned to be ultimately a multilane, divided arterial roadway. Only partial development of the areas served by the parkway, however, is expected by year 2005. The projected traffic demand indicates that a two-lane roadway will be adequate in 2005. Table 10 shows the traffic demand on this corridor.

Traffic across Screenline 2A west of Kunia Road increases in both directions. The peak direction becomes westbound in the morning and eastbound in the evening, as the Ewa Town Center becomes the focus of Leeward Oahu. Capacity across this screenline is estimated to be 5400 vehicles per hour on H-1 (1800 vph per lane) and 1100 vph on Farrington Highway. The traffic volumes, shown in Table 11, indicate that near-capacity conditions would be reached about year 1998 (westbound) and 2003 (eastbound).

The four-lane Fort Weaver Road should adequately serve year 2005 traffic demands. This finding differs form that of previous studies because of the slower rate of development used. The diversion of traffic due to the Secondary Urban Center and the Ewa Parkway also contribute to lower traffic volumes on Fort Weaver Road. Table 12 shows the Fort Weaver Road volumes and capacities, which were estimated to be 2200 vph (1100 vph per lane).

Conditions at the Kunia and Fort Weaver screenlines were also evaluated for the case without the Ewa Parkway. As shown in Table 13, over-capacity conditions are projected to occur at the Kunia screenline in the morning peak hour about year 2000. By year 2005, capacity would be reached by eastbound traffic in the afternoon. Near-capacity conditions would be reached on Fort Weaver Road in the 2005 morning peak hour. This evaluation provides further support for the construction of the Ewa Parkway.

Traffic generated in the Secondary Urban Center traveling to or from the easterly direction is calculated by summing the appropriate cells in Table 8 (2005 Trip Table); this shows peak hour volumes of 6,134 vph entering from the east and 5,366 vph exiting to the east. With Farrington Highway carrying a volume of approximately 900 vph, interchanges on H-1 would need sufficient capacity to handle 5,200 vph on off-ramps and 4,500 vph on on-ramps. At an estimated capacity of 1,200 vph per lane, five off-ramp lanes and four on-ramp lanes would be needed.

Two existing interchanges (Makakilo and Palailai) and the proposed West Beach interchange to Farrington Highway provide three on-ramp and three off-ramp lanes in the easterly direction. The Ewa Town Center master plan shows a new loop off-ramp from H-1 onto the existing Farrington Highway overpass, which provides direct access into the Ewa Town Center.

This evaluation indicates that one additional on-ramp lane and one additional off-ramp lane in the easterly direction will be needed to serve traffic demands of the Secondary Urban Center. Alternatives to providing these lanes include two-lane ramps at Makakilo Interchange or a new interchange near the eastern edge of the Ewa Town Center.

Table 10
TRAFFIC DEMAND
Ewa Parkway
(Vehicles per hour)

Model projections except as noted:	AM Peak Hour		PM Peak Hour	
Year	East-bound	West-bound	East-bound	West-bound
1985	122	180	164	107
1990	132	241	212	126
1995	157	388	296	161
2000	224	702	506	256
2005	266	940	590	341
estimated capacity	500	1,800	1,500	900

Table 11
TRAFFIC VOLUMES
Screenline 2A (Kunia)

Model projections except as noted:	AM Peak Hour		PM Peak Hour	
Year	East-bound	West-bound	East-bound	West-bound
1985 (field count)	2,138	2,139	2,045	2,046
1985	2,208	2,204	1,957	1,957
1990	2,366	3,307	2,550	1,956
1995	2,473	5,177	3,813	2,663
2000	2,395	5,771*	4,735	2,951
2005	2,469	6,510*	6,003*	3,716
estimated capacity	6,500	6,500	6,500	6,500

* volume/capacity exceeds 0.85, indicating possible poor level of service

NOTE: Year 2000 and 2005 volumes for network with Ewa Parkway between Ewa Villages and Ewa Town Center in service.

Table 12
TRAFFIC VOLUMES
Screenline 2B (Fort Weaver Road)
(Vehicles per hour)

Model projections except as noted:	AM Peak Hour		PM Peak Hour	
Year	North-bound	South-bound	North-bound	South-bound
1985 (field count)	1,210	378	727	931
1985	1,191	359	699	904
1990	1,277	405	746	977
1995	1,500	460	838	1,168
2000	1,151	356	740	935
2005	1,216	408	801	1,092
estimated capacity	2,200	2,200	2,200	2,200

NOTE: Year 2000 and 2005 volumes for network with Ewa Parkway between Ewa Villages and Ewa Town Center in service

Table 13
TRAFFIC VOLUMES
(Without Ewa Parkway)
(Vehicles per hour)

Model projections except as noted:	AM Peak Hour		PM Peak Hour	
	East or North-bound	West or South-bound	East or North-bound	West or South-bound
Screenline 2A (Kunia)				
Year 2000	2,579	6,434*	5,178	3,145
Year 2005	2,680	7,393*	6,500*	3,967
estimated capacity	6,500	6,500	6,500	6,500
Screenline 2B (Fort Weaver Road)				
Year 2000	1,765	495	942	1,386
Year 2005	2,028*	546	1,055	1,591
estimated capacity	2,200	2,200	2,200	2,200

* volume/capacity exceeds 0.85, indicating possible poor level of service

East of Waiawa Interchange

Traffic increases at Screenline 1 east of Waiawa Interchange are shown in Table 14. The capacities at this screenline assume five lanes on H-1 (at 1,800 vph per lane), two lanes on Farrington Highway (at 1,100 vph per lane), one lane on Kamehameha Highway in Windward Oahu (at 1,000 vph) and the two outbound on-ramps at Waiawa Interchange (at 1,200 vph each); total capacity in each direction was reduced by 15% to account for uneven distribution of demand among the various highways.

The numbers indicate that near-capacity conditions will occur at about 1990. In the morning peak hour, eastbound traffic headed toward Honolulu is projected to increase at a slow rate, averaging about 0.4 percent per year to 2005. Westbound traffic leaving the Honolulu zone is projected to increase more rapidly at a rate of about 2.5 percent per year. The westbound volume in the morning peak hour, however, would be only 67% of capacity.

Afternoon peak hour volumes across this screenline are projected to increase at an average of 200 vph per year in each direction, with westbound demand exceeding capacity before year 2000. Eastbound traffic would be at near-capacity conditions before 2005.

The traffic projections developed by the model used in this study were compared with projections from other studies. Comparisons with Hali 2000 findings are difficult, since base years and target years used are different and only one common screenline was available. The comparisons, however, are shown in Table 15. Table 16 compares the projections of this study for year 2005 with State Highways Division estimates for year 2008 at Waiawa Interchange.

These comparisons illustrate the potential impact of the Ewa Town Center. The 24,000 jobs in the Secondary Urban Center projected by Campbell Estate's planners are more than twice the number previously considered for all of Ewa. The model used in this study estimates that these jobs will attract many residents of Central and Leeward Oahu who would otherwise commute into Honolulu to work; the employment also attracts traffic from the Honolulu zone (Primary Urban Center, East Honolulu, or Koolaupoko), which is expected to include 71% of Oahu's population.

Table 14
TRAFFIC VOLUMES
Screenline 1 (Waiawa - Kualoa)
(Vehicles per hour)

Model projections except as noted:	AM Peak Hour		PM Peak Hour	
Year	East-bound	West-bound	East-bound	West-bound
1985 (field count)	8,328	4,868	5,466	10,030
1985	8,515	5,054	5,483	10,042
1990	8,841*	5,914	6,000	10,433
1995	8,869*	7,324	7,007	11,622*
2000	9,113*	7,794	8,018	12,750*
2005	9,273*	8,306	9,211*	13,810*
estimated capacity	10,400	12,400	10,400	12,400

* volume/capacity exceeds 0.85, indicating possible poor level of service

TABLE 15
COMPARISON OF PREDICTIONS
(Hali 2000)
(Vehicles per hour)

	AM Peak Hour - Eastbound	
Study:	Hali 2000	Ewa Town Center
Target Year	2000	2005
Base Year	1980	1985
Kahe Point screenline		
Volume (Target Year)	2,200	2,183
% increase in 20 years	+ 57%	+ 69%
Waikele screenline	+ 90%	-
Kunia screenline	-	+ 12%
Kalauao screenline	+ 39%	-
Waiawa screenline	-	+ 9%

Table 16
COMPARISON OF PROJECTIONS
(State Highways Division)
(Vehicles per hour)

(East of Waiawa Interchange)	AM Peak Hour		PM Peak Hour	
Direction (relative to downtown Honolulu)	In	Out	In	Out
Model Results (Year 2005)				
Screenline 1 (Waiawa - Kualoa)	9,273	8,306	9,211	13,810
Estimated at Kualoa	- 500	- 300	- 600	- 800
East of Waiawa	8,773	8,006	8,611	13,010
State TA 85-17 (Year 2008)	12,944	5,223	7,846	11,840
(Model) minus (State)	-4,171	+2,783	+ 765	+1,170
(Model)/(State)	67.8%	153.3%	109.8%	109.9%

CONCLUSIONS AND RECOMMENDATIONS

The proposed Ewa Town Center will affect traffic patterns, not only in Ewa, but elsewhere on Oahu. The traffic model projects increased traffic demands which will exceed highway system capacities at several locations within 20 years. The Ewa Town Center, with the related development in the larger Secondary Urban Center, can be expected to ease the increasing travel demand into Honolulu in the morning peak period.

The model assumed a continuation of existing travel demands and characteristics, altered only by changes in population and employment. The near- and over-capacity conditions which are projected to occur indicate that traffic demands must be reduced or extensive improvements to the highway system will be necessary.

The State's proposed HOV program is a good first step toward reducing traffic demands. By accommodating more persons in each vehicle, the total vehicular demand can be reduced. Increased transit service could also reduce traffic demand, and the magnitude of the proposed Ewa Town Center could provide a basis for an effective transit system.

Recommendations resulting from the evaluation of the traffic projections include:

- Traffic reduction strategies should be pursued immediately. HOV lanes proposed for the highway system can be utilized to mitigate congestion. The Ewa Town Center provides an excellent opportunity to create an employer-based ridesharing program on Oahu.
- Use of contraflow lanes on highway corridors to increase peak hour capacities in existing peak directions should be carefully evaluated, in light of the rapid increase in traffic demands projected to occur in the "off-peak" direction.
- A transportation terminal within the Ewa Town Center should be developed to encourage HOV use and accommodate regional mass transportation needs.
- The Ewa Parkway between the Ewa Town Center and Ewa Villages/Ewa Marina should be constructed by year 2000. A corridor with adequate width to accommodate a six-lane highway, fixed transit, and desired amenities should be reserved. A two-lane highway, however, is expected to adequately serve year 2005 traffic demands.
- A north-south roadway parallel to Fort Weaver Road will not be needed for the development that is projected to occur by 2005.
- The new loop ramp from westbound H-1 directly into the Ewa Town Center should be constructed prior to 1995.
- One additional off-ramp lane from the east and one additional on-ramp to H-1, eastbound should be provided before 2005.

TECHNICAL APPENDIX

TRAFFIC MODEL

TECHNICAL APPENDIX

TRAFFIC MODEL

A traffic model was developed to forecast future travel demand in and around the Ewa Secondary Urban Center (SUC). A simple network was used to represent the regional transportation system with greater detail provided in the Ewa area (Figure A-1). Individual roadways were not modeled, instead arterials which provide similar travel service were collectively represented as a single link wherever possible. For the future, only one modification, a proposed Ewa Parkway between the Ewa Marina/Ewa Villages area and the Ewa SUC, was incorporated into the model. The network reflects the study's purpose of identifying the traffic impacts of the Ewa SUC on a regional basis, rather than addressing individual highway problems.

The island of Oahu was divided into five major zones. The Ewa area was further divided into several subzones for a total of twelve analysis zones, as listed in Table A-1. Population and employment estimates for each of the twelve zones were used to generate traffic volumes. A gravity model was used to distribute the generated volumes. The mathematical portion of the traffic model was performed on an Apple II+ (64k) computer with the aid of Microsoft Corporation's Multiplan spreadsheet program. Peak hour traffic demand for morning (AM) and afternoon (PM) conditions were calculated.

The simple network permitted the manual assigment of traffic volumes. 1985 State Department of Transportation traffic counts were used to calibrate the model at several screenlines. With projections of population and employment, future traffic demands were estimated for the period of 1985-2005 in five-year increments.

Trip Generation

The trip generation model uses population and employment data as input parameters to estimate vehicular demand. Estimates of 1985 population and employment in each of the Ewa area subzones were obtained from The Estate of James Campbell. Future projections to the year 2005 of these Ewa input parameters were developed as part of the on-going planning of the Ewa Town Center.

Island-wide population estimates were developed for the period of 1985-2005 by the State Department of Planning and Economic Development; total island employment for each analysis year was also projected. Further, The City and County of Honolulu's General Plan and Development Plans (DP) include guidelines for population in each DP area.

For the future, the Ewa area estimates show increased employment and decreased population when compared with government estimates. The

differences were accounted for by proportionally adjusting the estimates for the non-Ewa zones while holding the island-wide totals constant. Table A-2 summarizes the input parameters.

Trip generation factors were applied to calculate peak hour vehicle trips into and out of each analysis zone. These factors, in vehicle trips/hour per person or vehicle trips/hour per employee, were based on factors compiled by the Institute of Transportation Engineers (ITE) in the informational report Trip Generation, (Third Edition).

For the Ewa Town Center, trip generation factors for population were based on the ITE rates. Trip factors for employment were derived using Campbell Estate's predictions of floor space and employment for each analysis year. Table A-3 lists this information.

The trip generation model estimates increases in total peak hour vehicle trips on Oahu of approximately 18 percent in year 2005, when compared with year 1985. During this same period, island-wide population is expected to increase 17 percent and employment, 19 percent. These findings illustrate the model's assumption that current travel characteristics are likely to persist. Table A-4 summarizes the population and employment figures used and the projected vehicle-trips for Oahu and for the Ewa Town Center.

Trip Distribution and Assignment

Trip distribution determines the number of trips within and between all zones. In traffic assignment, the designation of trip routes allows the traffic generated by the model to be assigned onto the appropriate links of the network.

Trip distribution relied on the gravity model whose premise is that the number of trips between two zones is directly proportional to the trips produced in the first zone and to the trips attracted in the second zone, and also inversely related by some measure of impedance between the two zones. In equation form, the gravity model is:

$$T_{ij} = P_i \times \frac{A_j/F_{ij}^n}{\Sigma A_j/F_{ij}^n}$$

Where: i and j are zones
T_{ij} = trips from i to j
P_i = trips produced (out of zone i)
A_j = trips attracted (into zone j)
F_{ij} = impedance factor between zones i and j
n = exponent for calibration

Initial estimates of impedance were based on peak hour travel times; however, adjustments made during the calibration process incorporate other factors, such as socio-economic characteristics between zones, into the impedance factors. Figure A-1 shows the impedance

factors used in this study. Internal trips, or trips within a single zone, were assigned an impedance factor equal to the impedance on its access link.

The gravity model equation was used to distribute trip productions from each zone. Adjustments are usually necessary to correct the gravity model results so that total trip attractions to each zone agree with values obtained in trip generation. These adjustments are commonly performed by computer iterations, but computer capacity limited such procedures. Instead, a single adjustment was performed by proportioning the differences at each attraction zone over the production zones. Additional adjustment of trips was necessary in some cases because of negative trip totals; this adjustment was done manually on a proportional basis.

Traffic assignment identified the trip routes on the network between all zones. Since the major arterials serving each zone had been combined into single links, the assignment of traffic volumes onto the network was not difficult to perform manually.

Calibration Process

The mathematical portion of traffic model provides numerical estimates of travel. The calibration process provides a means of correlating the estimated travel with actual traffic conditions.

Several screenlines were selected for the calibration, using locations where key transportation issues related to the Ewa Town Center could be expected. Screenline 1 is located kokohead of Waiawa Interchange, where H-1 and H-2 meet. The screenline also includes Kamehameha Highway in Windward Oahu, near Kualoa. Screenline 2 is the east boundary of the Ewa area. It includes "2A" across H-1 and Farrington Highway west of Kunia Road and "2B" across Fort Weaver Road south of Farrington Highway. Screenline 3 is the west boundary of Ewa, across Farrington Highway near Kahe Point. Traffic volumes on Makakilo Drive near H-1 were also used (Screenline M).

Traffic counts taken in 1985 by the State Department of Transportation across each screenline were summed by direction. The model was programmed to compute corresponding volumes based on the trip assignments from the distribution so that the counted and estimated volumes could be compared.

The main objective of the calibration was to achieve volumes from the model within five percent of the counted traffic. The calibration involved adjusting trip generation factors in eleven analysis zones (all except Ewa Town Center), the impedance factors, and the impedance exponent. The trip generation factors for 1985 from the calibration were used for future years with only minor adjustments (to balance total attractions and productions on Oahu). The impedance factors from the calibration were used for future years; impedance factors for the proposed highway links (Ewa Parkway) were based on the factors used in the existing highway network. Impedance exponents used are: 2.0 for the AM Peak Hour and 2.3 for the PM Peak Hour.

Comparisons of predicted and counted volumes for 1985 are shown in Table A-5. In all cases, the model predicted 1985 traffic within five percent of the counted volumes.

Future Projections

The calibrated model was used to estimate future trip demands at five-year increments to year 2005. The model network with the Ewa Parkway was used for years 2000 and 2005. Trip tables were prepared using the major zones to facilitate use of the information. Table A-6 shows the 1985 trip table and Tables A-7 through A-10 show the future trip tables.

Table A-1
ZONE SYSTEM

Major Zone	Analysis Zone
Secondary Urban Center	West Beach Honokai Hale Campbell Industrial Park/Harbor Ewa Town Center Makakilo NAS Barbers Point
Fort Weaver	Ewa Villages Ewa Marina Ewa Beach
Waianae	Waianae DP area
Central Oahu	Central Oahu/North Shore/Koolauloa DP areas
Honolulu	Primary Urban Center/East Honolulu/Koolaupoko DP areas

Table A-3
TRIP GENERATION FACTORS
Ewa Town Center

Independent Variable	Vehicle Trip Ends AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
Population	0.07	0.17	0.20	0.13
Employment				
Year 1990	0.45	0.18	0.46	0.74
1995	0.57	0.14	0.32	0.67
2000	0.43	0.11	0.28	0.55
2005	0.42	0.12	0.32	0.57

Table A-2
MODEL INPUT

Year:	1985	1990	1995	2000	2005	Source
Population						
Secondary Urban Center	13,905	16,120	21,067	27,691	34,474	(1)
Ewa Beach, Marina, Villages	17,500	18,219	21,226	24,786	28,346	(1)
Waianae	33,952	35,538	37,177	39,104	40,266	(3)
Central Oahu*	144,375	153,139	159,946	167,568	173,250	(3)
Honolulu**	605,568	636,284	657,484	666,551	678,164	(3)
Total	815,300	859,300	869,900	925,700	954,500	(2)
Employment						
Secondary Urban Center	3,600	6,500	11,600	17,800	24,000	(1)
Ewa Beach, Marina, Villages	800	800	900	1,000	1,200	(1)
Waianae	2,812	2,862	2,897	2,927	2,952	(3)
Central Oahu*	37,750	39,251	40,538	41,722	42,838	(3)
Honolulu**	360,786	375,739	388,622	400,514	411,736	(3)
Total	405,748	425,153	444,558	463,963	482,726	(2)

* includes Central Oahu, North Shore, and Koolauloa DP areas
** includes Primary Urban Center, East Honolulu, and Koolaupoko DP areas

Sources:
(1) Campbell Estate
(2) City and County of Honolulu, Department of General Planning (Development Plans)
(3) Interpolated using (1) and (2); (employment figures for 1990 and 1995 do not add up due to roundoff errors).

Table A-4

TRIP GENERATION MODEL

Year	Input: Population	Input: Employment	Output: Total Vehicle-Trips AM Peak Hour		Output: Total Vehicle-Trips PM Peak Hour	
Island of Oahu						
1985	815,300	405,748	200,000		271,600	
1990	859,300	425,153	210,500		285,500	
1995	896,900	444,558	219,700		298,700	
2000	925,700	463,963	227,600		309,600	
2005	954,500	482,726	235,400		321,300	
Ewa Town Center			In	Out	In	Out
1995	0	0	0	0	0	0
1990	265	700	334	171	375	552
1995	2,459	2,000	1,312	698	1,132	1,660
2000	5,684	6,000	2,978	1,626	2,817	4,039
2005	8,909	11,000	5,244	2,835	5,302	7,428

Table A-5

1985 TRAFFIC VOLUMES
(Vehicles per hour)

	Field Count	Model Prediction	Difference
AM Peak Hour			
Screenline 1 (Waiawa/Kualoa)			
Eastbound	8,328	8,515	+2.2%
Westbound	4,868	5,054	+3.8%
Screenline 2 (Kunia)			
A) H-1 & Farrington Hwy - Eastbound	2,138	2,208	+3.3%
Westbound	2,139	2,204	+3.0%
B) Fort Weaver Road - Northbound	1,210	1,191	-1.6%
Southbound	378	359	-5.0%
Screenline 3 (Kahe)			
Eastbound	1,287	1,292	+0.4%
Westbound	668	663	-0.7%
Makakilo Drive (north of H-1)			
Southbound	1,039	1,045	+0.6%
Northbound	219	225	+2.7%
PM Peak Hour			
Screenline 1 (Waiawa/Kualoa)			
Eastbound	5,466	5,483	+0.3%
Westbound	10,030	10,042	+0.1%
Screenline 2 (Kunia)			
A) H-1 & Farrington Hwy - Eastbound	2,045	1,957	-4.3%
Westbound	2,046	1,957	-4.3%
B) Fort Weaver Road - Northbound	727	699	-3.9%
Southbound	931	904	-2.9%
Screenline 3 (Kahe)			
Eastbound	732	753	-2.9%
Westbound	1,310	1,325	-1.1%
Makakilo Drive (north of H-1)			
Southbound	421	440	+4.5%
Northbound	916	937	+2.3%

TABLE A-6

YEAR 1985 TRIP TABLE
(Vehicles per hour)

		From: Secondary Urban Center	Fort Weaver	Waianae	Central Oahu	Honolulu	TOTAL
AM Peak Hour							
TO:	SUC	1,298	121	209	463	1,140	3,231
	Fort Weaver	79	1,978	43	205	32	2,337
	Waianae	183	59	4,190	243	178	4,853
	Central Oahu	301	303	295	22,047	3,704	26,650
	Honolulu	745	708	745	6,317	154,455	162,970
	TOTAL	2,606	3,169	5,482	29,275	159,509	200,041
PM Peak Hour							
TO:	SUC	2,225	65	121	258	554	3,223
	Fort Weaver	123	2,244	41	258	482	3,148
	Waianae	245	42	4,529	275	763	5,854
	Central Oahu	472	267	302	30,393	8,243	39,677
	Honolulu	730	325	289	4,139	214,203	219,686
	TOTAL	3,795	2,943	5,282	35,323	224,245	271,588

TABLE A-7

YEAR 1990 TRIP TABLE
(Vehicles per hour)

		From: Secondary Urban Center	Fort Weaver	Waianae	Central Oahu	Honolulu	TOTAL
Am Peak Hour							
TO:	SUC	1,911	180	338	733	1,860	5,022
	Fort Weaver	87	1,995	45	216	57	2,400
	Waianae	211	61	4,274	258	215	5,019
	Central Oahu	346	313	302	23,209	3,782	27,952
	Honolulu	836	723	750	6,532	161,220	170,061
	TOTAL	3,391	3,272	5,709	30,948	167,134	210,454
PM Peak Hour							
TO:	SUC	3,409	82	161	309	486	4,447
	Fort Weaver	171	2,292	41	266	499	3,269
	Waianae	372	44	4,666	280	755	6,117
	Central Oahu	684	280	315	31,886	8,693	41,858
	Honolulu	1,038	340	301	4,321	223,857	229,857
	TOTAL	5,674	3,038	5,484	37,062	234,290	285,548

TABLE A-8

YEAR 1995 TRIP TABLE
(Vehicles per hour)

		From: Secondary Urban Center	Fort Weaver	Waianae	Central Oahu	Honolulu	TOTAL
Am Peak Hour							
TO:	SUC	3,261	322	585	1,218	3,087	8,473
	Fort Weaver	106	2,271	51	243	60	2,731
	Waianae	232	66	4,365	263	221	5,147
	Central Oahu	395	348	314	23,999	3,956	29,012
	Honolulu	875	764	732	6,498	165,431	174,300
	TOTAL	4,869	3,771	6,047	32,221	172,755	219,663
PM Peak Hour							
TO:	SUC	5,295	106	182	348	639	6,570
	Fort Weaver	251	2,640	45	306	566	3,808
	Waianae	558	55	4,849	362	1,153	6,977
	Central Oahu	935	311	318	32,916	9,264	43,744
	Honolulu	1,974	366	290	4,377	230,615	237,622
	TOTAL	9,013	3,478	5,684	38,309	242,237	298,721

TABLE A-9

YEAR 2000 TRIP TABLE
(Vehicles per hour)

		From: Secondary Urban Center	Fort Weaver	Waianae	Central Oahu	Honolulu	TOTAL
AM Peak Hour							
TO:	SUC	4,953	630	794	1,614	3,701	11,692
	Fort Weaver	163	2,529	61	283	73	3,109
	Waianae	248	72	4,518	266	190	5,294
	Central Oahu	429	366	320	25,149	3,830	30,094
	Honolulu	900	785	746	6,682	168,257	177,370
	TOTAL	6,693	4,382	6,439	33,994	176,051	227,559
PM Peak Hour							
TO:	SUC	7,735	190	222	427	780	9,354
	Fort Weaver	453	2,994	53	342	593	4,435
	Waianae	630	66	4,997	400	1,344	7,437
	Central Oahu	1,121	344	337	33,779	10,033	45,614
	Honolulu	2,975	396	302	4,345	234,775	242,793
	TOTAL	12,914	3,990	5,911	39,293	247,525	309,633

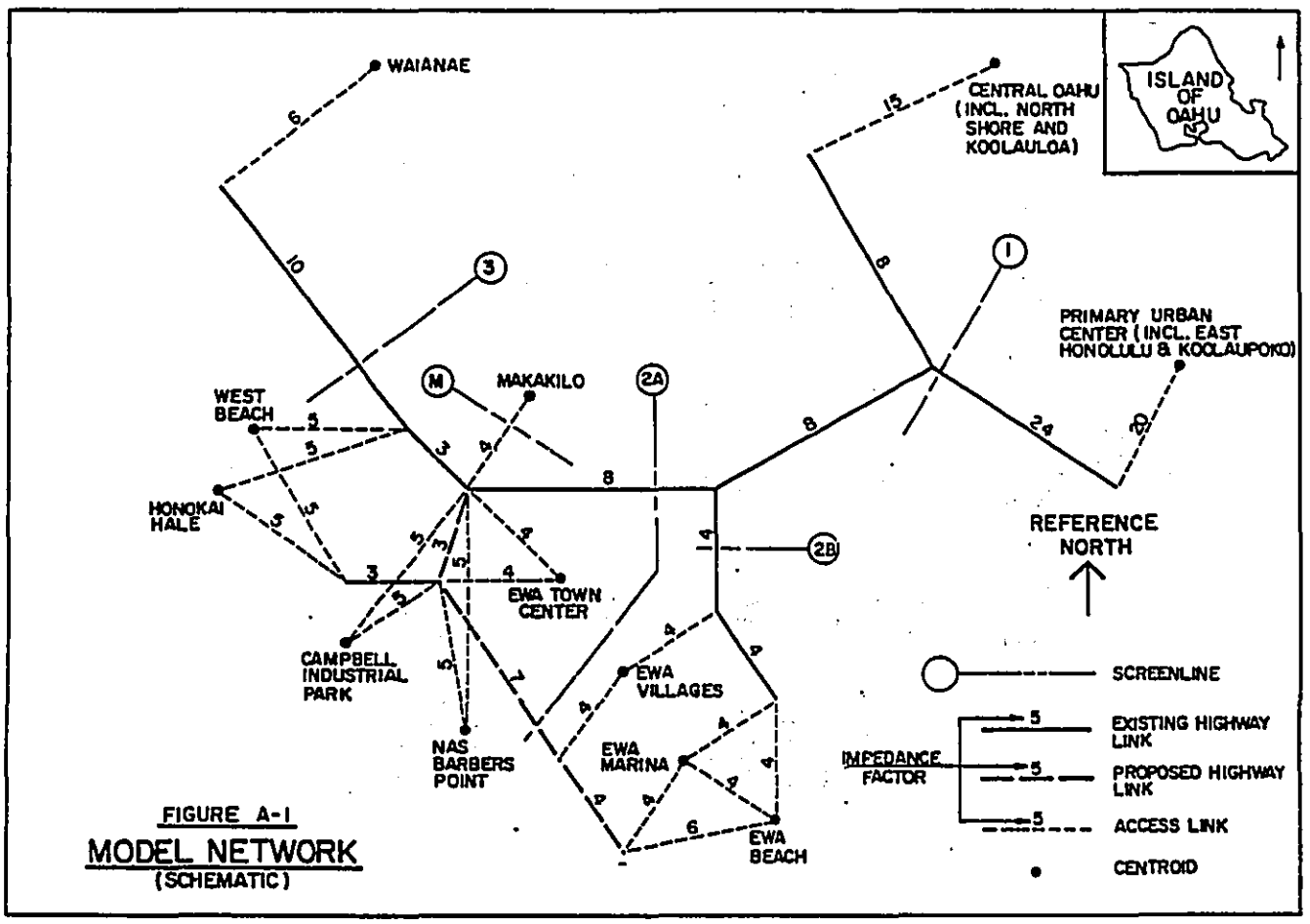


FIGURE A-1

MODEL NETWORK

(SCHEMATIC)

TABLE A-10

YEAR 2005 TRIP TABLE
(Vehicles per hour)

		From					
		Secondary Urban Center	Fort Weaver	Waianae	Central Oahu	Honolulu	TOTAL
AM Peak Hour							
TO:	SUC	6,924	866	1,005	1,971	4,163	14,929
	Fort Weaver	194	2,876	72	323	85	3,550
	Waianae	252	74	4,586	252	124	5,288
	Central Oahu	463	394	336	25,867	3,934	30,994
	Honolulu	900	822	770	6,781	171,406	180,679
	TOTAL	8,733	5,032	6,769	35,194	179,712	235,440
PM Peak Hour							
TO:	SUC	10,748	259	261	547	905	12,720
	Fort Weaver	533	3,410	57	396	696	5,092
	Waianae	709	82	5,097	487	1,777	8,152
	Central Oahu	1,264	373	338	34,666	10,432	47,073
	Honolulu	4,102	428	299	4,382	239,044	248,255
	TOTAL	17,356	4,552	6,052	40,478	252,854	321,292

Kapolei Town Center
Transportation Issues, 1985-2005

Engineering Concepts, Inc. and Pacific
Planning and Engineering, Inc. October 1987.

KAPOLEI TOWN CENTER

TRANSPORTATION ISSUES, 1985-2005

Prepared for:

The Estate of James Campbell
Honolulu, Hawaii

Prepared by:

Engineering Concepts, Inc. and
Pacific Planning and Engineering, Inc.
Honolulu, Hawaii

September 1987

TABLE OF CONTENTS

		Page
INTRODUCTION		1
EMPLOYMENT AND POPULATION		3
TRAVEL FORECASTS FOR YEAR 2005		9
	Corridor Screenlines	10
	Screenline Comparisons - 1985 and 2005 Traffic Volumes	12
	Screenline Directional Comparisons	14
DISCUSSION OF KAPOLEI TRANSPORTATION ISSUES		17
	Assessing the Study Forecast Results	17
	Other Major Oahu Transportation Issues	18
	The Use of the Automobile	18
	Roads and Driving Conditions	19
	Positive Effect of Locating Jobs Outside of PUC	19
APPENDIX A	CONTEMPLATED IMPROVEMENTS BY STATE AND COUNTY GOVERNMENTS	
TABLE 1	Comparison of DGP 2005 and HALI 2000 Oahu Population and Employment	4
TABLE 2	Kapolei Town Center Employment Comparisons with the Leventhal Report	7
TABLE 3	Morning and Afternoon Peak Hour Volume Ratios	13
TABLE 4	Morning Peak Hour Volume Ratio	15
TABLE 5	Afternoon Peak Hour Volume Ratio	16
FIGURE 1	Development Plan Areas	5
FIGURE 2	Screenline Locations	11

INTRODUCTION

The Estate of James Campbell is developing the 643-acre Kapolei Town Center located within the Secondary Urban Center. The Secondary Urban Center includes the Kapolei Town Center, the Ko Olina Resort, The James Campbell Industrial Park and Deep Draft Harbor, and the adjacent residential communities of Makakilo and the proposed Kapolei Village.

The Kapolei Town Center will provide areas for a shopping center, office and commercial buildings, governmental and municipal services, parks and schools, and single- and multi-family housing. Campbell Estate's projection indicates year 2005 employment levels of between 12,000 and 19,000 persons and dwelling units of 3,000 to 5,000.

This report describes a study of transportation issues for Kapolei Town Center (hereinafter referred to as the "Issues Study"), including vehicle forecasts for year 2005.

The data used for this study are based on the most recent version of the year 2005 land use by the City and County of Honolulu Department of General Planning (DGP). The year 2005 population and employment data are currently being evaluated by the Oahu Metropolitan Planning Organization (OMPO). The long-range transportation plan will be updated using the current available information and is expected to be completed in late 1988. The OMPO study (HALI 2005) is a major effort because it studies travel for the entire island of Oahu, broken down to 190 zones.

In contrast, this study is focused on the vehicle characteristics of the corridor between Kapolei and Honolulu. It describes present transportation conditions and discusses future transportation needs and plans.

A previous study entitled "Traffic Impact Study, Ewa Town Center," was completed in September 1986 by Parsons, Brinckerhoff, Quade and Douglas, Inc. It primarily studied the internal traffic conditions in Ewa for the present and the future. The corridor analysis between Kapolei and Honolulu was based on the information obtained from the 1980 OMPO study entitled HALI 2000.

EMPLOYMENT AND POPULATION

The employment and population distributions for the eight development plan areas (DPA) for the year 2005 supplied by the City's DGP are markedly different from the HALI 2000 land use for the DPAs. Table 1 shows the values, and Figure 1 shows the DPA boundaries.

These conclusions can be obtained from a review of the employment and population data:

1. DGP 2005: Primary Urban Center (PUC) is 68 and 50 percent of Oahu employment and population respectively.

2. HALI 2000: PUC is 81 and 50 percent respectively.

The zones used for travel forecasting in this study follow the DPA with minor exceptions. For example, the Pearl City and Aiea areas, which are included in the PUC DPA, are taken out as a separate zone. All zonal employment and population values are based on DPA values and Oahu totals.

By year 2005, Honolulu (including East Honolulu) and the Windward zones grow only 10.3 percent in population and 11.8 percent in employment over 1985 values. Meanwhile, Central Oahu, Pearl City, and Waipahu areas grow approximately 15.6 percent in population and 96.9 percent in employment, which is almost double that of today's employment. These areas will be greater trip attractions and the attraction will increase faster than that of Honolulu. They will tend to intercept Ewa trips more significantly than they now do.

For the Development Plan Areas, DGP predicts Central Oahu will grow 15 percent in population and 114 percent in jobs, comparing 1985 and 2005 figures. The combined growth for Ewa and Waianae

TABLE 1

COMPARISON OF DGP 2005 AND HALI 2000 OAHU POPULATION AND EMPLOYMENT

DGP 2005

DPA[1]	Employment	Percent of Oahu	Population	Percent of Oahu	Persons/ Job
1	323,538	68	476,750	50	1.47
2	28,119	6	77,484	8	2.76
3	62,625	13	145,264	15	2.32
4	10,354	2	60,681	6	5.86
5	28,692	6	125,414	13	4.37
6	7,376	2	13,483	1	1.83
7	4,988	1	16,387	2	3.29
8	9,443	2	39,035	4	4.13
Total Oahu	475,135	100	954,498	100	2.01

HALI 2000

DPA	Employment	Percent of Oahu	Population	Percent of Oahu	Persons/ Job
1	377,312	81	462,550	50	1.23
2	11,301	2	72,483	8	6.41
3	34,850	8	127,281	14	3.65
4	6,104	1	58,182	6	9.53
5	23,845	5	125,171	14	5.25
6	4,290	1	13,181	1	3.07
7	3,285	1	15,710	2	4.78
8	2,976	1	42,603	5	14.32
Total Oahu	463,963	100	917,161	100	1.98

[1] Development Plan Areas:
1 = Primary Urban Center
2 = Ewa
3 = Central Oahu
4 = East Honolulu
5 = Koolaupoko
6 = Koolauloa
7 = North Shore
8 = Waianae

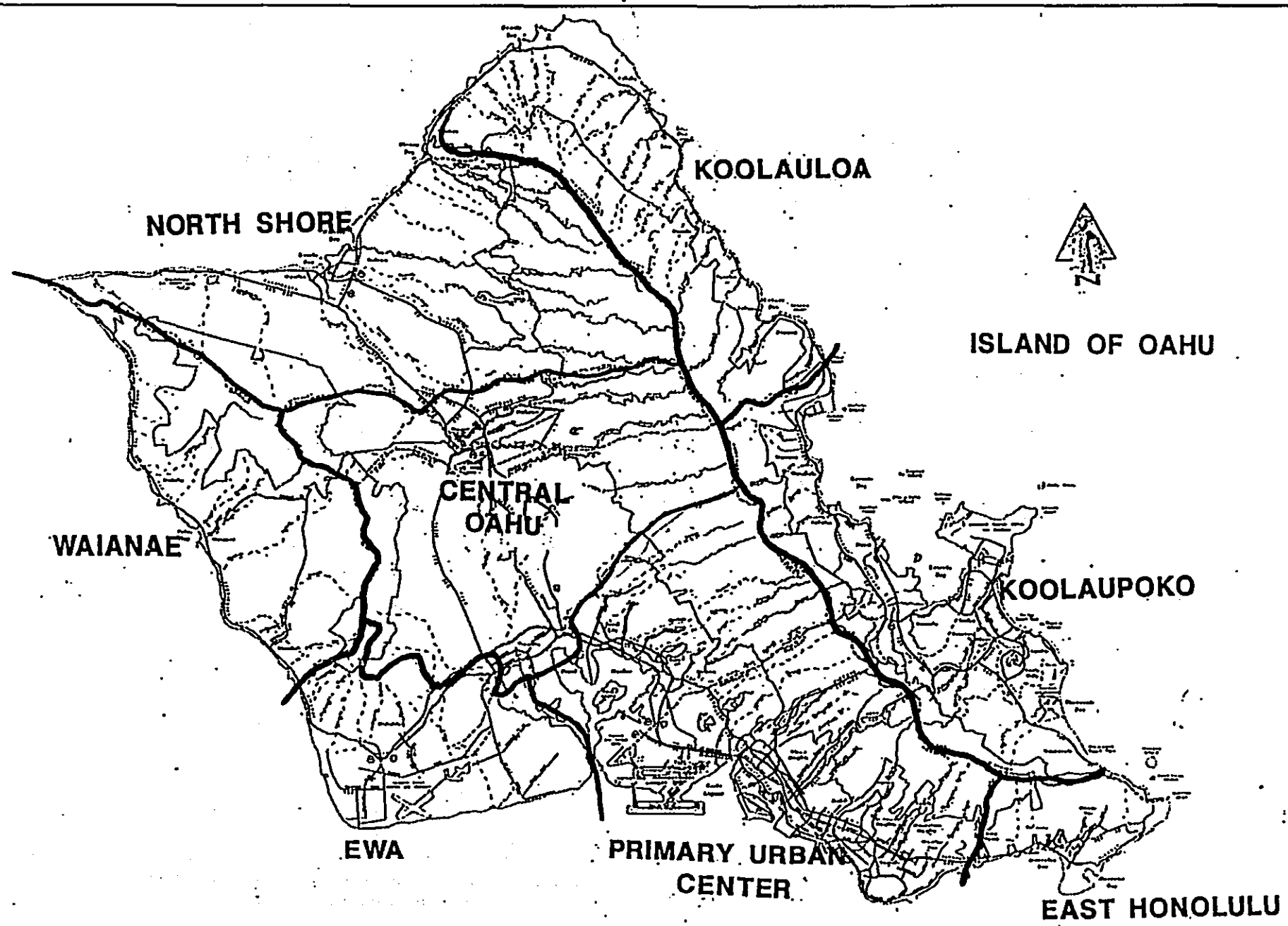

KOOLAULOA
NORTH SHORE
ISLAND OF OAHU
CENTRAL OAHU
WAIANAE
KOOLAUPOKO
EWA
PRIMARY URBAN CENTER
EAST HONOLULU

FIGURE 1

is 539 percent in population and 310 percent in jobs. The PUC's effect in attracting new peak hour trips should be vastly different from that of today's experience. This does not mean that traffic volumes will be lower or will not increase. Daily trips will increase, and vehicle trips should be expected to increase during off-peak hours for shopping, social-recreation, school, or other purposes.

The PUC has about 82 percent of Oahu's jobs at this time, changing to 68 percent under DGP's 2005 locations. The 14 percent drop in job share during the year 2005 represents a significant policy statement about the development of future Oahu and has a major effect on the vehicle trips forecasted. In addition, the reduction of job percentage has a double effect since the decrease in the PUC's percentage is a gain in the outlying areas.

The jobs in the Honolulu Zone (which includes East Honolulu) will grow by 15.7 percent, or 50,460, without Kapolei, compared to 38,072 with Kapolei. Population grows by 10.3 percent, or 56,234 persons. Thus, growth in vehicle trips can be expected to grow with or without Kapolei. However, the growth in employment in the outlying areas are of such magnitude that the increase in the Honolulu Zone's attractiveness would be much less than today.

The 9,791 jobs for Kapolei Town Center is based on the DGP 2005 Ewa Development Plan Area value of 28,119 jobs. Employment estimates for all other areas in Ewa for 2005 were obtained from a report by Kenneth Leventhal & Co. Table 2 indicates that the derived value is between the mid and upper range of Leventhal's estimate. The study shifted all 9,791 jobs in Kapolei to the PUC under the "without Kapolei" scenario.

Based on the DGP 2005, population for Kapolei Town Center is 15,600. The population of Kapolei Town for evaluating "with and without Kapolei" remains the same in both scenarios.

TABLE 2

KAPOLEI TOWN CENTER EMPLOYMENT

COMPARISONS WITH THE LEVENTHAL REPORT

	YEAR				
	1985	1990	1995	2000	2005
Issues Study	0	660	2,217	5,396	9,791
Leventhal					
Low Range	0	0	1,265	3,495	5,783
Mid Range	0	265	2,459	5,684	8,909
High Range	0	866	5,025	9,355	13,685

Thus, the assignment of jobs and population for "without Kapolei" tends to increase commuter traffic.

Persons per job ratio indicates the exporting of trips outside of the zone, particularly in the morning peak periods when work trips tend to dominate trip-making characteristics. This measure can be distorted when car ownership, income levels, and age distribution values of a zone are vastly different than the norm. The effect of the work trip in the afternoon is less dominant since the afternoon peak hour has more trip purposes and more persons making trips.

For Oahu, the 1985 persons per job ratio was 2.22 and is predicted by DGP to decrease to 2.01 by year 2005. Every DPA area ratio decreases, meaning there will be more jobs closer to home on an islandwide basis over the next twenty years. Future vehicle trips in the travel corridors during the peak hours should show slower growth than has been experienced in the past. For example, based on DOT vehicle counts near the Kaonohi Overpass, daily vehicle trips in both directions on the H-1 in Pearl City have increased over 40 percent in the last decade.

The persons per job ratio for the PUC basically remains the same. For the Leeward area, the decreases through 2005 will be significant. Ewa's year 2005 ratio of 2.76 is 39 percent of that in 1985. In Waianae, the rate of 4.13 is only 29 percent of that in 1985. As an already low trip generating area, outbound trips should not be expected to increase.

TRAVEL FORECASTS FOR YEAR 2005

Two Oahu scenarios were studied; one scenario is with Kapolei Town Center and the other without Kapolei. The difference between the two is removing the 9,791 jobs from Kapolei and shifting them to the Primary Urban Center (PUC).

If one looks at the corridor traffic at various points, forecasts can be compared to ground counts to "validate" the model of estimating future trips. Traffic predictions for different years vary by the population and employment distributions for those given years. The following results are based on the DGP forecast of year 2005 population, employment, and land use distributions for the Oahu Metropolitan Planning Organization's long-range travel forecasting for Oahu.

DGP 2005 values are currently being used for OMPO's update to their long-range transportation plan of twenty years, called HALI 2005. This distribution of values is different than those used in the 1986 traffic study contained in the Kapolei Environmental Impact Assessment Report (EIAR). That study used DGP 2000 values. Thus, results and conclusions of the two studies are not comparable.

Population and employment values are used to estimate future vehicle trips during the morning and afternoon peak hours in the Issues Study. The trips during the peak hours represent not only work trips but also other types of trip purposes as well. In a sense, the distribution of population and employment represents relative attractiveness of an area to do business, shopping, social, recreational, educational, or countless other activities.

Forecasting by trip purpose is done for OMPO's long-range transportation plans, which require many man-hours of data gathering, checking, coding, programming, verifying forecasts, and running programs on main-frame computers. The method of the study

reported herein (Issues Study) is a variation of the "quick-response" forecasting technique documented in various transportation planning literature.

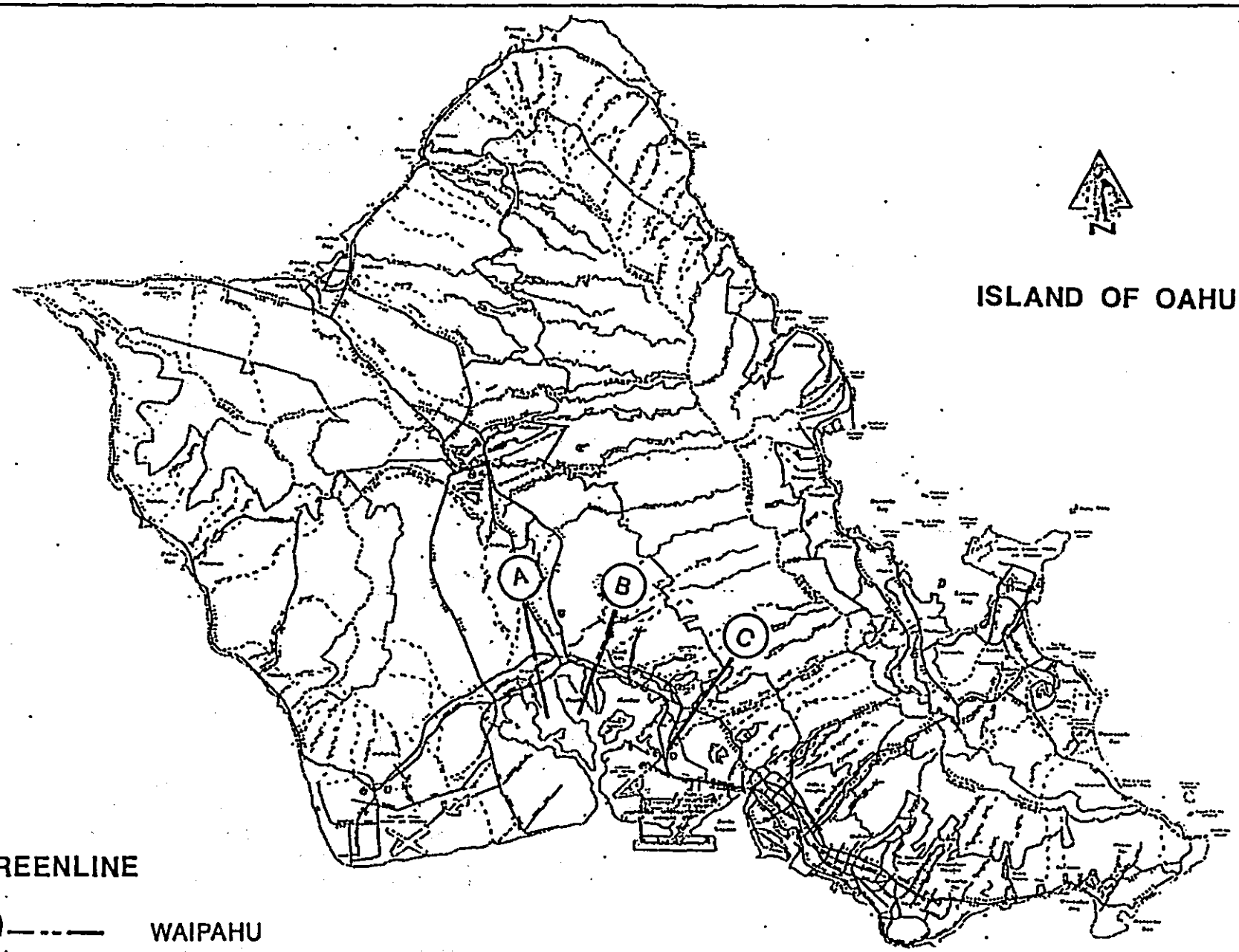
An effort was made to utilize established or recognized data or methods of the Oahu planning process. For example, OMPO data such as the "F-Factors" were utilized in applying the gravity model in distributing the trips to a 15-zone network. OMPO's own planning algorithms are also based on the gravity model. The most recent data for highway and transit improvements were evaluated for inclusion in the zone network.

Various checks were made for reasonableness of the results. For example, generated peak hour islandwide trips were examined and compared with HALI 2000 information. Total trips used when compared to population and employment are conservative; i.e., the ratios used in the "Issues" study are higher than documented values of vehicle trips for Oahu, which would result in greater trips.

Corridor Screenlines

Various screenlines were evaluated. Screenlines represent corridor vehicle volumes in the east-west direction during the morning and afternoon peak hours between Ewa and the PUC. The screenlines are described below. See the Island of Oahu Map, Figure 2, for screenline locations.

1. Screenline A is located in Waipahu, west of Waiawa Interchange, for east-west vehicular traffic flow crossing Waikane Stream. The State Department of Transportation (DOT) traffic count stations are--
   a. Located along H-1 freeway at Waikele Stream Bridge;
   b. Located along Waipahu Street at Waikele Stream; and



SCREENLINE

A — WAIPAHU

B — PEARL CITY

C — HALAWA

FIGURE 2

c. Located along Farrington Highway at Waikele Bridge.

2. Screenline B is located in Pearl City, east of Waiawa Interchange, for east-west vehicular traffic flow along the Waimano Home Road, running north to south. The State DOT traffic count stations are--
   a. Located on the H-1 freeway at Waimano Stream Bridge;
   b. Located at the intersection of Kamehameha Highway and Lehua Avenue-Waimano Home Road; and
   c. Located at the intersection of Waimano Home Road and Moanalua Road.

3. Screenline C is located in Halawa, east of the Aloha Stadium, for east-west vehicular traffic flow crossing Halawa Stream. The State DOT traffic count stations are--
   a. Located along Moanalua Freeway at Halawa Bridge;
   b. Located along H-1 freeway, 1.0 miles southwest of the Aiea on-ramp near the Pearl Harbor Interchange;
   c. Located at the intersection of Salt Lake Boulevard and Kahuapaani Street; and
   d. Located at the intersection of Kamehameha Highway and Salt Lake Boulevard.

Screenline Comparisons--1985 and 2005 Traffic Volumes

Results of comparing 1985 counts at the screenlines with year 2005 forecast volumes are given in Table 3 (the ratios are directly comparable).

Results indicate that the inbound flow in the morning peak would increase in either case. With Kapolei, the volumes would increase less than the volumes without Kapolei. The percent

TABLE 3

MORNING AND AFTERNOON PEAK HOUR GROWTH RATIOS

(2005 volume/1985 volume)

Direction[1]/Scenario	Screenline A	Screenline B	Screenline C
Morning Peak Hour			
Inbound - With Kapolei	1.61	1.08	1.04
Inbound - Without Kapolei	1.73	1.16	1.12
Outbound - With Kapolei	1.85	2.00	1.68
Outbound - Without Kapolei	1.56	1.81	1.55
Afternoon Peak Hour			
Inbound - With Kapolei	1.99	1.90	1.62
Inbound - Without Kapolei	1.64	1.72	1.43
Outbound - With Kapolei	1.57	1.18	1.11
Outbound - Without Kapolei	1.70	1.25	1.22

[1] Inbound to PUC; outbound from PUC.

difference between the two scenarios would be on the order of 8 to 12 percent.

In the outbound direction in the morning peak hours, the percent increase "with Kapolei" is greater than "without Kapolei." This condition would mean that the opposite roadway would be better utilized. With Kapolei, traffic in this "off peak" or Ewa-bound direction would be 13 to 29 percent greater than without Kapolei. The 29 percent value for traffic west of the Waiawa Interchange is a result of the growth in jobs and population in Central Oahu, Waipahu, and Pearl City/Aiea.

For the afternoon peak hours and with Kapolei, volumes outbound from the PUC are 7 to 13 percent less than without Kapolei. Volumes are projected to increase 11 to 70 percent for both scenarios. The largest difference occurs again at the screenline west of the Waiawa Interchange.

The inbound direction to the PUC is the usual off-peak direction at these screenlines during the afternoon. The volume with Kapolei would be 18 to 35 percent greater in this direction than without Kapolei. Again, greater use is indicated for the off-peak lanes and less use in the peak direction lanes with Kapolei.

Screenline Directional Comparisons

The use of existing facilities is imbalanced, as indicated in Table 4. It presents ratios of 1985 counts and the study forecasts for corridor volumes at Screenlines A, B, and C. The ratios shown indicate increasingly balanced use (a value equal to one in 2005).

TABLE 4

MORNING PEAK HOUR VOLUME RATIO
(Inbound/Outbound)

Year/Scenario	Screenline A	Screenline B	Screenline C
1985	1.37	2.21	2.51
2005/With Kapolei	1.19	1.19	1.56
2005/Without Kapolei	1.51	1.42	1.82

The results indicate the significance of the DGP 2005 distribution's effect on vehicle travel. The difference between with and without Kapolei is on the order of 8 to 12 percent in the morning peak hour inbound direction. The effect of the DGP distribution on travel can be seen when comparing the decrease of almost 70 percent in the imbalance of flow at Screenline C. (This represents flow between the PUC and Aiea and areas west.) Thus, the decentralized employment distribution has a major impact on year 2005 vehicle volumes in the morning peak hour.

Another point is at Screenline A, where, in 2005 with Kapolei, imbalance is less than 1985; without Kapolei it is greater than 1985. At this point, the effect of Kapolei Town Center is greatest and prior to the interchange trips of Central Oahu, Waipahu, and Pearl City/Aiea with the PUC.

The directional ratios for the afternoon peak hour are given in Table 5.

TABLE 5

AFTERNOON PEAK HOUR VOLUME RATIO
(Outbound from PUC/Inbound to PUC)

Year/Scenario	Screenline A	Screenline B	Screenline C
1985	1.15	1.84	2.00
2005/With Kapolei	0.91	1.14	1.37
2005/Without Kapolei	1.19	1.33	1.70

The imbalance is greater in the afternoon peak hour than it is in the morning as a result of trips other than work trips. The results indicate that, with Kapolei, the directional ratio at Screenline A will be less than one. The implication is that Kapolei Town Center and its surroundings will act as an urban center with more vehicle traffic in its outbound direction than the inbound.

As in the morning peak hour, the case of without Kapolei has ratios less than those at present, with still lesser ratios for the with Kapolei scenario. Thus, the forecast results for year 2005 indicate that, with Kapolei, there will be greater use of the off-peak direction lanes than without Kapolei in both the morning and afternoon peak hours.

DISCUSSION OF KAPOLEI TRANSPORTATION ISSUES

The focus of the Transportation Issues Study is to discuss what might happen along with relevant facts, data, and study results. This discussion presents a perspective on various present and future transportation issues or concerns.

Assessing the Study Forecast Results

A summary of findings is given below.

1. The results of the forecast analysis indicate that Kapolei Town Center will result in slower traffic growth in the Leeward to PUC corridor during both the morning and afternoon rush hours.

2. Better use of the roads would result because higher volumes would use the lanes in both directions during the rush hours with Kapolei.

3. DGP's year 2005 land use forecast for employment is heavily decentralized and would result in slower growth in corridor traffic by predicting jobs closer to outlying areas.

4. Rapid transit by year 2005 will not go beyond Leeward Community College, and the auto use should be expected to continue to be the overwhelming mode for commuter trips in the Leeward area.

5. Traffic will grow because population will increase. However, the results indicate that job locations have a significant effect on how that traffic will increase to the year 2005.

Readers will likely evaluate the Issues Study results based on their own experiences of highway driving. However, land use distributions predicted by DGP 2005 are markedly different from what Oahu has experienced. Thus, past driving experience is not a complete base of reference. General expectations of traffic to and from the PUC and Ewa cannot be drawn from past actual driving experiences.

The PUC in 2005 will have 14 percent less job share than in 1985. This condition should be viewed as a major factor when discussing future travel and should be considered carefully when discussing how traffic patterns might change in the future.

Other Major Oahu Transportation Issues

The Issues Study focuses solely on Kapolei Town Center transportation issues. The study does not specifically assess such issues as trans-Koolau travel and mass transit within the PUC. These facilities are part of the OMPO long-range facility plan, which is used in this study.

The current rapid transit study by the City is considering terminals from Leeward Community College to Kapiolani at Atkinson Boulevard. Mass transit trips are not forecasted in this study. However, the effect of the rapid transit system is taken into account in the vehicle forecasts by lower trip generation rates for the year 2005.

The Use of the Automobile

Based on statistics, Oahu's population has increased roughly 1.5 percent per year over the last decade. Motor vehicle registrations have increased nearly 3.8 percent per year over that same period. Car usage dominates Oahu travel, and such indicators as car registration or ownership shows our growing reliance on this mode of transportation.

Roads and Driving Conditions

The arrival of statehood ushered in a period of high economic growth and construction activities in the state, and particularly on Oahu. Much of our major highways have been built or rebuilt in the past 30 years. As with all major urban areas, our major facilities have reached capacity levels during peak hours in a short period of time.

Future highway works, except for an unfinished 10-mile segment of H-3, will be principally to improve existing systems. The improvements are undertaken to increase safety and capacity at selected locations on Oahu. See Appendix A for contemplated improvements by the State and the City and County of Honolulu.

Today, the commuters from the Leeward and Central areas to Honolulu face traffic congestion at Pearl City, Middle Street, and off ramps into town. Since the roads in place today will most likely be the roads available for use in the next 20 to 30 years, even the contemplated improvements would not significantly increase corridor capacity.

Positive Effect of Locating Jobs Outside of PUC

The issue of traffic conditions is as varied and complex as there are drivers, roadways, and intersections. Most problems have unique characteristics; for example, by direction of travel, time of day, safety concerns, and number of cars.

Upon discussing traffic volumes twenty years in the future, one must understand that where people live, work, play, shop, etc. determines the how, when, and where people use their cars. If these generating factors are adjusted, then traffic will also be adjusted.

Honolulu has grown rapidly over the last twenty years. The center of population has moved westward and today it is near Halawa. Besides the central business district, other major employment and traffic generating centers are the University of Hawaii and Waikiki on the east side of the central business district. If the residential growth takes place outside of the Honolulu district while new jobs are created in Honolulu between Middle Street and Kapahulu Avenue, increasing congestion would occur throughout all corridors leading into Honolulu.

Creating activity centers in the outlying areas such as planned by the Kapolei Town Center will lessen the future growth in traffic between the Leeward area and points from Middle Street to Kapahulu Avenue.

How much traffic volumes are affected depends on the significance of the action. Improving ramps, using express buses, implementing a computer controlled signal system, etc. are cost-effective actions for the short-term that are needed. They are expensive projects, but they do not have any substantive impact when considering various 20-year growth scenarios. The magnitude of the changes required to address Oahu's major traffic congestion requires much more public monies and land.

However, adding highway lanes alone has not proven to be the answer. Growth in travel has outstripped our willingness and financial ability to fund capacity improvements.

If traffic congestion in 2005 is to be addressed, our travel patterns must be changed. One method of changing the current practice is to create jobs outside of PUC. DGP 2005 job distribution is one such action. Kapolei Town Center is job decentralization, and this study shows that jobs in Kapolei will have the effect of slowing down traffic growth between the Leeward area and downtown Honolulu.

APPENDIX A

CONTEMPLATED IMPROVEMENTS BY STATE AND COUNTY GOVERNMENTS

	Est Cost ($000)	Est Compl (Year)
I. Corridor: Primary Urban Center (PUC), Waiawa to Ainakoa Avenue		
A. H-1 Interstate Highway (DOT)		
1. Widen to 10 lanes with HOV lanes (Waiawa IC to Halawa IC)	7,150	1988
2. Widen to 12 lanes by adding additional lane in each direction (Waiau IC to Halawa IC)	14,000	1995
3. Reconstruct interchange at Middle Street	34,200	1998
4. Reconstruct interchange at University Avenue	14,000	1995
B. Makai Boulevard (DOT)		
1. Construct 2-lane HOV elevated viaduct above Nimitz Highway (Keehi IC to Pacific St)	16,500	--
C. Nimitz Highway (DOT)		
1. Construct intersection improvements (Middle St to Waiakamilo St)	5,700	1992
D. Pali Highway (DOT)		
1. Construct 2 additional lanes (Waokanaka St to Country Club Road)	3,000	1989

DOT = State of Hawaii Department of Transportation
DTS = City and County of Honolulu Department of Transportation Services

	Est Cost ($000)	Est Compl (Year)
E. Puuloa Road (DOT)		
1. Widen to 4 lanes (Salt Lake Blvd to Nimitz Hwy)	7,000	--
F. Sand Island Access Road (DOT)		
1. Widen to 4 lanes (Auiki St to container yard)	36,000	1995
2. Widen to 6 lanes (Auiki St to Nimitz Hwy)		
3. Construct interchange at Nimitz Highway		
G. Mass Transit (DTS)		
1. Construct mass transit	--	--
H. Moanalua Road (DTS)		
1. Widen from 2 to 4 lanes Pali Homi St to Aiea IC)	--	--
I. Alakea Street (DTS)		
1. Widen from 4 to 5 lanes (King St to Queen St)	--	--
J. McCully Street (DTS)		
1. Widen from 4 to 5 lanes (King St to Kapiolani Blvd)	--	--
K. Puuhale Road (DTS)		
1. Widen from 2 to 4 lanes (Nimitz Hwy to Dillingham Blvd)	--	--
L. Vineyard Boulevard (DTS)		
1. Provide double left turn lanes at Punchbowl Street and other intersections	--	--
M. Ward Avenue (DTS)		
1. Widen from 4 to 5 lanes (Kinau St to Beretania St)	--	1990

	Est Cost ($000)	Est Compl (Year)
II. Corridor: Ewa-Waianae		
A. H-1 (DOT)		
1. Widen by 1 additional HOV lane (Palailai IC to Kunia IC)	10,500	1987
B. Fort Weaver Road		
1. Widen from 2 to 4 lanes (Renton Rd to Hanakahi St)	4,133	1987
2. Widen from 2 to 4 lanes (Hanakahi St to Ewa Beach Rd)	15,000	1991
C. Farrington Highway (DTS)		
1. Widen from 2 to 4 lanes (Kalaeloa Ave to Fort Weaver Road)	--	--
III. Corridor: Central Oahu-North Shore		
A. H-1 (DOT)		
1. Continue HOV lanes (Kunia IC to Waiawa IC). Convert existing lane (2.4 miles) to HOV inbound (Kunia side). Construct new lane (1.2 miles) to meet with H-2 (Waiawa side)	1,600	1989
2. Construct new interchange at Paiwa Street	4,000	1991
B. H-2 (DOT)		
1. Construct new interchange at Mililani Cemetery Road	8,200	1990
2. Construct 1 HOV lane in each direction (Waiawa IC to Mililani Town)	6,000	1990
C. Kamehameha Highway (DOT)		
1. Widen to 4 lanes (Waiawa IC to Mililani Cemetery Road)	8,200	--

	Est Cost ($000)	Est Compl (Year)
2. Construct 1 additional lane in each direction (Mililani Cemetery Road to Mililani Town)	48,000	--
3. Widen to 4 lanes (Mililani to Haleiwa)	31,000	--
D. Kunia Road (DOT)		
1. Widen to 4 lanes (Schofield to Waipahu)	20,000	--
E. Waipahu Street (DTS)		
1. Widen to 4 lanes (Kunia Rd to Kamehameha Hwy)	--	--
IV. Corridor: East Honolulu		
A. Kalanianaole Highway (DOT)		
1. Construct 2 reversible HOV lanes (Aina Koa Ave to Keahole). Construct bus pulloffs. Construct left turn lanes at major intersections. Synchronize traffic signals	92,000	1995
2. Widen to 3 lanes (Lunalilo Home Rd to Hanauma Bay turnoff road)	2,000	--
V. Corridor: Trans Koolau-Koolauloa-Koolaupoko		
A. H-3 (DOT)		
1. Construct 4 lane divided highway (Halawa IC to Kaneohe Marine Corps Sta)	816,040	1998
B. Kahekili Highway (DOT)		
1. Widen to 6 lanes (Likelike Hwy to Haiku Rd). Widen to 4 lanes (Haiku Rd to Kamehameha Hwy). Construct interchange at Likelike	42,000	--

	Est Cost ($000)	Est Compl (Year)
C. Kalanianaole Highway (DOT)		
1. Widen to 4 lanes (Saddle City to Waimanalo Beach Park)	10,500	--
2. Widen to 6 lanes (Castle Jet to Kailua Jet)	6,000	--
D. Kaneohe Bay Drive (DOT)		
1. Widen to 4 lanes (Kamehameha Hwy to Hokapu Blvd)	8,700	--
E. Likelike Highway (DOT)		
1. Widen to 6 lanes (H-3 to Kahekili Hwy)	Included in V.B.1 cost above	--
2. Construct new interchange at Kamehameha Highway	7,000	--
3. Widen to 6 lanes (Kahekili Hwy to Kaneohe Bay Drive)	1,500	--
F. Pali Highway (DOT)		
1. Construct interchange at Castle Jet	9,000	--
2. Construct interchange at Kailua Jet	7,000	--
3. Implement reversible HOV lanes (feasibility study underway)	--	--
VI. City of Honolulu Computerized Traffic Signal System (Middle St to Kalanianaole Hwy). Structure to house computerized equipment to monitor (using TV camera and screen) and control traffic signals along state and city and county streets and highways (between Middle St and portions of Kalanianaole Hwy in East Honolulu corridor)	700	1988

Kapolei/Ewa
Major Roadways Evaluation

Engineering Concepts, Inc. and Pacific
Planning and Engineering, Inc. November 1987.

KAPOLEI/EWA

MAJOR ROADWAYS EVALUATION

Prepared for:

The Estate of James Campbell
Honolulu, Hawaii

Prepared by:

Engineering Concepts, Inc.
and
Pacific Planning & Engineering, Inc.

November 1987

CONTENTS

	Page
INTRODUCTION	1
SUMMARY	1
ROADWAY NEEDS ANALYSIS	3
FINDINGS AND CONCLUSIONS	5
Findings	5
Conclusion	6
TECHNICAL INFORMATION	6
TABLE 1 AFTERNOON PEAK HOUR TRAFFIC SOUTHBOUND TO EAST EWA	4
FIGURE 1	2

INTRODUCTION

This memo addresses road needs between Kapolei Town Center and East Ewa to the year 2005. It basically reviews the need for two roadways--the east-west and the north-south roads. The general location and alignment of both roadways are shown on Figure 1. The existing major roadways are Interstate H-1, Farrington Highway, and Fort Weaver Road.

SUMMARY

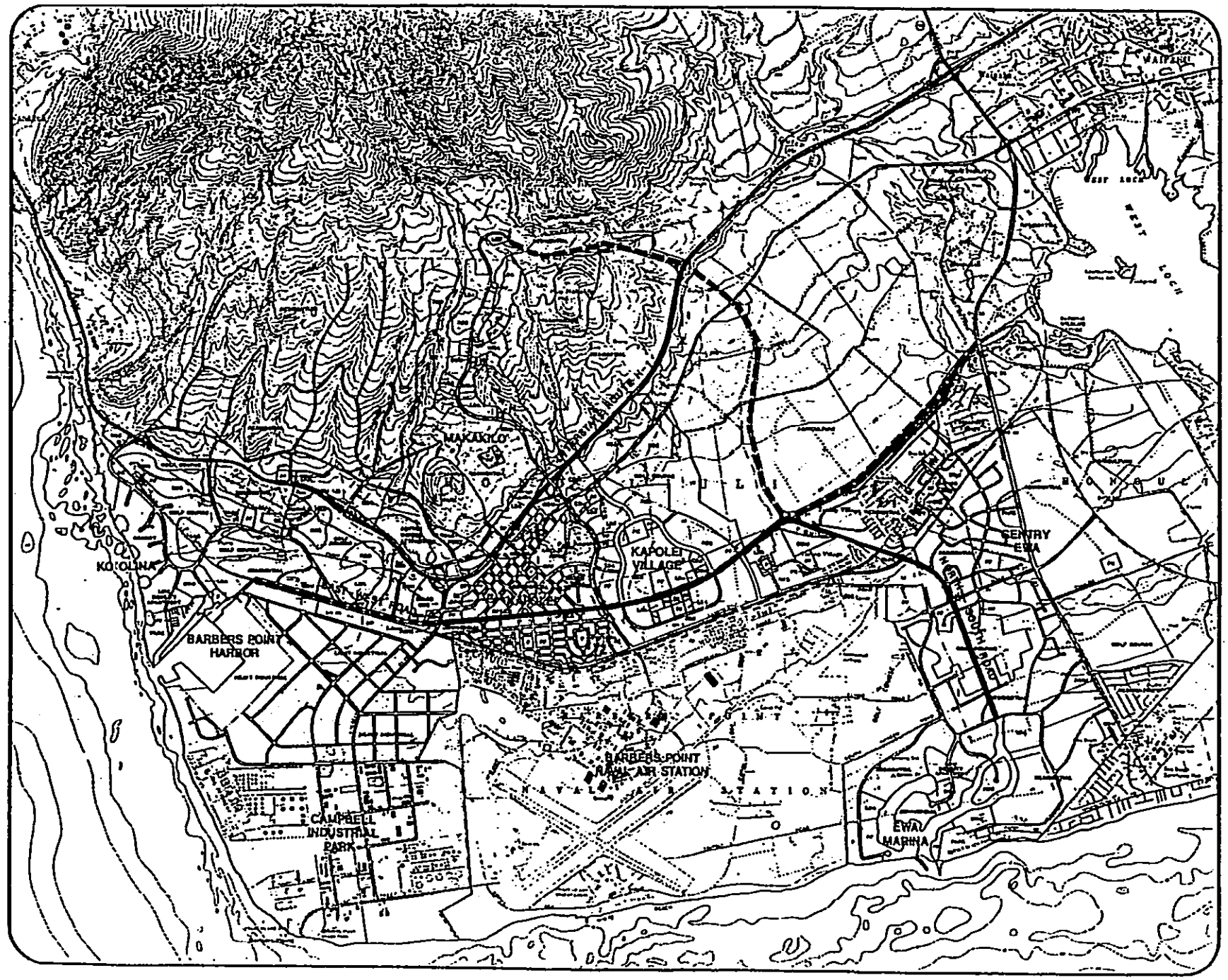
- Vehicular traffic between East Ewa and Makakilo, Kapolei, Waianae, etc. uses Fort Weaver Road, H-1, and Farrington Highway.

- With time, traffic will grow between East Ewa and Kapolei and between East Ewa and Honolulu.

- Because of traffic increase, Fort Weaver Road will be congested. The H-1 will have periods of congestion at interchanges with Fort Weaver Road, Makakilo, and Kalaeloa Boulevard.

- If direct routes consisting of the east-west and the north-south roads are constructed, traffic will be removed from Fort Weaver Road, the H-1, and Farrington Highway. This will decrease congestion on these roads.

- The east-west and north-south road extensions to Fort Weaver Road and the H-1 respectively are not required to the year 2005.



EWA
LONG RANGE
MASTER PLAN

THE ESTATE OF
JAMES CAMPBELL

LEGEND:

NEW ROADS BY YEAR 2005

FUTURE ROADS BEYOND YEAR 2005

FEET
0 1000 3000

FIGURE 1

- The four through lanes of Fort Weaver Road will have congestion at times but would be adequate to the year 2005. Since there is now a right-of-way for a third lane in each direction, the decision to add lanes can be made beyond year 2005 without major difficulty.

- If the trend of development continues beyond year 2005, a second lane in each direction for the east-west and north-south roads will be required.

- Based on a water need analysis, there is sufficient land capacity for a total population/housing that will require six through lanes for the east-west and north-south roads.

ROADWAY NEEDS ANALYSIS

Fort Weaver Road will soon be a divided four-lane highway with speed limits ranging from 35 to 45 miles per hour. The State Department of Transportation (DOT) is now improving the highway. It basically serves Ewa Village, the proposed Ewa Marina, and the Ewa Beach area.

Based on this study and on traffic forecasts and analyses conducted for the West Loch Estates for the City and County of Honolulu, the capacity value used is 2,400 vehicles per hour (vph) for Fort Weaver Road at the intersections of Renton and West Loch Estates roadways. This capacity is based on maximum or saturation flow, four-lane highway, left turn pockets, and an approximate 65 percent green phase for traffic heading straight on Fort Weaver Road. If traffic approaches or exceeds this value, congestion will result during the peak period.

Table 1 contains the study forecasts for traffic heading toward East Ewa in the afternoon peak hour. The model's result of 1,670 vph is greater than the closest comparable DOT road count of 1,300 vph. The reason is the area's population and uses do not generate vehicle trips as the average Oahu area, which is used in the model. However, the types of housing units planned for the East Ewa area would result in more average trip generating characteristics. A check was made with traffic forecasts for the City's "West Loch Estates Study," and future traffic along Fort Weaver Road was similar to the model results. Thus, the model results are deemed to represent future traffic demand for the East Ewa area.

TABLE 1

AFTERNOON PEAK HOUR TRAFFIC

SOUTHBOUND TO EAST EWA

	Year				
Origin	1985	1990	1995	2000	2005
From West:	270	460	550	800	970
From East:	1,400	1,700	2,000	2,150	2,200

Rather than placing East Ewa bound traffic on the H-1/Farrington Highway couplet and then south on a north-south road link, the east-west road can take the traffic more directly south via the southern half of the north-south road. This roadway will serve the greater demands to and from the west more directly than a round about way to a congested H-1/Farrington Highway. Moreover, the east-west road will serve as a collector-distributor function in the Kapolei Town area.

FINDINGS AND CONCLUSIONS

Findings

- Fort Weaver Road will be over capacity by year 1995 if no additional lanes are constructed. However, its capacity is sufficient to handle the afternoon peak hour traffic from areas east of intersections with H-1 and Farrington Highway to the year 2005.

- Partial links of the east-west and north-south roads, shown as solid lines on Figure 1, can provide the capacity to handle traffic from the west destined to East Ewa, easing the congestion on Fort Weaver Road from H-1 south to Ewa Beach. The roadways should be implemented prior to 1995 to alleviate Fort Weaver Road congestion. The alignment would encourage interchange between the Town Center and East Ewa. It would also provide a more direct path instead of the round about route along H-1. The specific points of termination for the new roadways are partially dependent on where and how soon new development and connector roads will be located.

- The east-west road link will alleviate demand on Farrington Highway or H-1 between the Makakilo and Fort Weaver interchanges. If development occurs to the extent assumed by 1995, the east-west road could be handling as much as 550 vehicles during the afternoon peak hour destined for East Ewa. It would additionally serve access needs for the developing Town Center and Kapolei Village.

- Based on the DGP 2005 values, six through lanes for Fort Weaver Road would be adequate to handle forecast traffic demand during the afternoon peak hour. Adding a third lane in each direction to Fort Weaver Road does not mean the new roads are not required. Without them, Kapolei access needs would not be fully served and added congestion would occur along H-1 and/or Farrington Highway.

- Other links of the east-west and the north-south roads connecting directly with H-1 or Fort Weaver Road, shown as dashed lines on Figure 1, are not necessary if the above mentioned capacity improvements are made. Beyond 2005, future development and resultant traffic may warrant implementation of these links.

Conclusion

Construct the links of the east-west and the north-south roads, shown as solid lines on Figure 1, prior to 1995, with concurrent development of the Kapolei Town Center and Village region.

The sections below provide the general discussion of the study and bases for the findings.

TECHNICAL INFORMATION

The question of whether a highway is built usually involves a time period of ten or more years. Financing, planning, design, and construction requirements can result in two decades or more, regardless of when the facility is actually needed.

How do we determine when a highway is needed? From a traffic engineer's standpoint, the answer is when the existing roadways need additional lanes or improvements to carry the vehicular traffic. This occurs when the traffic is said to exceed the roadway "capacity." Capacity is a measure of the maximum traffic a road or an intersection can handle per hour.

At some future time, traffic will grow to an extent that major congestion results. The particular year depends on the growth of population, employment, and other factors. Traffic forecasts are made based on such factors to determine when or under what conditions highway improvements are required. On Oahu, the Oahu Metropolitan Planning Organization is responsible for the programming of such improvements for Oahu highways and transit.

This memo and results are based on the results of traffic forecasting based on the DGP 2005 land use and population distribution for Oahu. Forecasts were made for five-year intervals starting with 1985. Sources of the population and employment figures are DGP 2005, DPED statistics, and the Leventhal Study for Kapolei Town Center. Population and employment figures for the interim years (1990, 1995, 2000) are mainly interpolations between 1985 and 2005 values. Vehicular trip forecasts were made for each of those years in the Ewa area and the rest of Oahu.

The findings of this memo are based on the following data:

1. The major development areas covered in this discussion are--

   a. Second Urban Center (Kapolei Village and Ewa Town Center)

   b. Campbell Industrial Park

   c. Ko Olina Resort

   d. Gentry-Ewa Village

   e. Ewa Marina-Ewa Beach

   f. Makakilo

2. The existing roadways serving the major development areas are--

   a. East-west roads

      1) H-1 freeway (six-lane divided highway without traffic signals)
      2) Farrington Highway (two-lane divided highway with traffic signals)

   b. North-south roads

      1) Fort Weaver Road (four-lane divided highway with traffic signals)
      2) Kalaeloa Boulevard (four-lane divided highway without traffic signals)
      3) Barbers Point Access Road-Fort Barrette Road (six-lane, four-lane, and two-lane undivided highway with traffic signals)

3. The major job centers included in the roadway analyses are--

   a. Kapolei Town Center
   b. Barbers Point NAS
   c. Campbell Industrial Park
   d. Ko Olina Resort

4. The major new roadways planned within the development areas are--

   a. East-west road

      1) Phase I - Between Kalaeloa Boulevard and the intersection with the north-south road in the vicinity of Kaloi Gulch
      2) Phase II - Between the north-south road and Fort Weaver Road

   b. North-south road

      1) Phase I - Between east-west road and Ewa Marina
      2) Phase II - Between east-west road and H-1 freeway

5. Capacity of existing roadways based on Level of Service (LOS) "D"

   a. H-1 freeway - 5,450 vehicles per hour (vph) in each direction

   b. Farrington Highway - 1,250 vph in each direction

   c. Fort Weaver Road - 2,400 vph in each direction

   d. Kalaeloa Boulevard - 2,850 vph in each direction

   e. Barbers Point Access Road is the same as Fort Barrette Road

      1) Six lanes - 3,200 vph in each direction
      2) Four lanes - 2,400 vph in each direction
      3) Two lanes - 1,150 vph in each direction

6. Capacity of new roadways based on LOS "D"

   a. East-west road (two lanes undivided) - 1,250 vph in each direction

   b. North-south road (two lanes undivided) - 1,250 vph in each direction

7. Afternoon peak hour forecasts for year 2005 with Kapolei for existing roadways (refer to Figure 1)

   a. H-1 freeway

      1) Inbound (to Honolulu) - 4,600 vph
      2) Outbound (to Waianae) - 4,000 vph

   b. Farrington Highway

      1) Inbound (to Honolulu) - 1,010 vph
      2) Outbound (to Waianae) - 880 vph

c. Fort Weaver Road

1) Inbound (to H-1 freeway) - 1,330 vph
2) Outbound (to East Ewa) - 2,270 vph

d. Kalaeloa Boulevard

1) Inbound (to H-1 freeway) - 2,420 vph
2) Outbound (to Campbell Industrial Park) - 2,100 vph

e. Barbers Point Access Road-Fort Barrette Road

1) Inbound (to H-1 freeway) - 1,700 vph
2) Outbound (to Barbers Point NAS) - 1,050 vph

8. Afternoon peak hour 2005 forecasts for new roadways

a. East-west road (Phase I)

1) Inbound (to Kapolei) - 380 vph
2) Outbound (to East Ewa) - 900 vph

b. North-south road (Phase I)

1) Inbound (to Kapolei) - 380 vph
2) Outbound (to East Ewa) - 900 vph

APPENDIX K

Noise Impact Study for the Proposed Kapolei Town Center

Prepared for The Estate of James Campbell.

Design Engineering, Inc.
March 1987

THE PROPOSED KAPOLEI TOWN CENTER

PROJECT OF THE ESTATE OF

JAMES CAMPBELL

EWA, HAWAII

MARCH 6, 1987

Submitted to

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K-1

TABLE OF CONTENT

PAGE

1. OBJECTIVE 1

2. INTRODUCTION - DISCRIPTION OF SITE 1

3. SUMMARY OF FINDINGS 1

4. NOISE MEASUREMENT 2

5. SOURCES OF NOISE 3
   Roadway Traffic 3
   Aircraft Traffic 4
   Quarry 4
   Others 4

6. EFFECT OF NOISE 4

7. NOISE CRITERIA 5

8. EVALUATION OF ACCEPTABILITY
   OF SITE FOR RESIDENTIAL USE 7
   Traffic Noise 7
   Aircraft Noise 9

9. NOISE IMPACT OF AIRCRAFT FLY-BY NOISE 11

10. FUTURE NOISE
   Traffic Noise 12
   Aircraft Noise 12

11. SUMMARY AND RECOMMENDATIONS 13

12. TABLES:
   1 - Hourly Equivalent Noise Level - STATIONS 1 -5 . 15
   2 - Hourly Equivalent Noise Level - STATIONS 6 - 9 . 16
   3 - Aircraft FLY-BY Noise Level 17
   4 - Traffic Count - 1986 18
   5 - Station 1 - 10 minute Equivalent Noise Level . . 19
   6 - Station 2 - 10 minute Equivalent Noise Level . . 20
   7 - Station 3 - 10 minute Equivalent Noise Level . . 21
   8 - Station 4 - 10 minute Equivalent Noise Level . . 22
   9 - Station 5 - 10 minute Equivalent Noise Level . . 23
   10- Station 6 - 10 minute Equivalent Noise Level . . 24
   11- Station 7 - 10 minute Equivalent Noise Level . . 25
   12- Station 8 - 10 minute Equivalent Noise Level . . 26
   13- Station 9 - 10 minute Equivalent Noise Level . . 27
   14- LDN NOISE LEVEL ALONG ROADWAYS 28
   15- Hourly Equivalent Noise Level of Aircrafts . . . 29

The analysis of aircraft fly-by noise indicates that few, if any, complaints on day-time (7 AM to 10 PM) fly-by noise are expected from future residents of the development site. Also night-time (10 PM to 7 AM) complaints are not expected because the fly-bys, if any, are few and far between.

NOISE MEASUREMENTS:

Noise measurements were taken over a 24 hour period, at nine locations from 7 AM to 7 AM of the following day. The noise measurement stations are shown on figure 7.

Station 1 - 400' North of Waimanalo Road at Kaloi Gulch.

2 - Approximately 1280' North of Waimanalo Road and 3400' west of station (1).

3 - 400' East of Barber Point Road and 550' south of Waimanalo Road.

4 - 590' South of Farrington Highway and approximately 1850' east of Barbers Point Road.

5 - 1150' South of Farrington Highway an approximately 5150' east of Barbers Point Road.

6 - Approximately 1950' West of Barbers Point Road, and 590' south of Farrington Highway.

7 - 200' east of Kalaeloa Blvd. and 100' south of Waimanalo Road.

8 - Approximately 1550' west of Barbers Point Road and 1700' south of Waimanalo Road.

9 - Approximately 1650' west of Kalaeloa Blvd. and 10' north of pump 10 Road.

The noise measurement stations were selected to obtain data which would best represent the combined noise of aircraft, ground traffic and other activities on the ground.

Short period noise readings were also taken at other locations with a hand held meter to obtain data on aircraft fly-by noise and average ambient noise. Table 3 and figures 4, 5 and 6 show typical overhead fly-by noise levels of military and commercial aircraft.

The noise level at any location was sampled 4 times per second and their average was recorded every second over a 24 hour period.

To get some idea on the variation of noise with time, the recorded 1 second data was converted to equivalent noise level every 10 minute and every hour. The results are shown in tables 5 to 13 and tables 1 and 2.

Tables 5 through 13 show the equivalent noise level every 10 minutes. The hourly equivalent noise levels are shown in tables 2 and 3. The day-time (7 AM to 10 PM) equivalent noise level LD, the night-time (10 PM to 7 AM) equivalent noise level LN, and the day-night equivalent noise level LDN for each station are shown on the bottom of tables 1 and 2.

Figures 2 and 3 are visual representations of the hourly noise variation at stations 7 and 8.

SOURCES OF NOISE:

The existing contributors of noise to the development site are traffic on roadways, aircraft, quarry operation, aircraft maintenance facilities at Barbers Point Naval Air Station, and industrial activities at Campbell Industrial Park.

The major contributors of noise in descending order, are traffic noise on roadways, quarry noise, and aircraft fly-by noise.

ROADWAY TRAFFIC:

Roadway traffic is the major contributor of noise to the development area. According to the State Department of Transportation, the average daily traffic (ADT) in 1986 on the roadways in the subject area were as follows:

1) H-1 Freeway - 21,008 vehicles.
2) Barbers Point Road - 10,043 vehicles.
3) Kalaeloa Boulevard - 7666 vehicles.
4) Farrington Highway -

A) 5522 vehicles between Barbers Point Road and Waipahu.
B) 7067 vehicles between Barbers Point Road and Kalaeloa.

The hourly traffic counts for the roadways above are shown in table 4. Visual representations of hourly traffic on roadways are shown in figures 8 through 11.

It is easy to see, from figures 8 through 11, that the traffic and the associated noise increases rapidly from 6 AM to a morning peak between 7 AM and 8 AM, and drops rapidly to a relatively steady volume by 10 AM.

CORRECTION

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

THE PROPOSED KAPOLEI TOWN CENTER

PROJECT OF THE ESTATE OF

JAMES CAMPBELL

EWA, HAWAII

MARCH 6, 1987

Submitted to

THE ESTATE OF JAMES CAMPBELL

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K-1

TABLE OF CONTENT

PAGE

1. OBJECTIVE 1
2. INTRODUCTION - DISCRIPTION OF SITE 1
3. SUMMARY OF FINDINGS 1
4. NOISE MEASUREMENT 2
5. SOURCES OF NOISE 3
   Roadway Traffic 3
   Aircraft Traffic 4
   Quarry 4
   Others 4
6. EFFECT OF NOISE 4
7. NOISE CRITERIA 5
8. EVALUATION OF ACCEPTABILITY
   OF SITE FOR RESIDENTIAL USE 7
   Traffic Noise 7
   Aircraft Noise 9
9. NOISE IMPACT OF AIRCRAFT FLY-BY NOISE 11
10. FUTURE NOISE
   Traffic Noise 12
   Aircraft Noise 12
11. SUMMARY AND RECOMMENDATIONS 13
12. TABLES:
   1 - Hourly Equivalent Noise Level - STATIONS 1 -5 . 15
   2 - Hourly Equivalent Noise Level - STATIONS 6 - 9 . 16
   3 - Aircraft FLY-BY Noise Level 17
   4 - Traffic Count - 1986 18
   5 - Station 1 - 10 minute Equivalent Noise Level . . 19
   6 - Station 2 - 10 minute Equivalent Noise Level . . 20
   7 - Station 3 - 10 minute Equivalent Noise Level . . 21
   8 - Station 4 - 10 minute Equivalent Noise Level . . 22
   9 - Station 5 - 10 minute Equivalent Noise Level . . 23
   10- Station 6 - 10 minute Equivalent Noise Level . . 24
   11- Station 7 - 10 minute Equivalent Noise Level . . 25
   12- Station 8 - 10 minute Equivalent Noise Level . . 26
   13- Station 9 - 10 minute Equivalent Noise Level . . 27
   14- LDN NOISE LEVEL ALONG ROADWAYS 28
   15- Hourly Equivalent Noise Level of Aircrafts . . . 29

13. FIGURES:

1 - Plot Plan of Site 30
2 - Hourly Equivalent Noise Level @ Station 7 . . . 31
3 - Hourly Equivalent Noise Level @ Station 8 . . . 32
4 - Overhead Fly-By Noise - C-130 33
5 - Overhead Fly-By Noise - P-3 34
6 - Overhead Fly-By Noise - Commercial 35
7 - Existing Day-Night (LDN) Contour 41
8 - Traffic Count - Kalaeloa Blvd. 36
9 - Traffic Count - Barbers Point Road 37
10- Traffic Count - Farrington Hwy. (A) 38
11- Traffic Count - Farrington Hwy. (B) 39
12- Hourly Fly-By Noise vs # Flights/Hr 40

K-2

NOISE IMPACT STUDY
OF
THE PROPOSED KAPOLEI TOWN CENTER PROJECT
OF THE ESTATE OF JAMES CAMPBELL

February 26, 1987

OBJECTIVE:

This study was undertaken:

1. To determine the existing vehicular traffic and aircraft noise levels at the proposed Ewa District Urban Center and housing site of the Estate of James Campbell.

2. To evaluate the impact of the vehicular traffic and aircraft noise on future residents of the proposed housing project, and

3. To recommend measures to reduce noise levels where necessary, to normally acceptable levels.

INTRODUCTION:

The boundaries of the proposed housing site are, Barbers Point Naval Air Station on the south, H-1 Freeway on the North, Kaloi Gulch on the east and approximately 1/4 mile beyond Kalaeloa Blvd. on the west.

Barbers Point Access Road, which connects the Naval Air Station to Farrington Highway and H-1 Freeway, is midway between Kaloi Gulch and Kalaeloa Blvd. SEE FIGURE (1).

Traffic on Farrington Highway, Barbers Point Access Road, and Kalaeloa Blvd. is heavy between 6 AM and 6 PM. After 6 PM, the traffic drops rapidly to lowest level between 1 AM and 4 AM and climbs rapidly to a peak between 7 AM and 8 AM. (SEE TABLE 4 and figures 8 to 11)

SUMMARY OF FINDINGS:

A noise contour map was developed by combining, logarithmically, the noise contributed by Traffic and Aircraft Noise sources to each location on the line. A study of the noise contour map shows that all of the proposed development site, except for narrow areas on both sides of roadways and around the quarry, fall into HUD's "Clearly Acceptable", noise category. This means that noise level is low enough to allow indoor and outdoor activities with little or no interference by noise from roadways and aircraft fly-bys.

The analysis of aircraft fly-by noise indicates that few, if any, complaints on day-time (7 AM to 10 PM) fly-by noise are expected from future residents of the development site. Also night-time (10 PM to 7 AM) complaints are not expected because the fly-bys, if any, are few and far between.

NOISE MEASUREMENTS:

Noise measurements were taken over a 24 hour period, at nine locations from 7 AM to 7 AM of the following day. The noise measurement stations are shown on figure 7.

Station 1 - 400' North of Waimanalo Road at Kaloi Gulch.

2 - Approximately 1280' North of Waimanalo Road and 3400' west of station (1).

3 - 400' East of Barber Point Road and 550' south of Waimanalo Road.

4 - 590' South of Farrington Highway and approximately 1850' east of Barbers Point Road.

5 - 1150' South of Farrington Highway an approximately 5150' east of Barbers Point Road.

6 - Approximately 1950' West of Barbers Point Road, and 590' south of Farrington Highway.

7 - 200' east of Kalaeloa Blvd. and 100' south of Waimanalo Road.

8 - Approximately 1550' west of Barbers Point Road and 1700' south of Waimanalo Road.

9 - Approximately 1650' west of Kalaeloa Blvd. and 10' north of pump 10 Road.

The noise measurement stations were selected to obtain data which would best represent the combined noise of aircraft, ground traffic and other activities on the ground.

Short period noise readings were also taken at other locations with a hand held meter to obtain data on aircraft fly-by noise and average ambient noise. Table 3 and figures 4, 5 and 6 show typical overhead fly-by noise levels of military and commercial aircraft.

The noise level at any location was sampled 4 times per second and their average was recorded every second over a 24 hour period.

To get some idea on the variation of noise with time, the recorded 1 second data was converted to equivalent noise level every 10 minute and every hour. The results are shown in tables 5 to 13 and tables 1 and 2.

Tables 5 through 13 show the equivalent noise level every 10 minutes. The hourly equivalent noise levels are shown in tables 2 and 3. The day-time (7 AM to 10 PM) equivalent noise level LD, the night-time (10 PM to 7 AM) equivalent noise level LN, and the day-night equivalent noise level LDN for each station are shown on the bottom of tables 1 and 2.

Figures 2 and 3 are visual representations of the hourly noise variation at stations 7 and 8.

SOURCES OF NOISE:

The existing contributors of noise to the development site are traffic on roadways, aircraft, quarry operation, aircraft maintenance facilities at Barbers Point Naval Air Station, and industrial activities at Campbell Industrial Park.

The major contributors of noise in descending order, are traffic noise on roadways, quarry noise, and aircraft fly-by noise.

ROADWAY TRAFFIC:

Roadway traffic is the major contributor of noise to the development area. According to the State Department of Transportation, the average daily traffic (ADT) in 1986 on the roadways in the subject area were as follows:

1) H-1 Freeway - 21,008 vehicles.
2) Barbers Point Road - 10,043 vehicles.
3) Kalaeloa Boulevard - 7666 vehicles.
4) Farrington Highway -

A) 5522 vehicles between Barbers Point Road and Waipahu.
B) 7067 vehicles between Barbers Point Road and Kalaeloa.

The hourly traffic counts for the roadways above are shown in table 4. Visual representations of hourly traffic on roadways are shown in figures 8 through 11.

It is easy to see, from figures 8 through 11, that the traffic and the associated noise increases rapidly from 6 AM to a morning peak between 7 AM and 8 AM, and drops rapidly to a relatively steady volume by 10 AM.

After 3 PM the traffic increases rapidly again to an afternoon peak level between 3 and 4 PM, and drops rapidly to a day-time low level by 8 PM. The traffic drops steadily after 8 PM to a night-time low between 1 and 4 AM.

QUARRY:

The quarry is located approximately 4700' east of Barbers Point Access Road and extends from Farrington Highway northward approximately 400'.

AIRCRAFT TRAFFIC:

Military and commercial aircraft are the third largest contributors of noise to the development site.

The total number of military aircraft flights varied anywhere from 0 to 25 per day. The fly-by of commercial aircraft is nearly constant at 6 to 10 per hour from 7 AM to 7 PM.

The fly-by heights of commercial aircraft was estimated to be 3000' to 4000' above ground level. Almost all of the commercial aircraft flew over Barbers Point Naval Air Station. Some passed 500', or more, south of noise survey stations 8 and 9.

Military aircraft flew over the proposed development site when runway 4L or 22R was used for touch and go flight operation. The average flight path over the development site is shown on figure 7. The fly-by height of the aircraft was estimated to be 1000' above ground level. The average time between flights varied between 15 and 25 or more minutes.

OTHER SOURCES:

Other sources contributing noise to the development site are the maintenance operations at the Naval Air Station and industrial operations at the Campbell Industrial Park.

The noise from the above sources is audible as a steady low level sound which combines with roadway noise from Barbers Point Naval Air Station to make up the ambient noise level. They are not audible when the wind is blowing toward the sound sources.

EFFECT OF NOISE:

General Discussion:

The sound pressure level (SPL) generated by any noise source can be readily measured to determine its intensity, frequency components and the duration of the noise. However, sound

pressure level readings alone do not tell us much about the reaction of people to the noise.

Much research has been conducted on the reaction of people to noise. It is generally agreed that the reaction of people to noise is not the same for all people. In other words, two persons may react differently to the same noise. Studies on why people complain have shown that the most often cited reasons are:

1. Interference with rest and recreation,
2. Interference with speech communication,
3. Interference with radio and music listening and
4. Interference with sleep.

The severity of the complaints is associated with or with combinations of the following factors:

1. The nature of the noise spectrum (frequency content, amplitude)
2. The loudness and duration of the noise.
3. The time of occurences (day, evening, night)
4. The number of occurences (per minute, hour, day)
5. The loudness of the noise above the ambient noise.
6. The activity the person happens to be engaged in when the noise intrusion takes place.
7. The health and noise exposure history of the person.
8. Human factors (attitude, tolerance, benefit derived)

Studies have shown that approximately 10 percent of the population in any community are apparently super-sensitive to noise and complained about any noise other than the noise they generated. The remaining 90 percent reacted to noise in various degrees. About 25 out of 100 tolerated noise of any level. The remainder did not complain until the outdoor noise level exceeded 70 dBA or the indoor noise level exceeded 55 dBA for more than 10% of the exposure time. Complaints increased rapidly as the noise level exceeded these values.

Because the reaction of people to noise is subjective, a condition of no complaints to noise should not be expected.

NOISE CRITERIA FOR COMPATIBLE LAND USE:

Researchers, in an attempt to relate the reaction of people to noise, have adopted noise criteria which can be used with reasonable accuracy, to determine the acceptablility of the noise.

Energy equivalent noise level (LEQ) and day-night energy equivalent noise level (LDN) are used today to determine the acceptability of noise in a residential area.

Equivalent sound level (LEQ) is a sound level which has equal amount energy as the cumulative energy of a time varying sound.

Day-time equivalent sound level (LD) is the equivalent sound level for the day-time period (7 AM to 10 PM) only.

Night-time equivalent sound level (LN) is the equivalent sound level for the night-time period (10 PM to 7 AM of the following day) only.

Day-night equivalent sound level (LDN) is the 24 hour equivalent sound level with a 10 dBA human reaction correction factor added to each night-time sound level. The 10 dBA is added to each night-time sound level because people consider night-time noise more objectionable than day-time noise.

1) The U.S. Department of Transportation in Traffic Noise prediction Model FHWA-RD-77-108, recommends 67 dBA outdoor equivalent noise level (LEQ) for land use category B. Land use category B includes residences, motels, schools, churches, and hotels.

2) The U.S. Housing and URBAN DEVELOPMENT (HUD) Considers a site "clearly acceptable" for housing use, if the outdoor day-night equivalent noise level (LDN or DNL) is less than 65 dBA, and "Normally Unacceptable," if the LDN noise level is between 65 and 75 dBA. A site is "unacceptable," for Housing use if the LDN noise level is above 75 dBA.

FAA, FHA and VA also use guidelines that an outdoor LDN noise level of 65 dBA or less is "clearly acceptable" and LDN noise level above 65 dBA significantly noisy and "normally unacceptable".

"Clearly acceptable", means the noise level is low enough to allow indoor and outdoor activities with virtually no interference from noise.

"Normally unacceptable", means the noise exposure is great enough to be of some concern, but with mitigative construction and acoustical treatment, the indoor noise level can become acceptable for residential use. For noise levels between LDN 65 and 70 dBA, normal construction with acoustical treatment in the living room and bedrooms would be sufficient. For noise level between LDN 70 and 75 dBA, sound proofing of walls and ceiling, and acoustical treatment in the living room and bedrooms are necessary. Where the noise is due mainly to traffic noise, a barrier wall between the roadway and the residence may be used to reduce the indoor and outdoor noise to acceptable levels.

EVALUATION OF THE ACCEPTABILITY OF THE PROPOSED SITE FOR RESIDENTIAL AND COMMERCIAL USE.

The noise level at any location on the development site is the logarithmic sum of noise contributed by noise sources surrounding that location. The noise level at any location can be calculated if the following are known;

1. The noise level of the sources.
2. The distance from each source to the location.
3. The terrane between the source and location.

Sources contributing noise to the development site have been identified earlier in this report as traffic on roadways, aircraft fly-by, quarry operation, and other sources in Campbell Industrial Park and Barbers Point Naval Air Station.

Tables 1 and 2 show the noise level measured at measurement stations (1) through (9). Table (3) shows the ground level noise of typical military and commercial aircraft flying directly overhead. Table (4) shows the hourly traffic counts on H-1 Freeway, Farrington Highway, Barbers Point Access Road, and Kalaeloa Blvd.

Figure (7) shows the existing day-night (LDN) noise contour map for the proposed development site when runway 4L is used for the touch and go operation. When runway 22R is used for touch and go and landing operations, the noise contour map would remain essentially the same, except that the LDN 60 dBA contour finger in the lower right hand corner would be on the upper left corner extending approximately 500' past Pump 10 Road where it would merge with the traffic noise.

The noise contour lines were developed by combining, logarithmically, the noise contributed by each source to each location on the line. The hourly equivalent noise for 3 fly-bys per hour, or a total of 45 flybys per day (7 AM to 10 PM) was used as the aircraft noise.

A study of the noise contour map shows that all of the proposed development site, except for narrow areas on both sides of roadways and around the quarry, fall into HUD's "Clearly Acceptable", noise category. This means that noise level is low enough to allow indoor and outdoor activities with little or no interference by noise from roadways and aircraft fly-bys.

TRAFFIC NOISE:

The noise level on both sides of roadways depends on the following:

1. The traffic volume,
2. The ratio of trucks to automobiles,

3. The speed of the vehicles and
4. The road surface condition.

The existing LDN noise levels on both sides of the roadways are shown in table 14.

Kalaeloa Blvd. and H-1 Freeway:

The noise level on 100' wide strip on each side of Kalaeloa Blvd. and H-1 Freeway is above LDN 75 dBA. This area, according to HUD's noise guide, is not acceptable for residential use.

The strip may be used for commercial buildings if noise mitigative measures are incorporated in the design of the building.

The land area between 100' and 400' from the above roadways fall into HUD's "normally unacceptable", residential land use category. Residential buildings in this area must be (1) shielded from roadway noise by a barrier wall,or (2) acoustically treated to reduce the interior noise level to acceptable levels, 55 dBA from 7 AM to 10 PM in the living area and 45 dBA in the bedrooms at night (10 PM to 7 AM). Residences between 100' and 200' from the roadways would require in addition to interior acoustical treatment, sound proofing of walls and ceiling or roadway noise barrier wall. Residences between 200' and 400' from the roadways would only require (1)The roadway barrier wall, or (2) interior acoustical treatment in the living room and the bedrooms.

Barbers Point Access Road:

The land area between 50' and 150' from Barbers Point Access Road fall into HUD's "normally unacceptable", category for residential use. Residences in this area, on both sides of the road, must be (1) shielded from roadway noise by a barrier wall, or (2) acoustically treated to make the interior noise acceptable. The first row of residences facing the roadway would require (1) a 5' to 6' high barrier wall or earth berm where feasible or (2) sound proofing.

Farrington Highway:

The traffic on Farrington Highway west of Barbers Point Access Road is greater than the traffic east of the Barbers Point interchange. The noise level along Farrington Highway, west of Barbers Point Access Road is approximately 2 dBA higher than the noise level east of Barbers Point Access Road.

Table 14 shows the land area between 50' and 200' from Farrington Highway fall into HUD's "normally unacceptable" category for residential use. Residences built in this area

must be acoustically treated to make the interior noise level acceptable. The first row of buildings facing the Highway must be (1) shielded from roadway noise by a barrier wall, or (2) sound proofed. Barrier wall or earth berm 5' to 6' high may be used where feasible.

AIRCRAFT FLY-BY NOISE:

The average flight paths of military and commercial aircraft over the proposed development area are shown on figure 7. The flight path of military aircraft is near the perimeter of the development site. The aircraft travel north east to south west (tradewind conditions) or west to east (Kona wind conditions) on the flight path, depending on the runway being used.

Commercial aircraft headed for the International Airport, approach the development site slightly north from west and leave the site before reaching Barbers Point Access Road. The flight path is nearly parallel to Pump 10 Road and approximately 500' to 1000' south of the road.

Table 3 shows the aircraft fly-by noise directly under the flight path and 4' above ground level. Figures 4, 5 and 6 are graphic representations of table 3. It is easy to determine from the graphs, the duration of noise above any noise level. The following are observations made from figures 4, 5, and 6.

1. At any fixed point on the ground, the noise level rise and fall with each passage of aircraft. The rate of change of noise level depends on the speed and height of the aircraft above ground level.

2. The approximate time the noise level remains above LEQ 70 dBA.

   a) C-130 military aircraft - 4.5 seconds.
   b) P-3 military aircraft - 4.5 seconds.
   c) Commercial Aircraft - 5.2 seconds.

3. The approximate time the noise level remains above the 65 dBA acceptable noise level.

   a) C-130 Military Aircraft - 6.5 seconds.
   b) P-3 Military Aircraft - 12.8 seconds.
   c) Commercial Aircraft - 18.0 seconds.

4. The approximate time the noise level remains above the ambient noise level. The time depends on the ambient noise level and the speed and height of the aircraft.

   a) C-130 Military Aircraft - 61 seconds.
   b) P-3 Military Aircraft - 51 seconds.
   c) Commercial Aircraft - 59 seconds.

The above observations show that aircraft contribute short duration noise to the proposed development site. The 65 dBA acceptable noise level is exceeded for less than 18 seconds per flight.

Compared with the nearly steady flow of noise from traffic and other sources, the short duration aircraft noise adds little to the hourly equivalent noise level except where the noise from traffic and other sources in less than 55 dBA. See table 15 and Figure 12.

Obviously, the number of flights per hour would affect the hourly equivalent noise level. To determine the effect, the hourly equivalent noise levels for 0 through 7 flights per hour were calculated, using the military aircraft fly-by noise data. The results are shown in table 15 and figure 12.

The table shows the hourly equivalent noise level increases as the number of flights increases. The increase, however, is not linear. See Figure 12. The noise increment is larger at first, and gradually decreases and becomes nearly constant as the number of flights per hour increases. The effect of the aircraft noise becomes smaller as the equivalent noise level of traffic and other sources becomes larger. It becomes negligible when the difference between the equivalent noise levels of aircraft and other noise sources is less than 5. Where the difference is more than 5, the aircraft fly-by noise progressively becomes the dominating noise source.

The areas on the proposed development site where aircraft fly-bys become the major contributor of noise are as follows:

1. Along military aircraft flight path from Barbers Point Naval Air Station to about 1500' past station (1), near Kaloi Gulch and Waimanalo Road.

2. Along military aircraft flight path between Campbell Industrial park and approximately 1000' before reaching Pump 10 Road.

3. Along commercial aircraft flight path approximately 500' south of station (8), between 3000' east of Kalaeloa Blvd and 1000' west of Barbers Point Access Road.

The aircraft fly-by noise is negligible, compared with the steady day-time traffic noise, along the rest of the aircraft flight path.

Table 15 also shows that the hourly equivalent noise level, under the flight path, does not exceed the 65 dBA acceptable noise level, even when the number of flights reach as high as 7 per hour.

NOISE IMPACT:

It was pointed out earlier that most people do not complain about noise until the exterior noise level exceeds 70 dBA for more than 10% of the exposure time. Exposure time is defined here as the time the fly-by noise remains above the ambient noise level.

Table 3 and figures 4, 5 and 6 show the fly-by noise of military and commercial aircraft at the development site. Figures 4 and 5 show that the fly-by noise of military aircraft (C-130 and P-3) exceeds 70 dBA for approximately 4.5 seconds out of an exposure time of 61 and 51 seconds respectively. Figure 6 shows the fly-by noise of typical commercial aircraft remains above 70 dBA for approximately 5.2 seconds out of 59 seconds exposure time.

The fly-by noise of both military and commercial aircraft remains above 70 dBA for less than 10% of the exposure time. Few complaints, if any, are therefore expected due to the loudness of aircraft fly-by noise.

Researchers have also found that people would complain if the existing (ambient) noise is intruded by other short duration noise such as noise from aircraft fly-bys and passing heavy trucks. The severity of the complaint would depend, in addition to the loudness and duration of the noise, on the number of intrusions and the time of intrusion. Researchers have found that most people do not object to intruding noise of short duration during the daytime (7 AM to 10 PM) if it occurs more than 10 minutes apart, and the noise level does not exceed 70 dBA for more than 10% of the exposure time. However, the same noise intrusion could be objectionable at night-time (10 PM to 7 AM), depending on the type of construction of the residence.

During the noise measurements period, the time interval between aircraft fly-bys varied between 15 and 25 minutes or more. Interruptions of day-time activities by aircraft fly-bys are not expected to cause any complaint, as long as the average number of flights per hour remains less than 6.

SUMMARY - AIRCRAFT FLY-BY NOISE IMPACT

The preceding analysis of aircraft fly-by noise indicates that few, if any, complaints on day-time (7 AM to 10 PM) fly-by noise are expected from future residents of the development site. Also night-time (10 PM to 7 AM) complaints are not expected because the fly-bys, if any, are few and far between.

FUTURE NOISE

TRAFFIC NOISE:

In the next 10 to 20 years, traffic on the development site and on existing roadways are expected to increase with housing developments on the east and west sides of the proposed Campbell Estate development site. The traffic on existing roadways is expected to increase by 20% or more. However, the traffic increase is not expected to increase the existing noise level at the proposed development site by more than 2 or 3 dBA. Such an increase will not seriously alter the acceptability of the site for residential or commercial use.

The areas which would be affected by future increase in traffic noise are the current "normally unacceptable" areas.

The current acceptable area would not change because the buildings in the "normally unacceptable", areas will serve as noise barriers.

(1) Greater use of barrier walls, (2) more extensive sound proofing and interior acoustical treatment than discussed earlier, or (3) the set back of the residences must be increased in order to allow for the future increase in noise.

Future traffic on roadways within the development site will also raise the noise level of the site. The average daily traffic volume on the main or collector road is expected to reach 15000 by year 2007 and the day-night (LDN) noise level is expected to reach 65 dBA, 50' from the center-line of the collector road.

Any residence less than 50' from the center-line of the collector road would fall into HUD's "normally unacceptable", noise category. Barrier wall or acoustical treatment must be incorporated in the residential design, to allow for the future noise.

AIRCRAFT NOISE:

Unless the existing military aircraft using runways 4L and 22 R, are replaced with noisier aircraft in the future, the existing fly-by noise is expected to remain the same. The number of flights per hour, however, might increase beyond the present average 3 to 4 flights per hour.

Should this happen, the interval between flights would be shorter, and may cause some future residents to complain when the average fly-by per hour approaches 6 or more.

Should noisier aircraft such as F4 replace the C-130 and P-3, on runways 4L or 22R, the fly-by hourly equivalent noise level is estimated to increase to more than 65 dBA. This would make the area directly under the flight path "normally unacceptable".

During the noise survey, it was noticed that runways 4R and 22L were also used for touch and go operations, including jet aircraft touch and go operations. The flight path was over the ocean. The take-off and climb noise was barely measureable at the development site.

The existing hourly equivalent fly-by noise level at the development site is not expected to change in the future if runway 4R or 22L is used for touch and go operations of noisier jet aircraft such as the F-4.

The impact of future aircraft noise on the development site can be kept negligible if the use of runway 4L or 22R is restricted to touch and go operations of aircraft with noise levels comparable to those of C-130 and P-3, and runway 4R or 22L is used for touch and go operations of noisier jet aircraft such as the F 4.

Therefore, only in the event that (1) noisier fighter aircraft become based at the air station and (2) the Air Station changes its present runway 4R usage will the design of residences under the flight path need to include mitigative measures such as sound proofing the ceiling and exterior walls, and acoustical treatment of the interiors, to allow for future possibility that runway 4L and 22R might be used for touch and go operations of noisier aircraft.

The above operational procedure will provide minimum noise impact and maximum safety factor for residents in Barbers Point Naval Air Station and surrounding community.

SUMMARY & RECOMMENDATION

The noise study shows the existing noise on the proposed James Campbell Estate development site in Ewa fall in to HUD's, DOT's and FAA's "acceptable", land use category, except for areas near the roadways. The areas near the roadways fall into "normally unacceptable", and "unacceptable" land use categories as follows;

1. KALAELOA BLVD and H-1 FREEWAY-

   a) Unacceptable - Between Centerline and 100'
   b) Normally unacceptable - Between 100' and 400'

2. Barbers Point Access Road and Farrington Highway -

   a) Unacceptable - Between Centerline and 50'
   b) Normally unacceptable - Between 50' and 200'

The major contributor of noise to the development site is traffic on the roadways. Aircraft fly-bys contribute short duration noise along the flight paths near the perimeter of the development site. The existing fly-by noise level remains above 70 dBA for less than 5.2 seconds per flight, and above 65 dBA for less than 18 seconds per flight. The time interval between flights varies between 15 minutes and 25 minutes and over. The total exposure to aircraft noise in 15 hours (7 AM to 10 PM) is less than 1 hour, assuming 4 flights per hour. The noise impact of aircraft fly-by noise is negligible, compared with the steady traffic noise.

Traffic volumes on existing, and future roadways in the development site are expected to increase in the next 20 years. The resulting increase in noise level on the development site is not expected to change the classification of the existing "acceptable" land use area. The noise levels in the first few rows of residences in the "normally unacceptable", areas are expected to increase. However, the indoor noise can be made acceptable with greater set backs, barrier walls, or acoustical mitigative measures.

Future fly-by noise is expected to remain unchanged, unless the existing aircraft are replaced with noisier aircraft. Should this happen and should the Air Station change its present runway 4R usage policy, the area under the flight path could become "normally unacceptable". In this event, residences under the flight path will need to be treated acoustically to make the interior noise level acceptable.

However, if Naval Air Station uses runway 4R or 22L for the touch and go operation of noisier aircraft, in accordance with present practice, the fly-by noise will not affect the development site.

Recommendation:

Noise mitigative measures are necessary for all residences falling in the "normally unacceptable", land use area. This means greater set backs, barrier walls, or sound proofing of walls, ceiling and windows, and interior acoustical treatment must be included in the design of residences in this area, to allow for existing and future noise.

Specific design recommendation would be available when the preliminary architectural plan is ready.

Landscaping, unless 100' or more wide and very dense will have little effect on the noise but will provide a psychological illusion that the noise is quieter.

TABLE (1)

HOURLY EQUIVALENT NOISE LEVEL

IN dBA

TIME OF DAY	NOISE MEASUREMENT STATION 1	2	3	4	5
7 - 8 AM	59.9	58.2	64.5	54.9	61.7
8 - 9	55.4	55.7	65.5	54.5	55.3
9 - 10	52.5	54.5	64.0	56.4	57.2
10 - 11	47.9	54.3	64.0	62.1	59.2
11 - 12	58.5	55.4	64.9	57.4	59.3
12 - 1 PM	59.9	54.7	63.8	56.4	59.2
1 - 2	56.8	56.7	64.4	58.5	58.9
2 - 3	58.9	55.0	63.9	55.6	59.3
3 - 4	59.2	55.0	64.6	55.8	58.8
4 - 5	59.6	57.6	63.9	53.5	57.7
5 - 6	59.0	55.3	64.1	54.0	58.7
6 - 7	57.3	55.5	62.2	56.4	56.0
7 - 8	54.0	52.4	61.1	50.4	53.0
8 - 9	52.0	49.1	60.0	47.4	48.9
9 - 10	53.0	50.6	58.1	47.4	47.2
10 - 11	47.0	48.1	57.4	46.8	47.1
11 - 12	49.1	45.8	54.6	48.5	46.2
12 - 1 AM	45.6	44.9	51.0	48.0	44.9
1 - 2	45.2	45.7	47.4	46.5	44.2
2 - 3	44.5	44.7	45.6	46.2	48.5
3 - 4	42.5	43.2	44.4	46.1	51.6
4 - 5	45.1	46.3	52.4	46.8	55.1
5 - 6	44.8	47.5	53.8	49.4	53.1
6 - 7	55.2	49.7	61.7	51.9	54.4

DAILY EQUIVALENT NOISE LEVEL

IN dBA

STATION	1	2	3	4	5
LD	57.4	55.2	63.6	55.9	58.0
LN	48.5	46.6	55.2	48.2	51.1
LDN	60.99	58.97	67.45	60.21	62.81

TABLE (2)

HOURLY EQUIVALENT NOISE LEVEL
IN dBA

TIME OF DAY	NOISE MEASUREMENT STATION 6	7	8	9
7 - 8 AM	52.6	71.4	50.4	48.3
8 - 9	53.0	80.2	52.8	52.5
9 - 10	52.2	69.6	56.3	52.4
10 - 11	58.1	54.7	56.1	53.9
11 - 12	56.1	58.5	51.3	56.2
12 - 1 PM	59.3	58.9	58.1	56.4
1 - 2	57.4	56.1	58.2	59.1
2 - 3	59.8	55.8	56.8	58.1
3 - 4	55.3	57.1	57.4	61.4
4 - 5	51.9	55.1	58.3	53.7
5 - 6	47.9	56.2	56.0	54.1
6 - 7	53.7	53.0	54.3	52.5
7 - 8	51.7	51.8	54.1	51.6
8 - 9	47.7	52.5	53.0	51.8
9 - 10	45.3	53.9	52.4	52.9
10 - 11	44.7	54.1	51.1	51.1
11 - 12	45.0	53.5	47.8	52.5
12 - 1 AM	44.3	51.3	46.8	48.3
1 - 2	46.6	47.6	44.7	44.6
2 - 3	44.0	44.5	43.5	46.8
3 - 4	44.5	45.6	44.6	45.8
4 - 5	45.6	53.7	46.8	48.8
5 - 6	50.0	59.2	47.4	53.4
6 - 7	50.5	64.1	49.7	54.1

DAILY EQUIVALENT NOISE LEVEL
IN dBA

STATION	6	7	8	9
LD	55.2	69.4	55.5	55.6
LN	46.8	56.9	47.6	50.6
LDN	59.10	71.34	59.67	61.83

TABLE (3)
TYPICAL OVERHEAD FLY-BY NOISE LEVEL
IN dBA

TYPE OF AIRCRAFT

TIME IN SECONDS	LOCATION 1, 5 & 9 MILITARY C 130	P-3	P-3	LOCATION 8 COMMERCIAL DC10	747
1	46.6	57.4	56.7	55.7	57.4
2	47.0	56.3	59.3	55.7	56.3
3	47.9	57.5	61.7	56.3	57.5
4	48.9	55.2	62.0	57.9	55.2
5	49.6	58.0	61.2	61.9	58.5
6	50.9	56.4	61.7	64.1	59.2
7	52.6	56.7	63.0	67.1	60.2
8	53.9	59.3	63.3	69.2	61.1
9	55.2	61.7	65.4	69.8	63.0
10	57.7	62.0	66.4	70.5	65.8
11	60.1	61.3	67.0	70.5	67.3
12	63.6	61.7	69.3	70.8	67.9
13	71.0	63.0	70.4	70.9	70.9
14	79.1	63.3	70.5	70.3	70.7
15	79.1	65.4	69.9	70.8	71.5
16	75.0	66.4	69.2	69.2	71.7
17	71.0	67.2	69.5	66.1	70.9
18	69.3	69.3	70.3	63.8	68.9
19	63.7	70.4	71.7	62.1	65.6
20	61.6	70.3	70.8	61.6	63.5
21	60.5	69.7	67.1	60.0	61.4
22	59.2	69.1	64.2	57.4	60.7
23	58.6	69.3	62.4	56.3	60.4
24	57.4	70.3	60.1	57.5	60.4
25	56.3	71.1	59.8	55.2	59.2
26	56.2	70.9	59.0	58.0	57.5
27	56.1	67.1	57.0	56.4	55.2
28	55.9	64.2		56.7	58.0
29	54.9	62.5		59.3	56.4
30	53.1	60.1			
31	51.6	59.3			
32	51.1	57.1			
33	50.4				
34	49.6				
35	48.9				
36	48.2				
37	47.7				
38	47.7				
39	47.9				
40	48.0				
41	47.7				
42	47.3				
43	46.7				

HOURLY TRAFFIC COUNT

1986

TABLE (4)

TIME OF DAY	H-1 FREEWAY	FARRINGTON HIGHWAY A	FARRINGTON HIGHWAY B	BARBERS POINT ROAD	KALAELOA BLVD.
7 - 8 AM	1514	358	546	978	805
8 - 9	1182	290	393	422	447
9 - 10	1080	310	341	455	423
10 - 11	1017	371	442	463	441
11 - 12	1018	368	448	557	497
12 - 1 PM	971	366	450	582	452
1 - 2	1091	393	499	521	491
2 - 3	1230	423	550	585	456
3 - 4	1708	530	687	860	856
4 - 5	1759	442	594	1050	606
5 - 6	1398	308	391	805	307
6 - 7	946	248	282	551	185
7 - 8	639	166	156	369	66
8 - 9	566	124	133	293	92
9 - 10	556	116	130	188	31
10 - 11	454	71	95	172	63
11 - 12	309	53	73	157	41
12 - 1 AM	210	20	25	60	29
1 - 2	118	26	23	26	4
2 - 3	96	17	15	22	14
3 - 4	88	16	23	14	25
4 - 5	275	31	46	64	42
5 - 6	930	120	155	148	203
6 - 7 AM	853	355	570	701	1090
24 Hour TOTAL	21,008	5522	7067	10,043	7666

FARRINGTON HIGHWAY TRAFFIC:

A - TRAFFIC BETWEEN BARBERS POINT RD AND WAIPAHU

B - TRAFFIC BETWEEN BARBERS POINT RD AND KALAELOA BLVD.

TABLE (5)

CAMPBELL ESTATE NOISE STUDY

LOCATION 1 DATE 10/24 - 10/25 1986

TIME	LEQ	TIME	LEQ	TIME	LEQ	TIME	LEQ
7-10	74.6	1-10	63.8	7-10	58.8	1-10	45.7
AM 20	58.8	PM 20	57.7	PM 20	51.8	AM 20	45.6
30	58.1	30	54.3	30	50.8	30	45.6
40	58.5	40	54.0	40	52.2	40	42.0
50	57.4	50	59.4	50	55.5	50	46.1
8-00	51.9	2-00	51.5	8-00	55.1	2-00	46.0
8-10	58.4	2-10	59.9	8-10	53.5	2-10	45.0
20	51.8	20	65.0	20	52.7	20	44.0
30	55.0	30	65.7	30	53.3	30	44.0
40	60.5	40	60.4	40	56.2	40	45.0
50	50.8	50	48.7	50	48.1	50	44.0
9-00	55.9	3-00	53.5	9-00	48.3	3-00	45.0
9-10	54.1	3-10	66.4	9-10	50.2	3-10	44.1
20	48.2	20	64.5	20	52.0	20	41.2
30	51.3	30	52.2	30	49.0	30	41.3
40	53.3	40	54.2	40	53.3	40	43.3
50	57.9	50	68.9	50	54.7	50	44.9
10-00	50.2	4-00	49.1	10-00	58.9	4-00	40.2
10-10	48.3	4-10	65.2	10-10	45.7	4-10	46.4
20	47.0	20	66.3	20	45.9	20	46.9
30	49.1	30	48.7	30	46.4	30	42.3
40	47.5	40	54.6	40	47.1	40	38.5
50	47.3	50	61.8	50	49.5	50	46.8
11-00	47.9	5-00	60.7	11-00	47.5	5-00	49.7
11-10	59.9	5-10	52.2	11-10	49.7	5-10	48.6
20	54.5	20	57.7	20	49.0	20	46.2
30	54.5	30	69.3	30	48.9	30	42.9
40	64.4	40	64.3	40	49.3	40	43.6
50	58.2	50	50.1	50	48.8	50	43.8
12-00	59.5	6-00	60.6	12-00	48.6	6-00	43.9
12-10	66.8	6-10	58.3	12-10	45.6	6-10	43.0
PM 20	62.2	PM 20	60.8	AM 20	45.6	AM 20	39.7
30	52.5	30	61.2	30	44.2	30	52.2
40	58.7	40	52.3	40	46.5	40	58.9
50	55.2	50	52.3	50	45.8	50	69.0
1-00	64.1	7-00	58.8	1-00	45.6	7-00	68.2

TABLE (6)

CAMPBELL ESTATE NOISE STUDY

LOCATION 2 DATE 10/25 - 10/26 1986

TIME	LEQ	TIME	LEQ	TIME	LEQ	TIME	LEQ
7-10	66.9	1-10	55.5	7-10	52.4	1-10	43.1
AM 20	66.0	PM 20	59.1	PM 20	53.3	AM 20	42.7
30	51.3	30	55.3	30	53.0	30	48.6
40	58.4	40	56.9	40	54.0	40	47.5
50	55.1	50	56.4	50	52.3	50	45.0
8-00	51.3	2-00	56.8	8-00	49.2	2-00	47.3
8-10	55.6	2-10	56.1	8-10	50.9	2-10	45.7
20	59.2	20	54.9	20	47.4	20	44.6
30	51.9	30	56.1	30	47.7	30	45.6
40	53.7	40	54.7	40	48.0	40	44.2
50	58.5	50	54.4	50	49.3	50	44.5
9-00	55.1	3-00	54.0	9-00	51.2	3-00	43.5
9-10	54.1	3-10	56.6	9-10	49.1	3-10	44.0
20	56.3	20	57.4	20	50.1	20	42.8
30	56.5	30	58.8	30	51.7	30	44.6
40	52.5	40	57.8	40	50.2	40	41.4
50	53.0	50	55.5	50	49.8	50	43.6
10-00	54.4	4-00	57.0	10-00	52.5	4-00	43.0
10-10	50.1	4-10	59.5	10-10	48.4	4-10	45.0
20	52.3	20	56.4	20	48.3	20	16.6
30	56.7	30	56.7	30	48.7	30	48.8
40	54.1	40	57.7	40	49.3	40	45.3
50	56.2	50	55.4	50	48.1	50	47.1
11-00	56.2	5-00	60.0	11-00	45.9	5-00	45.0
11-10	54.9	5-10	56.5	11-10	46.6	5-10	47.3
20	54.9	20	56.9	20	45.4	20	46.4
30	57.2	30	55.5	30	44.9	30	50.4
40	57.2	40	55.8	40	46.8	40	48.3
50	54.01	50	53.5	50	46.3	50	47.7
12-00	54.2	6-00	53.7	12-00	44.8	6-00	45.0
12-10	56.2	6-10	54.7	12-10	43.1	6-10	49.3
PM 20	55.6	PM 20	56.8	AM 20	42.2	AM 20	48.4
30	52.7	30	56.0	30	43.6	30	51.2
40	53.6	40	57.0	40	47.1	40	51.4
50	54.9	50	52.6	50	47.1	50	47.9
1-00	55.4	7-00	55.6	1-00	46.3	7-00	49.8

TABLE (7)

CAMPBELL ESTATE NOISE STUDY

LOCATION 3 DATE 10/26 - 10/27 1986

TIME	LEQ	TIME	LEQ	TIME	LEQ	TIME	LEQ
7-10	62.5	1-10	62.2	7-10	63.5	1-10	47.4
AM 20	63.4	PM 20	65.8	PM 20	62.0	AM 20	47.3
30	64.1	30	65.0	30	61.1	30	47.7
40	65.0	40	64.1	40	60.6	40	47.3
50	65.8	50	65.9	50	60.0	50	47.0
8-00	65.9	2-00	63.4	8-00	59.6	2-00	47.4
8-10	68.4	2-10	63.5	8-10	61.1	2-10	44.8
20	61.8	20	67.6	20	61.5	20	44.8
30	70.5	30	65.2	30	62.8	30	45.0
40	65.5	40	62.8	40	59.2	40	46.0
50	60.8	50	62.6	50	58.8	50	46.1
9-00	65.9	3-00	61.9	9-00	56.8	3-00	47.0
9-10	63.4	3-10	62.4	9-10	58.4	3-10	44.8
20	65.8	20	63.6	20	58.3	20	44.4
30	65.9	30	64.8	30	58.7	30	44.6
40	62.0	40	65.5	40	58.3	40	44.3
50	62.5	50	66.5	50	57.9	50	44.9
10-00	64.1	4-00	64.5	10-00	57.1	4-00	44.0
10-10	65.1	4-10	64.5	10-10	57.0	4-10	48.2
20	62.2	20	65.0	20	57.4	20	50.2
30	65.5	30	66.5	30	57.3	30	51.3
40	61.8	40	63.0	40	57.3	40	54.1
50	60.8	50	62.6	50	57.7	50	53.3
11-00	68.8	5-00	61.5	11-00	57.4	5-00	57.5
11-10	68.6	5-10	60.8	11-10	56.5	5-10	52.8
20	66.2	20	62.4	20	55.5	20	53.4
30	62.9	30	63.6	30	54.8	30	52.9
40	63.6	40	64.5	40	54.5	40	54.8
50	63.8	50	63.8	50	53.6	50	54.3
12-00	64.0	6-00	69.5	12-00	52.4	6-00	54.6
12-10	63.5	6-10	60.7	12-10	52.5	6-10	58.3
PM 20	65.0	PM 20	61.0	AM 20	52.3	AM 20	60.0
30	67.5	30	61.6	30	51.1	30	61.0
40	62.8	40	62.1	40	50.5	40	61.8
50	62.6	50	64.5	50	50.0	50	62.5
1-00	61.4	7-00	63.0	1-00	49.6	7-00	66.5

TABLE (8)

CAMPBELL ESTATE NOISE STUDY

LOCATION 4 DATE 10/27 - 10/28 1986

TIME	LEQ	TIME	LEQ	TIME	LEQ	TIME	LEQ
7-10	62.4	1-10	59.4	7-10	58.1	1-10	46.7
AM 20	55.6	PM 20	57.3	PM 20	57.7	AM 20	45.9
30	64.1	30	65.0	30	61.1	30	47.7
40	53.1	40	54.0	40	45.4	40	45.0
50	51.7	50	59.9	50	48.1	50	44.9
8-00	52.3	2-00	62.3	8-00	47.5	2-00	49.1
8-10	52.5	2-10	60.3	8-10	48.5	2-10	47.6
20	53.4	20	52.8	20	49.1	20	46.9
30	54.1	30	52.1	30	46.1	30	47.4
40	55.0	40	56.4	40	45.5	40	46.2
50	55.8	50	55.9	50	47.0	50	44.3
9-00	55.9	3-00	56.2	9-00	48.2	3-00	45.0
9-10	59.4	3-10	60.8	9-10	45.2	3-10	48.7
20	63.4	20	53.7	20	46.8	20	45.0
30	53.8	30	60.0	30	44.9	30	44.2
40	55.1	40	57.5	40	47.1	40	46.2
50	54.7	50	52.2	50	50.0	50	47.3
10-00	52.2	4-00	50.5	10-00	50.3	4-00	45.3
10-10	61.3	4-10	53.9	10-10	47.1	4-10	45.4
20	57.7	20	52.8	20	45.9	20	45.6
30	61.9	30	52.4	30	47.4	30	46.9
40	58.8	40	55.0	40	48.4	40	47.9
50	68.9	50	53.3	50	46.4	50	47.3
11-00	63.9	5-00	53.6	11-00	45.8	5-00	47.4
11-10	55.2	5-10	51.7	11-10	49.7	5-10	46.7
20	53.7	20	55.9	20	47.5	20	48.0
30	59.3	30	56.6	30	50.5	30	48.8
40	61.8	40	57.0	40	47.2	40	51.8
50	57.6	50	49.2	50	48.7	50	49.8
12-00	56.9	6-00	53.8	12-00	47.2	6-00	51.0
12-10	59.4	6-10	54.0	12-10	47.7	6-10	52.0
PM 20	58.8	PM 20	51.1	AM 20	48.0	AM 20	49.8
30	52.5	30	60.3	30	47.0	30	52.6
40	54.7	40	59.1	40	48.1	40	52.1
50	53.0	50	57.7	50	48.0	50	52.9
1-00	59.8	7-00	56.1	1-00	49.2	7-00	52.1

TABLE (9)

CAMPBELL ESTATE NOISE STUDY

LOCATION 5 DATE 10/28 - 10/29 1986

TIME	LEQ	TIME	LEQ	TIME	LEQ	TIME	LEQ
7-10	86.0	1-10	58.5	7-10	53.9	1-10	42.1
AM 20	80.4	PM 20	58.6	PM 20	53.8	AM 20	40.8
30	51.9	30	60.1	30	52.6	30	42.4
40	50.8	40	56.6	40	51.7	40	39.5
50	50.4	50	60.0	50	55.2	50	51.2
8-00	50.7	2-00	59.3	8-00	50.5	2-00	48.9
8-10	52.8	2-10	58.6	8-10	41.0	2-10	52.5
20	62.8	20	59.3	20	50.6	20	51.5
30	54.2	30	59.7	30	56.5	30	45.0
40	53.8	40	59.9	40	50.4	40	46.5
50	52.5	50	58.2	50	46.9	50	45.9
9-00	54.0	3-00	59.8	9-00	48.0	3-00	49.3
9-10	54.0	3-10	60.3	9-10	46.2	3-10	49.3
20	57.3	20	55.4	20	39.0	20	51.8
30	58.7	30	59.4	30	50.1	30	54.3
40	57.1	40	58.9	40	51.1	40	55.2
50	58.3	50	60.1	50	49.8	50	55.0
10-00	58.0	4-00	58.6	10-00	47.1	4-00	53.8
10-10	58.9	4-10	61.3	10-10	47.5	4-10	53.6
20	59.2	20	59.2	20	47.4	20	53.1
30	62.5	30	56.3	30	47.0	30	53.2
40	57.2	40	55.7	40	47.1	40	53.1
50	59.1	50	56.0	50	47.0	50	58.1
11-00	58.2	5-00	57.6	11-00	46.7	5-00	59.7
11-10	59.3	5-10	57.9	11-10	46.6	5-10	58.3
20	58.7	20	53.0	20	46.7	20	41.5
30	59.6	30	59.0	30	46.6	30	48.5
40	59.9	40	65.0	40	46.2	40	55.8
50	58.9	50	58.7	50	45.2	50	61.5
12-00	59.3	6-00	58.6	12-00	46.7	6-00	53.1
12-10	59.0	6-10	57.9	12-10	45.8	6-10	58.7
PM 20	57.9	PM 20	54.7	AM 20	42.4	AM 20	56.7
30	58.0	30	51.6	30	43.6	30	53.9
40	62.3	40	57.7	40	44.5	40	50.4
50	59.0	50	55.9	50	49.5	50	52.7
1-00	58.9	7-00	58.0	1-00	43.8	7-00	53.8

TABLE (10)

CAMPBELL ESTATE NOISE STUDY

LOCATION 6 DATE 10/29 - 10/30 1986

TIME	LEQ	TIME	LEQ	TIME	LEQ	TIME	LEQ
7-10	60.9	1-10	54.8	7-10	55.0	1-10	44.3
AM 20	49.1	PM 20	54.6	PM 20	53.8	AM 20	46.4
30	51.5	30	53.4	30	56.2	30	51.7
40	48.9	40	59.7	40	45.0	40	47.2
50	49.9	50	61.7	50	44.7	50	44.3
8-00	55.3	2-00	60.0	8-00	55.5	2-00	45.5
8-10	54.4	2-10	58.2	8-10	50.8	2-10	44.0
20	51.6	20	61.3	20	52.8	20	44.0
30	53.1	30	63.0	30	44.9	30	44.0
40	53.7	40	63.2	40	44.4	40	44.0
50	50.8	50	58.7	50	46.3	50	44.0
9-00	54.4	3-00	54.2	9-00	46.8	3-00	44.0
9-10	48.7	3-10	53.5	9-10	46.4	3-10	45.6
20	49.6	20	53.5	20	45.3	20	44.0
30	55.6	30	52.6	30	45.0	30	44.0
40	52.6	40	56.5	40	44.2	40	44.3
50	52.4	50	57.8	50	46.0	50	44.4
10-00	54.5	4-00	57.7	10-00	45.0	4-00	44.9
10-10	59.0	4-10	57.7	10-10	44.3	4-10	44.9
20	57.8	20	57.1	20	44.2	20	46.2
30	50.9	30	50.4	30	44.0	30	44.6
40	55.8	40	49.6	40	44.2	40	45.3
50	59.2	50	47.9	50	47.3	50	45.5
11-00	65.8	5-00	46.5	11-00	44.1	5-00	47.0
11-10	56.6	5-10	46.4	11-10	44.1	5-10	49.6
20	53.8	20	46.7	20	44.0	20	48.2
30	58.8	30	46.8	30	44.0	30	55.7
40	55.4	40	48.1	40	44.8	40	48.5
50	55.7	50	48.7	50	46.5	50	48.2
12-00	56.0	6-00	50.5	12-00	46.5	6-00	49.8
12-10	55.3	6-10	55.9	12-10	44.5	6-10	49.8
PM 20	55.9	PM 20	52.8	AM 20	44.0	AM 20	50.7
30	66.3	30	55.1	30	44.2	30	49.4
40	60.8	40	50.0	40	44.4	40	50.0
50	58.7	50	58.4	50	44.6	50	50.7
1-00	58.8	7-00	49.7	1-00	44.2	7-00	52.5

TABLE (11)

CAMPBELL ESTATE NOISE STUDY

LOCATION 7 DATE 10/30 - 10/31 1986

TIME	LEQ	TIME	LEQ	TIME	LEQ	TIME	LEQ
7-10	61.5	1-10	56.3	7-10	52.6	1-10	48.1
AM 20	58.7	PM 20	57.0	PM 20	51.4	AM 20	49.0
30	60.8	30	55.0	30	50.9	30	48.1
40	80.2	40	56.7	40	52.8	40	47.0
50	84.6	50	55.8	50	52.3	50	46.8
8-00	55.3	2-00	56.0	8-00	50.8	2-00	46.7
8-10	83.8	2-10	53.0	8-10	54.1	2-10	45.0
20	82.9	20	57.0	20	48.2	20	44.0
30	81.1	30	58.2	30	51.3	30	45.0
40	78.4	40	51.2	40	53.3	40	44.0
50	80.5	50	57.1	50	57.9	50	45.0
9-00	74.3	3-00	58.1	9-00	50.2	3-00	44.0
9-10	80.9	3-10	59.4	9-10	58.8	3-10	45.6
20	86.9	20	57.4	20	51.7	20	45.6
30	77.8	30	57.4	30	50.3	30	44.2
40	58.0	40	56.8	40	52.0	40	46.5
50	56.0	50	56.4	50	55.4	50	45.8
10-00	58.1	4-00	55.3	10-00	55.1	4-00	45.6
10-10	58.1	4-10	56.6	10-10	54.4	4-10	49.7
20	57.4	20	59.2	20	54.3	20	50.0
30	57.7	30	55.1	30	54.7	30	52.8
40	58.8	40	53.3	40	55.3	40	55.9
50	59.7	50	51.2	50	54.1	50	55.1
11-00	60.2	5-00	55.3	11-00	51.9	5-00	58.4
11-10	59.1	5-10	55.9	11-10	53.9	5-10	49.1
20	57.9	20	58.1	20	52.8	20	52.2
30	58.3	30	56.9	30	52.4	30	54.2
40	60.0	40	55.0	40	55.0	40	64.5
50	58.2	50	55.9	50	53.3	50	66.4
12-00	57.4	6-00	55.1	12-00	53.6	6-00	68.9
12-10	57.1	6-10	58.9	12-10	50.0	6-10	60.8
PM 20	59.7	PM 20	55.3	AM 20	53.5	AM 20	62.4
30	60.6	30	53.6	30	52.8	30	63.69
40	58.6	40	51.5	40	52.4	40	64.5
50	58.8	50	50.5	50	49.8	50	69.5
1-00	58.8	7-00	48.2	1-00	49.0	7-00	63.8

TABLE (12)

CAMPBELL ESTATE NOISE STUDY

LOCATION 8 DATE 10/31 - 11/1 1986

TIME	LEQ	TIME	LEQ	TIME	LEQ	TIME	LEQ
7-10	50.4	1-10	56.9	7-10	54.4	1-10	45.7
AM 20	43.9	PM 20	61.9	PM 20	55.0	AM 20	44.5
30	53.1	30	53.0	30	55.3	30	43.9
40	49.3	40	58.3	40	54.0	40	44.2
50	49.4	50	61.2	50	54.5	50	45.5
8-00	56.3	2-00	58.0	8-00	51.2	2-00	44.5
8-10	49.6	2-10	56.4	8-10	57.9	2-10	44.5
20	62.2	20	60.0	20	51.4	20	42.5
30	50.9	30	51.5	30	51.6	30	44.3
40	51.7	40	57.2	40	52.0	40	42.4
50	49.5	50	58.0	50	53.6	50	43.9
9-00	53.1	3-00	57.5	9-00	55.2	3-00	43.5
9-10	56.1	3-10	57.0	9-10	53.3	3-10	45.4
20	60.3	20	60.1	20	52.1	20	44.2
30	58.5	30	55.8	30	52.0	30	46.0
40	56.5	40	55.5	40	51.2	40	42.8
50	54.0	50	58.5	50	55.0	50	45.0
10-00	52.4	4-00	57.6	10-00	51.0	4-00	44.4
10-10	51.1	4-10	57.5	10-10	50.3	4-10	46.0
20	54.5	20	58.4	20	51.5	20	47.6
30	56.7	30	58.7	30	50.7	30	49.8
40	59.0	40	57.9	40	53.3	40	46.3
50	58.2	50	59.0	50	52.1	50	48.1
11-00	57.0	5-00	58.0	11-00	48.9	5-00	43.0
11-10	51.9	5-10	57.5	11-10	48.6	5-10	45.1
20	51.5	20	55.0	20	47.4	20	45.9
30	51.8	30	58.2	30	46.9	30	46.1
40	58.2	40	55.0	40	48.8	40	48.5
50	58.0	50	54.5	50	48.3	50	48.9
12-00	46.2	6-00	55.9	12-00	46.8	6-00	49.6
12-10	58.2	6-10	57.7	12-10	46.1	6-10	47.0
PM 20	57.0	PM 20	52.8	AM 20	46.6	AM 20	46.6
30	49.9	30	55.0	30	45.2	30	48.2
40	55.6	40	53.3	40	48.1	40	50.4
50	58.9	50	51.6	50	47.5	50	52.9
1-00	59.0	7-00	54.6	1-00	47.0	7-00	53.0

TABLE (13)

CAMPBELL ESTATE NOISE STUDY

LOCATION 9 DATE 11/07 - 11/08 1986

TIME	LEQ	TIME	LEQ	TIME	LEQ	TIME	LEQ
7-10	49.5	1-10	56.3	7-10	53.5	1-10	46.7
AM 20	47.8	PM 20	57.6	PM 20	50.4	AM 20	44.1
30	48.3	30	58.7	30	50.7	30	43.9
40	50.3	40	51.0	40	51.7	40	45.3
50	47.7	50	62.6	50	49.4	50	43.5
8-00	46.2	2-00	68.4	8-00	54.0	2-00	44.3
8-10	48.5	2-10	57.8	8-10	53.5	2-10	43.9
20	55.3	20	56.3	20	51.7	20	50.0
30	46.8	30	55.3	30	49.4	30	47.6
40	56.9	40	55.0	40	50.7	40	46.2
50	49.9	50	58.4	50	54.0	50	44.7
9-00	57.4	3-00	66.0	9-00	51.4	3-00	48.6
9-10	52.7	3-10	58.2	9-10	51.9	3-10	44.9
20	53.0	20	54.5	20	53.1	20	47.1
30	47.8	30	67.9	30	51.7	30	48.7
40	54.3	40	63.6	40	53.1	40	46.4
50	59.8	50	64.4	50	56.4	50	43.9
10-00	46.9	4-00	59.5	10-00	51.0	4-00	43.9
10-10	53.9	4-10	54.5	10-10	51.0	4-10	50.3
20	52.6	20	52.7	20	51.3	20	46.8
30	46.1	30	57.5	30	51.7	30	47.2
40	54.9	40	50.2	40	50.9	40	49.7
50	56.3	50	50.7	50	50.8	50	45.9
11-00	59.5	5-00	56.5	11-00	50.6	5-00	52.9
11-10	59.6	5-10	56.6	11-10	51.3	5-10	50.9
20	58.1	20	55.9	20	48.3	20	52.7
30	54.9	30	57.0	30	54.0	30	54.1
40	55.7	40	49.8	40	53.3	40	60.9
50	59.9	50	51.7	50	54.9	50	50.9
12-00	49.0	6-00	53.8	12-00	53.2	6-00	50.9
12-10	52.9	6-10	54.1	12-10	54.4	6-10	49.8
PM 20	66.2	PM 20	48.2	AM 20	48.2	AM 20	51.7
30	60.1	30	51.3	30	49.5	30	53.8
40	54.5	40	53.3	40	44.5	40	55.9
50	55.5	50	59.9	50	48.9	50	56.6
1-00	49.4	7-00	50.2	1-00	44.5	7-00	57.0

TABLE (14)

LDN NOISE LEVEL ALONG ROADWAYS

KALAELOA BOULEVARD

DISTANCE IN FEET	50	100	200	400
LDN NOISE LEVEL (dBA)	79.4	74.9	70.4	65.8

BARBERS POINT ROAD

DISTANCE IN FEET	50	100	150
LDN NOISE LEVEL (dBA)	72.0	67.5	64.8

H - 1 FREEWAY

DISTANCE IN FEET	50	100	200	400
LDN NOISE LEVEL (dBA)	78.1	74.2	69.6	65.1

FARRINGTON HIGHWAY
EAST OF BARBERS POINT ROAD

DISTANCE IN FEET	50	100	150
LDN NOISE LEVEL (dBA)	72.8	68.4	65.8

FARRINGTION HIGHWAY
WEST OF BARBERS POINT ROAD

DISTANCE IN FEET	50	100	150
LDN NOISE LEVEL (dBA)	74.0	69.6	67.0

TABLE (15)

HOURLY EQUIVALENT NOISE LEVEL UNDER FLIGHT PATH

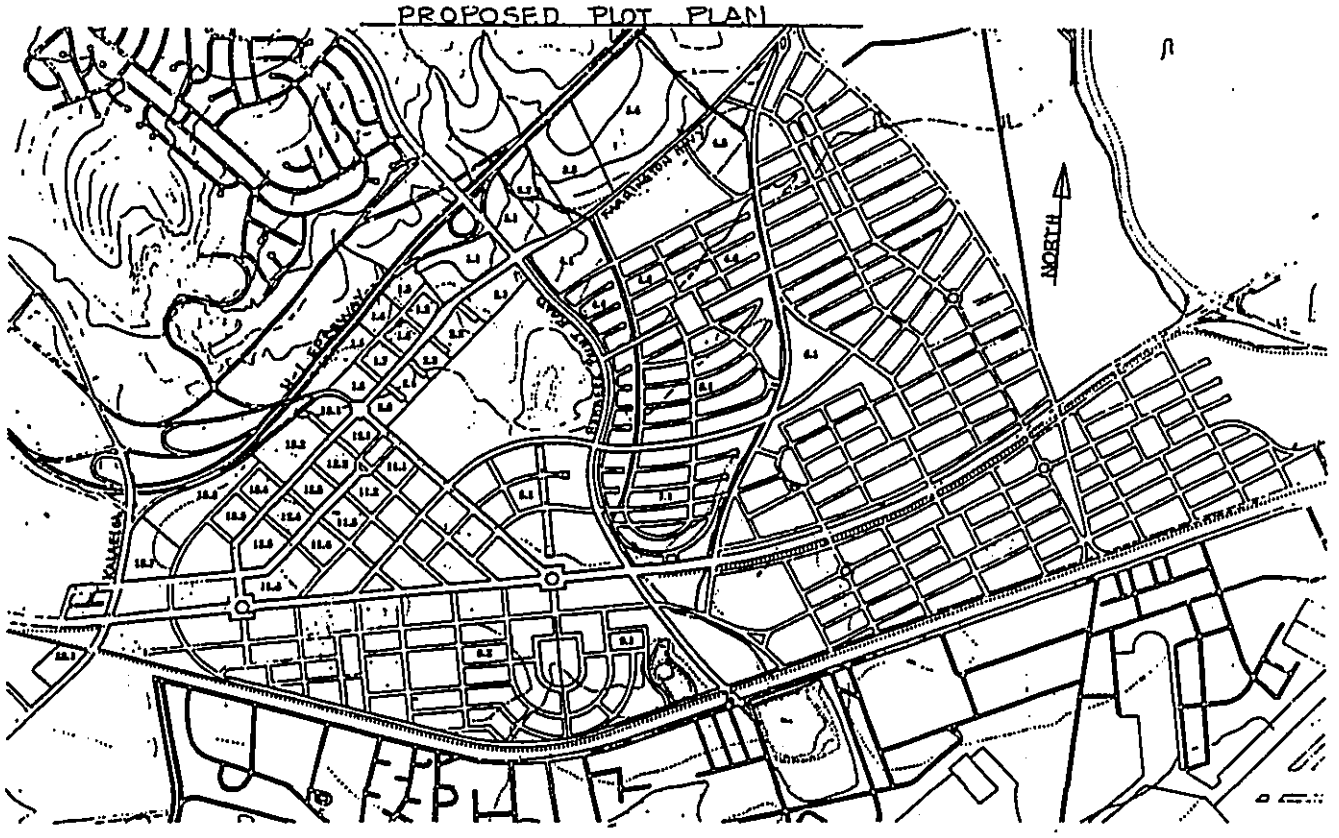
MILITARY AIRCRAFT P-3.
FLY-BY EQUIVALENT NOISE LEVEL - 64.28 dBA

FLIGHTS/HOUR	0	1	2	3	4	5	6	7
HOURLY LEQ	46	48.7	50.4	51.6	52.6	53.3	54.0	54.5
NOISE INCREMENT	0	2.7	1.7	1.2	1.0	0.7	0.7	0.5
TOTAL INCREASE	0	2.7	4.4	5.6	6.6	7.3	8.0	8.5
HOURLY LEQ	50	51.4	52.4	53.2	53.9	54.5	55.0	55.5
NOISE INCREMENT	0	1.4	1.0	0.8	0.7	0.6	0.5	0.5
TOTAL INCREASE	0	1.4	2.4	3.2	3.9	4.5	5.0	5.5
HOURLY LEQ	55	55.4	55.8	56.2	56.5	56.8	57.1	57.4
NOISE INCREMENT	0	0.4	0.4	0.4	0.3	0.3	0.3	0.3
TOTAL INCREASE	0	0.4	0.8	1.2	1.5	1.8	2.1	2.4
HOURLY LEQ	60	60.1	60.2	60.3	60.4	60.5	60.6	60.7
NOISE INCREMENT	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TOTAL INCREASE	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7

MILITARY AIRCRAFT C-130
FLY-BY EQUIVALENT NOISE LEVEL = 66.0 dBA

FLIGHTS/HOUR	0	1	2	3	4	5	6	7
HOURLY LEQ	46	50.3	52.4	53.8	54.9	55.7	56.4	57.0
NOISE INCREMENT	0	4.3	2.1	1.4	1.1	0.8	0.7	0.6
TOTAL INCREASE	0	4.3	6.4	7.8	8.9	9.7	10.4	11.0
HOURLY LEQ	50	52.2	53.6	54.7	55.6	56.3	56.9	57.5
NOISE INCREMENT	0	2.2	1.4	1.1	0.9	0.7	0.6	0.6
TOTAL INCREASE	0	2.2	3.6	4.7	5.6	6.3	6.9	7.5
HOURLY LEQ	55	55.8	56.4	57.0	57.5	58.2	58.4	58.8
NOISE INCREMENT	0	0.8	0.6	0.6	0.5	0.7	0.2	0.4
TOTAL INCREASE	0	0.8	1.4	2.0	2.5	3.2	3.4	3.8
HOURLY LEQ	60	60.2	60.4	60.6	60.8	61.0	61.1	61.3
NOISE INCREMENT	0	0.2	0.2	0.2	0.2	0.2	0.1	0.2
TOTAL INCREASE	0	0.2	0.4	0.6	0.8	1.0	1.1	1.3

PROPOSED PLOT PLAN



EWA TOWN CENTER
ESTATE OF JAMES CAMPBELL

FIGURE (1)

TRACT PLAN 2005
JULY, 1986

FIGURE (2).
HOURLY EQUIVALENT NOISE LEVEL AT STATION (7)

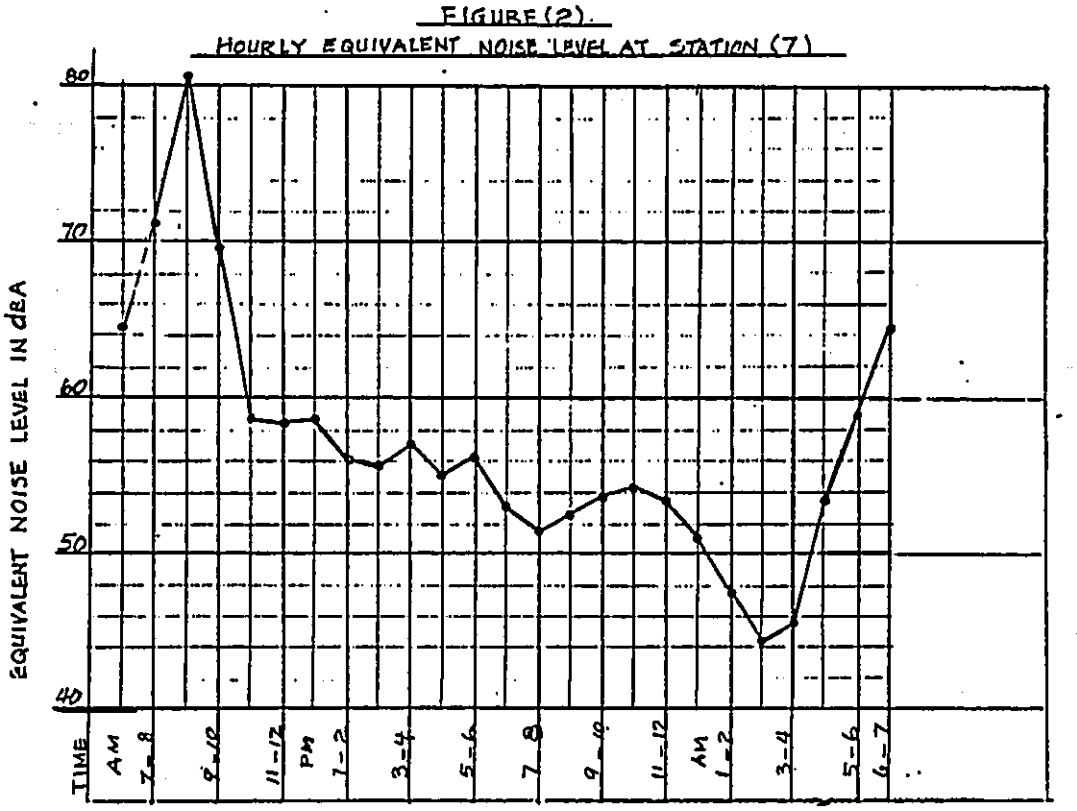


FIGURE (3)

HOURLY EQUIVALENT NOISE LEVEL AT STATION 8.

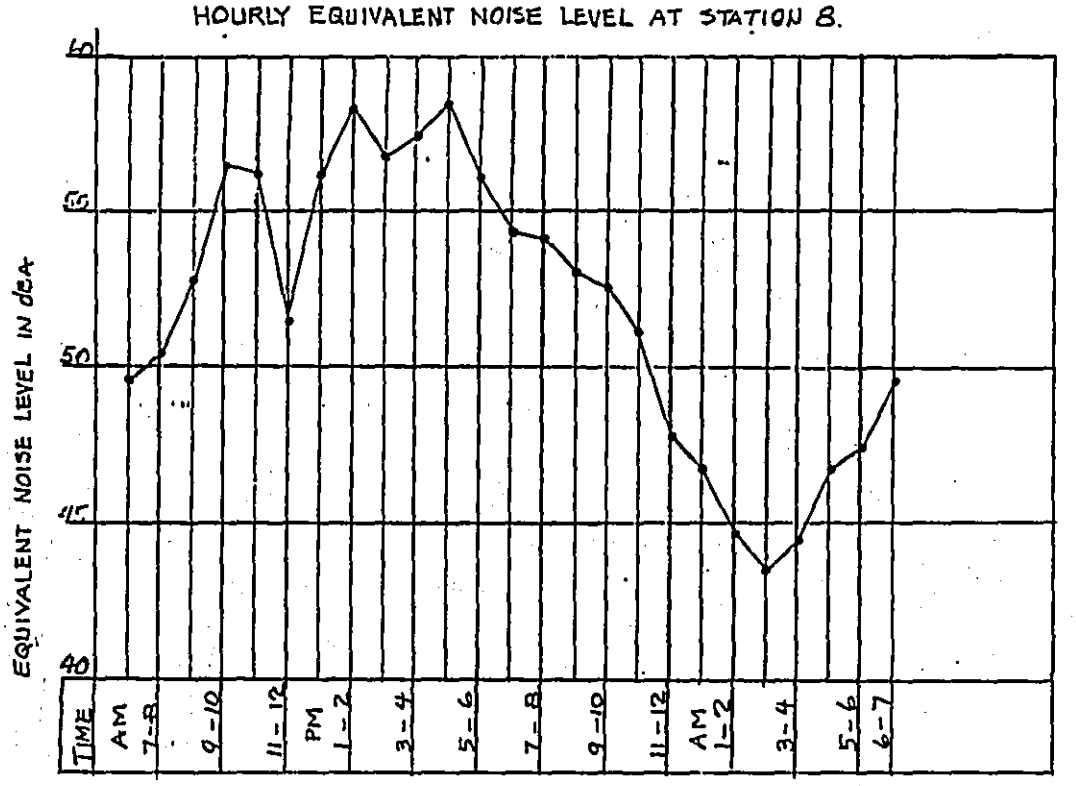


FIGURE (4)

TYPICAL OVERHEAD FLY-BY NOISE LEVEL

MILITARY AIRCRAFT C-130

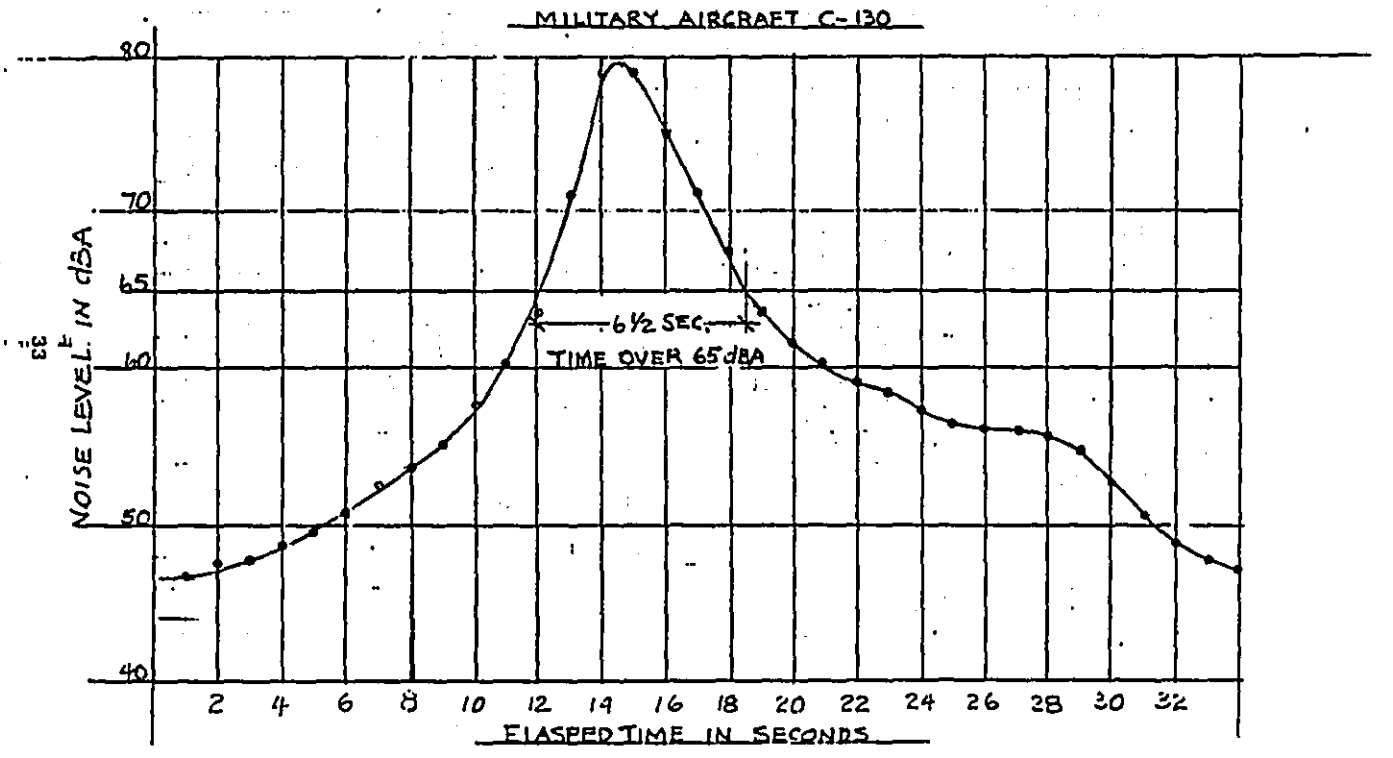


FIGURE (5)
TYPICAL OVERHEAD FLY-BY NOISE LEVEL

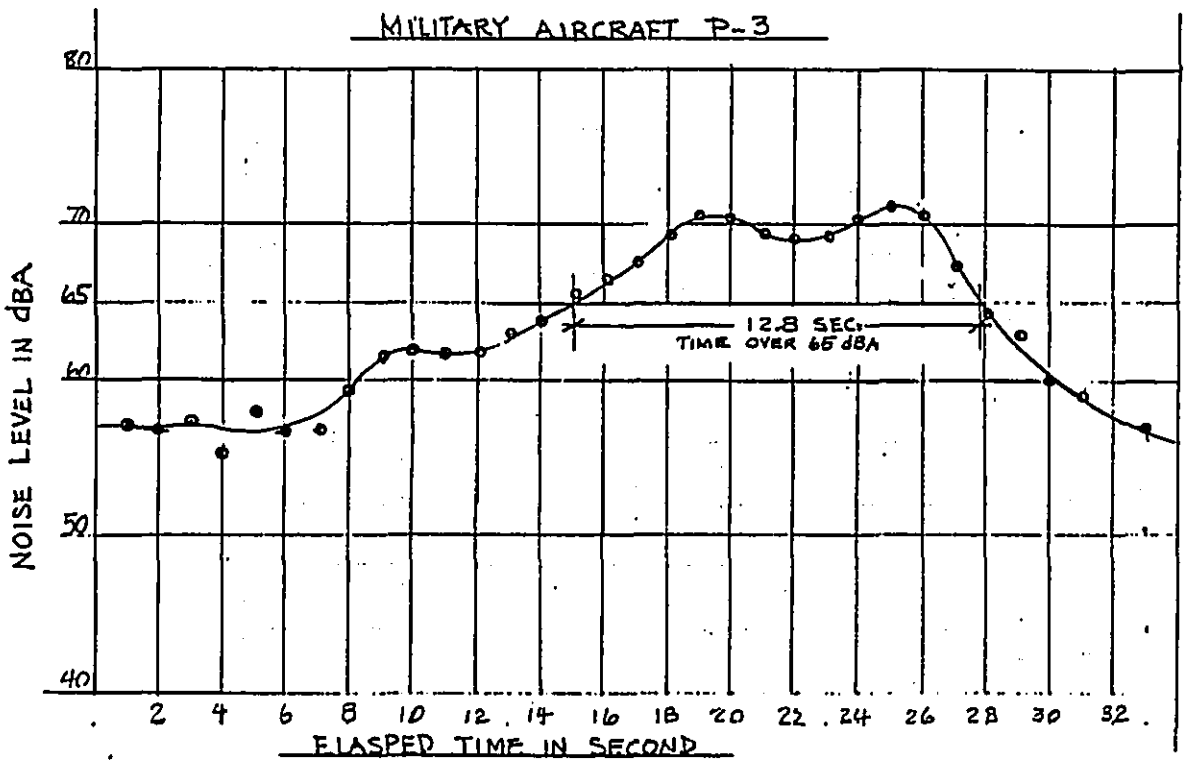


FIGURE (6)
TYPICAL OVERHEAD FLY-BY NOISE LEVEL

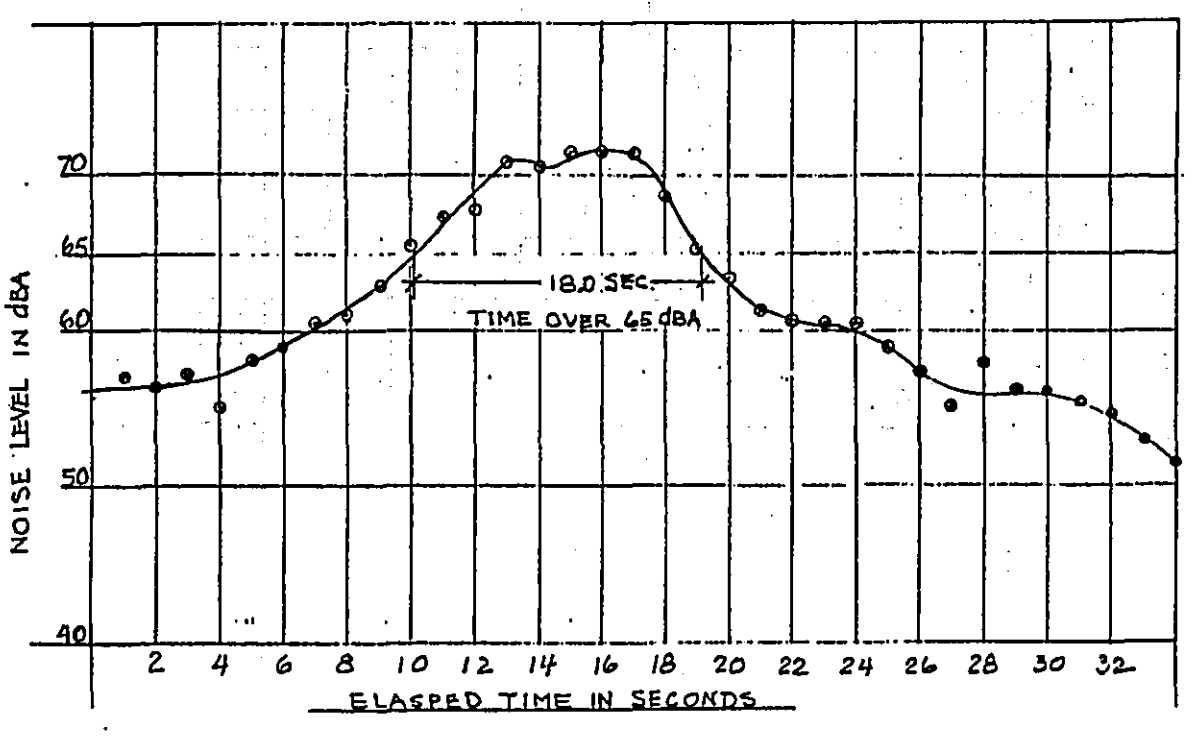


FIGURE (8)
KALAELOA BLVD - HOURLY TRAFFIC COUNT

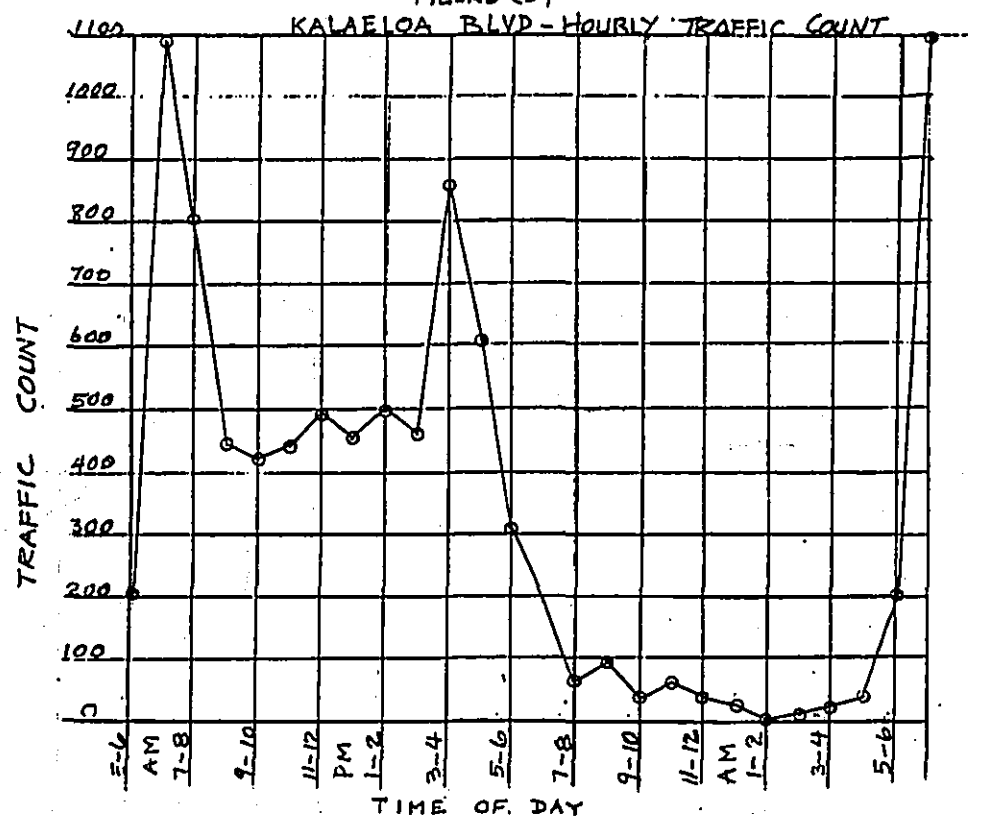


FIGURE (9)
BARBERS POINT ROAD HOURLY TRAFFIC COUNT

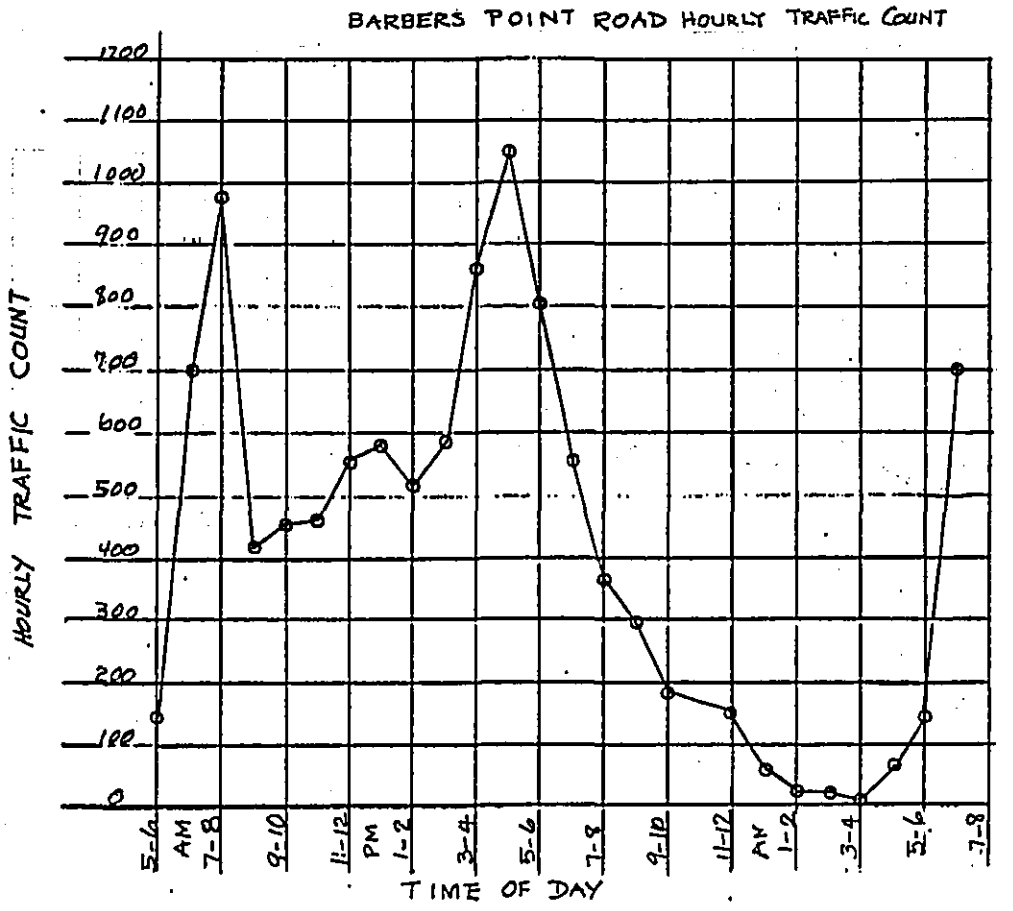


FIGURE 10
FARRINGTON HIGHWAY HOURLY TRAFFIC COUNT
LOCATION (A)

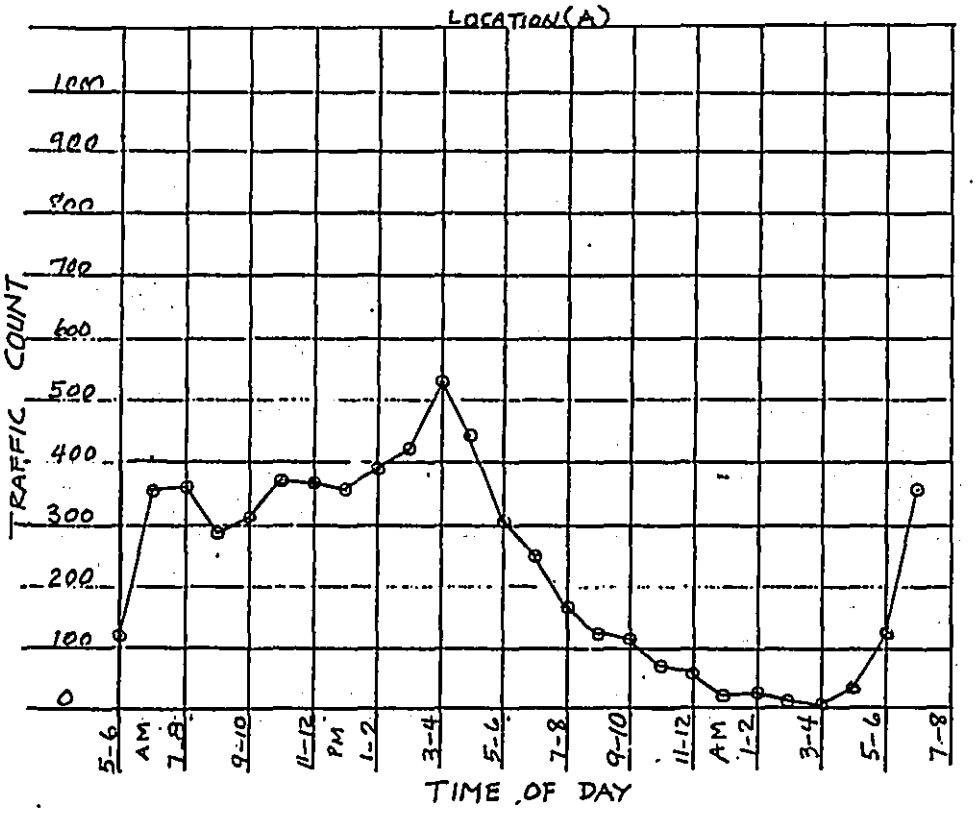


FIGURE (11)
FARRINGTON HIGHWAY HOURLY TRAFFIC COUNT
LOCATION (B)

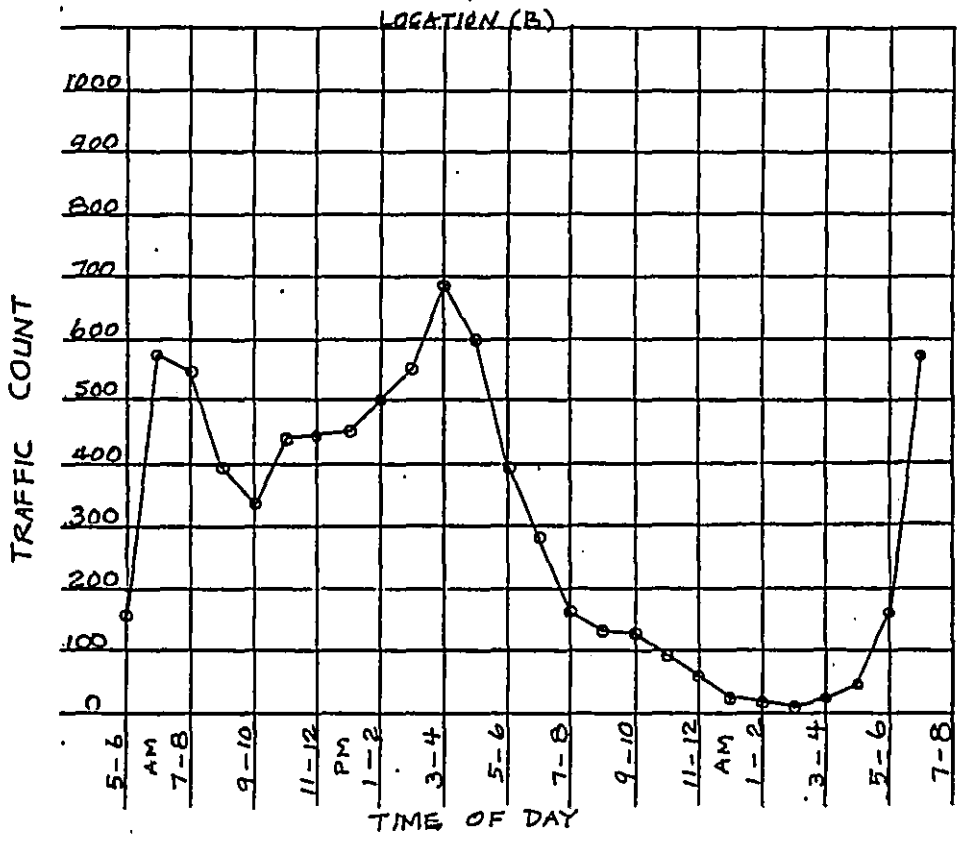
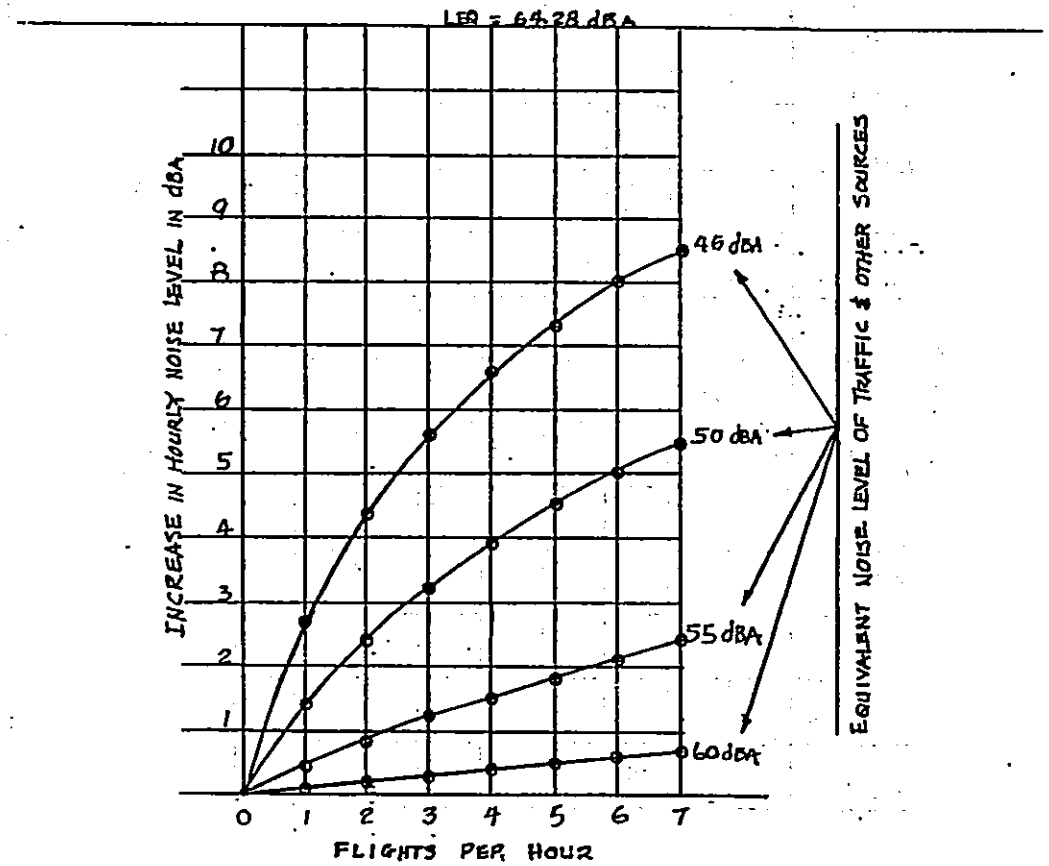
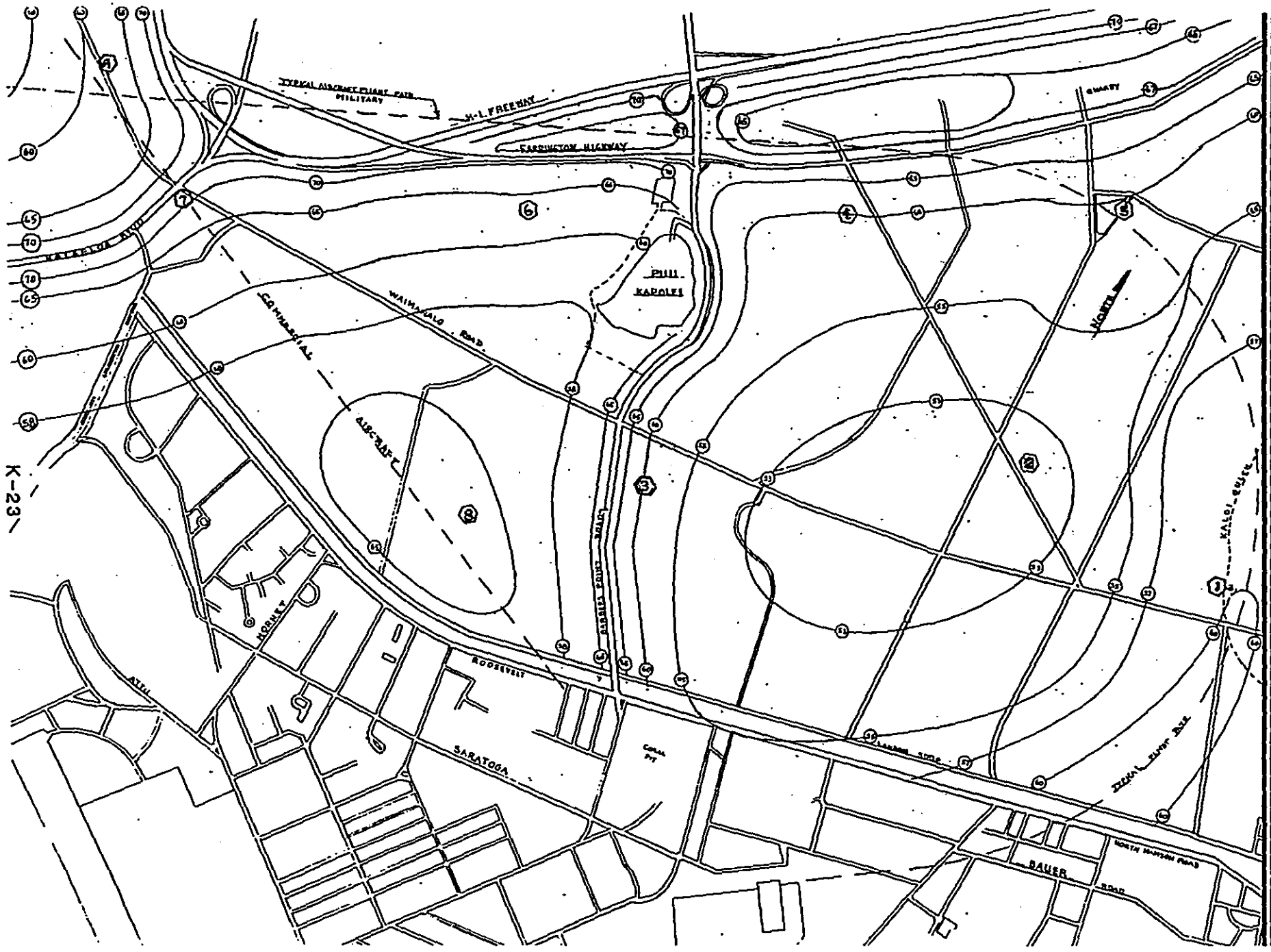


FIGURE 12

INCREASE IN HOURLY EQUIVALENT NOISE LEVEL
WITH NUMBER OF FLIGHTS/HR.
MILITARY AIRCRAFT – P-3
LEQ = 64.28 dBA





D/E INC.
Design/Engineering, Inc
ARCHITECTURAL • ACOUSTICAL
NOISE CONTROL • VALUE ENGINEERING

FIGURE (7)

THE ESTATE OF
JAMES. CAMPBELL

Ldn NOISE CONTOUR LINES AT THE PROPOSED HOUSING SITE. EWA. OAHU
MARCH 1987

LEGEND

(60) Ldn NOISE LEVEL IN dBA.

(1) MEASUREMENT STATIONS.

DRAWN BY: TUYOTO MIYAKE

SCALE: 1" = 1000'

APPENDIX I

Letter from U.S. Navy Regarding Status of 1984 AICUZ Noise Footprint. (September 24, 1988)

C 7 H. McCray
W. Hooper
L. Acosta
P. Wrestlhoff
J. Pavinell

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

IN REPLY REFER TO:
11010
Ser N5B/2250

24 SEP 1987

The Estate of James Campbell
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The Estate of James Campbell

NAVAL AIR STATION BARBERS POINT
AIR INSTALLATIONS COMPATIBLE USE ZONES
(AICUZ) STUDY

In November 1984, the Department of the Navy completed and approved an AICUZ study for NAS Barbers Point. The study was distributed to local government agencies of the City and County of Honolulu and the State of Hawaii and the general public for consideration in land use planning. Please be advised that the Navy has decided to update this AICUZ study.

This effort is being undertaken to reflect operational changes which have occurred and are programmed to occur at NAS Barbers Point since publication of the AICUZ study in November, 1984. In particular, various tenant squadrons and other users of NAS Barbers Point have transitioned to new aircraft, the civilian flying club has been disestablished, and new radar procedures are under evaluation. During the update effort, the Navy will provide periodic information about any changes in the AICUZ to local government agencies as well as to the public, and afford appropriate opportunities for comment including public meetings as necessary.

We have now determined that based on the above-mentioned operational changes, the present configuration of the 65 Ldn noise exposure contour to the north of the NAS Barbers Point is no longer supported. Accordingly, the noise footprint of the 1984 AICUZ study should not be used to evaluate noise exposure impacts from aircraft operations on existing or proposed developments north of the station boundary. However, other aspects of the AICUZ study, including accident potential zones and flight tracts which define areas subject to overflight of military aircraft with the attendant noise and safety concerns, are not expected to change and remain valid for general planning purposes.

We will endeavor to update the AICUZ in a timely manner in order to provide you with accurate planning information. If you have any questions concerning the 1984 AICUZ or the update, please contact Mr. Bill Liu at 471-3703.

Sincerely,

R. M. GALLEN
Captain, CEC, U.S. Navy
Base Civil Engineer
By direction of
the Commander

Subj: NAVAL AIR STATION BARBERS POINT, AIR INSTALLATION COMPATIBLE USE ZONES (AICUZ) STUDY

Same letter sent to the following:

City and County of Honolulu
- Department of General Planning
- Department of Land Utilization
- Department of Public Works
- Department of Health
- Department of Housing & Community Development
- Department of Parks & Recreation
- Building Department
- Board of Water Supply
- Planning Commission, Chairperson

Federal
- Veterans Administration
- Federal Aviation Administration
- Department of Housing & Urban Development
- Environmental Protection Agency
- Federal Executive Board
- Hickam AFB
- MCAS Kaneohe Bay

State
- Department of Business & Economic Development
- Department of Land & Natural Resources
- Department of Agriculture
- Department of Health
- Department of Social Services & Housing
- Department of Transportation
  - Airports Division
  - Harbors Division
- Oahu Metropolitan Planning Organization
- Hawaii Air National Guard
- Public Libraries
  - University of Hawaii, Manoa & Leeward
  - Ewa Beach
  - Hawaii State Library
  - Waipahu
- State Land Use Commission

Legislative
- House Transportation Committee
- Senate Transportation Committee

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33